Journalism and Mass Communication, ISSN 2160-6579
October 2012, Vol. 2, No. 10, 975-988

Tangents on TV: The Tangential Relationship of Narrative and Educational Content in Children's Television Through the Capacity Model

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Previous studies have shown that children learn from educational television; however, these studies have not explored how closely the educational content of the program is integrated to the narrative. The following study uses a systematic content analysis of 100 top-rated U.S. children's television programs to explore the tangential relationship (i.e., distance) of narrative and educational content through the lens of the capacity model—which is built upon three basic components: narrative content, educational content, and the distance between them. Programs were analyzed for distance by examining lesson clarity and integration, show type, target audience age, and station type. One-way ANOVAs indicates significant differences between the means of these variables. Programs targeting younger children presented educational content that was closely integrated into the plotline of the program and helped further the story. However, as the target audience aged, the educational content became more tangential to the narrative content and was less tied to the plotline of the program.

Keywords: capacity model, educational television, children, E/I programming, distance

Introduction

For more than 50 years, researchers (and producers) have attempted to understand television and its relationship with children. This research has examined nearly every topic, from media effects and violence to advertising and marketing, and has ranged from simple effects studies to longitudinal studies that examine changes in attitudes, knowledge, and behaviors (Pecora, 2007). One model used to explore children's relationship with television is the *capacity model* (Fisch, 2000, 2004), which explores how children comprehend educational content on television. Comprised of three basic elements—the processing of narrative, the processing of educational content, and the distance between the two—the capacity model posits that comprehension of educational material depends on the processing of both the educational content and the narrative content (Fisch, 2004). This study investigates how the educational content is closely integrated with the narrative on children's television through the perspective of the capacity model.

Children's Television Workshop (CTW) and Educational Television

For many years, producers of television programs held little regard for the cognitive and developmental needs of children, thus children's television was a wasteland that lacked meaningful and educational

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content—only cartoons, slapstick humor, and situational comedies were available. Prior to *Sesame Street*, many of the programs available to children were locally produced, had low production quality, and were condescending to children (Palmer &Fisch, 2001). In 1968, Children's Television Workshop (CTW) was established to help change this. Backed by an eight million dollar grant, CTW was able to create 130 curriculum-based episodes that were backed by empirical research and addressed pre-assigned educational goals. *Sesame Street* used a unique combination of integrating high production quality, entertaining content, and research into each program. The success of this model inspired producers, educational content specialists, and researchers to create integrated programs that were not only educationally sound, but appealing as well (Mielke, 1990).

Curriculum-Based Programs

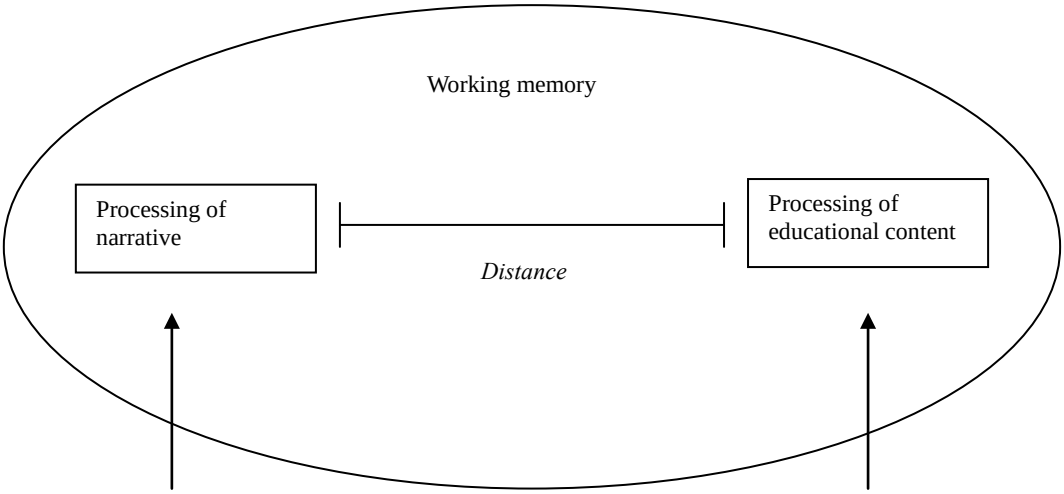
In 1996, a little blue dog began to change the world of educational television by teaching children critical thinking skills, repeating episodes, and creating quasi-interactive, kid-friendly characters (Crawley, Anderson, Wilder, Williams, & Santomero, 1999). *Blue's Clues*, which was televised on Nickelodeon from 1996 to 2006, was designed to teach preschoolers problem-solving and flexible thinking skills (Anderson et al., 2000). Unlike other children's programs at the time, producers of *Blue's Clues* were not only focused on the bottom line, but also on creating a curriculum that systematically provided tools to develop the social, cognitive, and affective needs of children. Other programs have sought to emulate this formula and developed a *school readiness* emphasis, which prepares children for school by developing academic and interpersonal skills, as well as self-confidence and cooperation (Fisch, 2004). This contributes to school readiness by providing basic academic curricula—such as reading, vocabulary, math, social, and science skills—in an entertaining fashion. This type of educational television has been found to foster imagination and creative play; encourage emotional development; introduce new vocabulary and math skills; encourage flexible thinking and problem solving; as well as develop self-confidence, cooperation, and engagement (Fisch, 2004; Mielke, 2000).

In addition to encouraging school readiness, curriculum-based programs promote pro-social behavior, which attempts to reduce aggression and stereotyping, while promoting friendly interaction and altruism (Mares & Woodward, 2001). Three children's programs in particular—*Sesame Street*, *Mister Rogers' Neighborhood*, and *Barney and Friends*—have distinguished themselves as having notable pro-social content, being extremely popular with children, and having a positive lasting effect on children. According to Mares and Woodard, children who watch such programs persist "longer on tasks, [be] more likely to obey rules, and [be] more likely to delay gratification without protest" (2001, p. 193). In addition, programs such as *Blue's Clues* (Anderson et al., 2000), *Between the Lion*s (Linebarger, Kosanic, Greenwood, & Doku, 2004), *Reading Rainbow* (Wood & Duke, 1997), and *Dora the Explorer* (Linebarger & Walker, 2005), have been shown develop cooperation, self-restraint, problem-solving skills, as well as aide vocabulary building, math, and reading skills (Fisch, Truglio, & Cole, 1999).

Capacity Model

One mechanism used to illustrate how children learn from television is the capacity model (Fisch, 2000, 2004), which explores how children comprehend educational content in television programming. The model is composed of "three basic elements: processing of narrative, processing of educational content, and the distance between the two—That is, the degree to which the educational content is integral or tangential to the

narrative…" (Fisch, 2004, p. 144). Several governing principles, such as prior knowledge of content and interest in the story, are employed by children when processing television, which assist in the simultaneous understanding of educational content and narrative content (see Figure 1).



Affected by:

Viewer Characteristics

Prior knowledge: story/characters, story schemata

Knowledge/schemata: formal features

Interest in subject matters

Verbal reasoning ability

Short-term memory

Program Characteristics

Complexity/coherence of story

Need for inferences

Fit to existing story schemata

Temporal organization

Advance organization

Affected by:

Viewer Characteristics

Prior knowledge of content

Interest in content

Program Characteristics

Clarity of presentation

Explicitness of content

Visually concrete content

Advance organizers

Figure 1. Capacity model.

Introduced by Fisch (2000), the capacity model has roots in cognitive psychology and the limited capacity of *working memory*, which refers to the mental resources required for viewers' comprehension of content (Fisch, 2009). According to scholars (Lang, Geiger, Strickwerda, & Sumner, 1993), working memory has a limited amount of resources available for processing, plays a key role in higher-order cognition, and is often associated with cognitive tasks—such as textual comprehension, logical reasoning, and problem-solving (Lorch & Castle, 1997). Therefore, if the demands of a given task, also known as the *cognitive load*, exceed the available resources in working memory, the material cannot be processed effectively (Fisch, 2004). According to capacity model, a child's comprehension depends on the cognitive demands of simultaneously processing both *narrative* and *educational content*. Narrative content refers to the story that is presented to the viewer during the program; whereas, educational content is the curricular lesson intended for the viewer to learn. When

processing both, the limited capacity of a child's working memory can pose a challenge to retaining and comprehending educational content that is presents simultaneously with narrative content (Fisch, 2009).

Distance

A unique feature of the capacity model is distance, or the degree to which educational content is integral or tangential to the overall narrative in a program (Fisch, 2002). This concept, which was dubbed "content on the plotline" by the Sesame Workshop, adopts language from previous studies that have examined story structure in text comprehension (Trabasso, Secco, & van den Broek, 1984). Distance can be thought of in terms of how educational content connects to the structure of the story (Fisch, 2004). Fisch (2000) defined two types of distance: small—when educational content is connected to a large number of subsequent events, and large—when educational content is embedded in the plot in a manner that does not forward the story.

To understand the concept of distance, imagine an episode of *Word Girl*—a program that features a young girl/secret superhero, saving the world from super villains each week. The episode would have a large distance if in the middle of chasing an evil villain. *Word Girl* stops to give a grammar lesson on the proper use of "*i* before *e* except after *c*", a topic that is not relevant to the plot and, therefore, tangential to the narrative. However, if *World Girl* gives a mathematical explanation using rate, time, and distance of how long it will take to catch the super villain while chasing him, then the content could be considered integral to the narrative and the distance would be small (Fisch, 2009). This smaller distanceminimizes the mental resources needed to comprehend the educational content, resulting in greater comprehension.

If the distance between educational and narrative content is large—indicating that the curricular lesson is tangential to the story—then the two types of content must compete for working memory. If this is the case, working memory will be devoted to processing narrative content and children will be less likely to process educational content as deeply (Fisch, 2000). This may cause children to have difficulty in recalling and comprehending the educational content in the program. However, the distance construct predicts that comprehension of educational content is stronger when the distance of that educational material is small (i.e., well-integrated into the narrative). In this case, educational content will be integrated with the narrative and the two will work in correlation (Fisch, 2004). Thus, the complementing content may reduce the amount of mental resources needed to process and understand the material (Fisch, 2002), and comprehension of the educational content is likely to be strengthened. One study examining this prediction showed that children who viewed the television program, *Cro*—a program that intertwines science, math and technology closely into the plot of its episodes—had a greater understanding of STEM concepts (Goodman, Rylander, & Ross, 1993). However, this comprehension only occurred when educational content was closely integrated to narrative content.

Processing of Narrative and Educational Content

How resources are allocated to working memory for the processing of narrative and educational content is influenced by three factors. First, narrative content is a default priority in working memory and will process it first. Second, when there are high demands for processing narrative (i.e., numerous advance organizers, transitions, and formal features), there are fewer resources available for educational content and the two processes must compete for resources. However, if there are low demands for processing narrative content (i.e., few transitions, a slow pace, and few advanced organizers), then there are more resources available to educational content. Finally, resources can be allocated to educational content voluntarily, but the processing of

narrative content can never be completely overridden.

One critical part in the comprehension of educational television is how much working memory is devoted to processing the narrative and educational content (Fisch, 2004). According to Fisch (2000), comprehension of educational content can be stronger when: (1) the total amount of working memory resources devoted to understanding the material is increased; (2) demands for processing narrative content are small, so more resources are available for processing educational content; (3) the distance between narrative and educational content is small (i.e., the educational content is integral to the narrative content, making the processes complement, rather than compete with, each other); (4) the viewer has a greater motivation to learn and voluntarily allocates more resources to working memory resources for the processing of educational content (Fisch, 2004); and (5) demands for processing educational content is small. However, if the demands for processing the educational and narrative content exceed the capacity of working memory, then comprehension is impaired and the acquisition (encoding, storage, and retrieval) of the information decreases (Lang, 2000). Since most educational television programs include both narrative and educational content, viewers must process both simultaneously to comprehend it fully.

Hypotheses

Fisch (2004) has posited that when educational content is integrated throughout and distance is small, children will have an easier time processing and remembering the curricular lesson. If the distance is large, then the two processes will compete for resources in working memory, and a child would have greater difficulty retaining the educational material (Fisch, 2009). However, little research has been conducted to determine the distance of educational and narrative content on children's programming. Thus, the following hypotheses were created:

RQ1: What is the distance between narrative and educational content on children's television?

Research has shown that as children becoming mature, salient formal features have less impact as children begin to understand context in a show (Bickham, Wright, & Huston, 2001). Therefore, it shows that are targeting younger children may have a more complex narrative. However, it is unknown how distance varies per target audiences.

RQ2: Does target audience's age influence the portrayal of distance on children's television?

H1: There will be a significant difference in means of the distance of the programs among the different target audiences.

In children's television, two main formats of shows exist—magazine and story (Wright et al., 1984). A "magazine" show is one in which information is presented to the audience in separate pieces that could be considered self-contained; whereas a "story" presents information in a larger, more meaningful plotline (Bryant, Zillmann, & Brown, 1983; Fisch, Brown, & Cohen, 2001). If there is a more meaningful plotline, then there may be a smaller distance between the narrative and educational content.

RQ3: Does the show format influence the portrayal of distance on children's television?

H2: There will be a significant difference in means of the distance of the programs between the different types of shows.

Finally, the type of station may also impact how distance is portrayed on children's television. Stations that are network broadcasting, such as Nickelodeon, Disney, or Cartoon Network, may air more entertainment oriented that public broadcasting (PBS), and thus may be less concerned with producing programs that closely integrate educational and narrative content. Thus, the following hypotheses were made:

RQ4: How does the station type affect the portrayal of distance on children's television?

H3: There will be a significant difference in means of the distance of a program airing on different channels.

H4: There will be a significant difference in means of the distance of the programs between the different types of stations.

Methodology

The purpose of this study is to examine how closely integrated educational content is to narrative content as presented in children's educational programs (Wilson, Kunkel, & Drogos, 2008). The following section explains the metrics used in the study, as well as the data collection process.

Unit of Analysis

The sample for this study was determined by examining the top 100 children's shows in 2008 for children aged 6-11, 9-14, and 6-14 based off cumulative reports from national Nielsen and PBS data (Nielsen Media Research, 2008a, 2008b, 2008c; Public Broadcasting Service, 2008). Since not all popular children's programs are educational, the authors chose to examine the top-rated programs for children, adolescents, and teens—some E/I, some not. The programs were either recorded during the first week of December 2008 or purchased from iTunes. The programs purchased from iTunes were the second episode from the 2008 season.

Procedure

Every episode was watched in its entirety, and coders were able to watch any episode as many times as necessary before any judgment on distance of educational content was made. For distance, the coders watched the entire program and determined how tightly the educational content and narrative content were interwoven. The coders used a modified educational quality index (EQI) to determine how the episode balances the curricular lessons with narrative content of the program (Wilson et al., 2008).

The distance score was determined by watching the program in its entirety, and assessing strategies that programs used to convey the primary lesson in each program. Opening credits were included in the coding schema, but commercials were not. These programs were viewed as many times as necessary until the coders were positive all the variables were accounted for and coded correctly, and to clarify any question.

Training and Reliability

Three coders were trained through a series of sessions used to ensure that the coders had a comprehensive understanding of the parameters of the study. At the end of the coding period, a subset of 20% of the segments was used to test for reliability, and inter-coder agreement emerged as 90.84%. Coders examined the programs by using a modified EQI (Wilson et al., 2008), for which a subsequent inter-coder reliability check yielded the following kappas for the data: lesson clarity 0.875 and lesson integration 0.833.

Variable Definitions

For this study, we had five predictor variables, and one dependent variable. The following is a brief discussion of them.

Distance. A unique feature of the capacity model is distance, or the degree to which educational content is integral or tangential to the plotline in a program (Fisch, 2002). Content in the plotline typically occurs in television programs that are well written, and place curricular content central to the show's plot.

In 2008, Wilson, Kunkel, and Drogos introduced the EQI designed to evaluate the educational quality of popular children's programming. Six criteria were used in the assessment of educational level: lesson clarity (how directly the lesson is presented to the viewer), lesson integration (how well the lesson is incorporated into

the plot of the show), lesson involvement (how engaging the primary lesson is for the viewer), lesson applicability (how realistic the primary lesson is), lesson importance (how worthy or crucial a lesson is), and lesson reinforcement (how much positive reinforcement is used with the lesson) (Wilson et al., 2008). However, only two of the elements would apply to this study; therefore, coders used a modified EQI to determine how well the episode embeds educational content into the narrative content.

Lesson clarity. According to Wilson et al. (2008), this is defined as "how directly and explicitly the primary lesson is presented" (p. 8). Lessons that are high in clarity are straightforward, easy to decipher, and transparent. Lessons that are low in clarity are not articulated clearly, and have distractions or competing sub-plots within an episode (Wilson et al., 2008).

Lesson integration. Wilson et al. (2008) defined lesson integration as "the extent to which the primary lesson is repeated or incorporated throughout the program" (p. 8). Lessons that are highly integrated will be emphasized multiple times throughout the episode. Lessons that are low in integration are isolated from the plotline and other aspects of the program and may "appear to be tangential to the main plot or storyline" (Wilson et al., 2008, p. 9). Each variable will be coded on a 3-point scale (0 = low, 1 = medium, 2 = high), and then be categorized as either "small" or "large" depending on the mean of the scores. Fisch (2000) has defined these two types of distance: small, when educational content is causally connected to a large number of subsequent events, and large, when educational content is embedded in the plot and does not forward the story. If the score of the variables is three or larger, then the educational content will be highly integrated with the narrative content, and categorized as "small". If the score is less than three, then the educational content is highly tangential to the narrative content, and will thus be categorized as a "large" distance.

Target age. One of the independent variables used in the analysis of our data was the age of the target audience. Research has shown that children's cognitive abilities progress over time, and younger children are less capable of understanding material that is cognitively complex (Richards & Anderson, 2004). Therefore, the programs were classified as targeting one of three categories: preschool (up to 5 years of age), elementary school (ages of 6-11), or preteen/teen (ages of 12-16) (Wilson et al., 2008). To determine the appropriate category, the coders examined FCC Form 398 that were filed in 2007 and 2008—which required television stations to state the target audience of the children's programs that were aired (Federal Communications Commission, 1996). If the Form 398 had an overlap in target age categories or a show was not found through the FCC Form 398, the researchers then examined the programs' websites for clarification.

Format of show. Another variable used in the analysis of this data is the format of show. In children's television, two main formats exist—magazine and story (Wright et al., 1984). A magazine format presents information to the audience in separate pieces that could be considered self-contained. This format presents information and plotlines in a non-cumulative frenetic manner, which tends to jump from segment to segment (Bryant et al., 1983; Wright et al., 1984). However, story types of programs present information in a cumulative format. A larger, more meaningful plotline develops in the story and often climaxes after the final commercial break. Each type effects the continuity of the program, and in turn, the distance of the educational content to the narrative content (Bryant et al., 1983).

Station and type. The final variable that examined was the type of station the program was being aired on—public television versus network television. Although public television has been historically known for a pro-social educational focus, network channels have created a number of educational programs in recent years. Thus, the type and the station, has been recorded.

Results

Descriptive statistics of the variables indicated that of the 100 children's television programs coded, 50% were categorized as having a small distance—where the educational content was highly integrated with the narrative content, and 50% were categorized as having a large distance—where the educational content was tangential to the narrative content. For the show format variable, 77% proved to be cumulative and 23% had a magazine format. When examining the target age of the programs coded, 35% were targeted to preschoolers, 45% were targets for elementary school children, and 20% were aimed at reaching preteens or teens. For the station type variable, 76% of the programs were network programming, and 24% were on public broadcasting. Twenty-three percent of the programs were on PBS, 25% were on Nickelodeon, 22% were on Disney, 17% were on the Cartoon Network, and 13% were on other channels. Table 1 shows the breakdown of these variables per individual show, thus answering RQ1.

Table 1

Dependent and Independent Variables in Analysis

Show	Format	Channel	Type	Target age	Clarity	Integration	Distance	
	1=Cumulative; 2=Magazine	1=PBS; 2=Nick; 3=Disney; 4=Cartoon Network; 5=Other	1=Network; 2=Public	1=Preschool; 2=Elementary; 3=(Pre)Teen	0=low; 1=med; 2=high	0=low; 1=med; 2=high	Score	Category
3-2-1 Penguins	1	5	2	2	2	2	4	Small
American Dragon: Jake Long	1	3	1	2	1	0	1	Large
Animalia	1	1	2	2	1	0	1	Large
Arthur	2	1	2	2	1	2	3	Small
Avatar: The Last Airbender	1	2	1	2	0	0	0	Large
Back at the Barnyard	1	2	1	2	0	0	0	Large
Bakugan	1	4	1	2	0	0	0	Large
Barney	1	1	2	1	2	2	4	Small
Batman: The Brave and The Bold	1	4	1	2	0	0	0	Large
Ben 10	1	4	1	2	0	0	0	Large
Ben 10: Alien Force	1	4	1	2	1	0	1	Large
Between the Lions	2	1	2	1	2	2	4	Small
Blue Dragon	1	4	1	2	1	0	1	Large
Blue's Clue's	2	2	1	1	1	2	3	Small
Bob the Builder	2	1	2	1	2	2	4	Small
BunnyTown	2	3	1	1	1	1	2	Large
Caillou	2	1	2	1	2	2	4	Small
Cake	1	5	1	2	1	1	2	Large
Camp Lazlo	1	4	1	2	0	0	0	Large
Chowder	1	4	1	2	0	0	0	Large
Class of 3000	1	4	1	2	1	0	1	Large
Clifford the Big Red Dog	1	1	2	1	1	2	3	Small
Codename: Kids Next Door	1	4	1	2	2	2	4	Small
Cory in the House	1	3	1	3	1	2	3	Small

(Table 1 continued)

Show	Format	Channel	Type	Target age	Clarity	Integration	Distance	
	1=Cumulative; 2=Magazine	1=PBS; 2=Nick; 3=Disney; 4=Cartoon Network; 5=Other	1=Network; 2=Public	1=Preschool; 2=Elementary; 3=(Pre)Teen	0=low; 1=med; 2=high	0=low; 1=med; 2=high	Score	Category
Curious George	1	1	2	1	0	0	0	Large
Cyberchase	1	1	2	2	1	2	3	Small
Danny Phantom	1	2	1	3	0	0	0	Large
Degrassi: The Next Generation	1	2	1	3	1	2	3	Small
Design Squad	2	1	2	3	2	2	4	Small
Dinosaur King	1	5	1	2	0	0	0	Large
Dora the Explorer	2	2	1	1	2	2	4	Small
Dragon Tales	1	1	2	1	2	2	4	Small
Drake & Josh	1	2	1	3	2	2	4	Small
El Tigre	1	2	1	2	0	0	0	Large
Fairly Odd Parents	1	2	1	2	1	1	2	Large
Fetch! with Ruff Ruffman	2	1	2	2	2	2	4	Small
Foste's Home for imaginary Friends	1	4	1	2	0	0	0	Large
Go, Diego, Go!	2	2	1	1	2	2	4	Small
Handy Manny	2	3	1	1	2	1	3	Small
Hannah Montana	1	3	1	3	2	2	4	Small
Higglytown Heroes	2	3	1	1	2	2	4	Small
Horseland	1	5	1	2	2	2	4	Small
iCarly	1	2	1	3	1	1	2	Large
Imagination Movers	1	3	1	1	2	2	4	Small
It's a big big world	2	1	2	1	2	2	4	Small
Jackie Chan Adventures	1	5	1	2	0	0	0	Large
Jane and the Dragon	1	5	1	2	1	0	1	Large
Johnny and the Sprites	2	3	1	1	1	1	2	Large
Johnny Test	1	4	1	2	0	0	0	Large
Kim Possible	1	3	1	3	1	0	1	Large
LazyTown (Spanish Version)	1	2	1	1	2	2	4	Small
Little Einsteins	1	3	1	1	2	2	4	Small
Magi-Nation	1	5	1	2	1	1	2	Large
Mama Mirabelle	2	1	2	1	2	2	4	Small
Martha Speaks	1	1	2	1	2	2	4	Small
Maya and Miguel	1	1	2	2	2	2	4	Small
Mickey Mouse Clubhouse	2	3	1	2	1	1	2	Large
Mighty B!	1	2	1	2	0	1	1	Large
My Friend Rabbit	1	5	1	1	1	2	3	Small
My Friends Tigger & Pooh	2	3	1	1	1	2	3	Small
My Gym Partner's a Monkey	1	4	1	2	0	0	0	Large
Naruto	1	5	1	2	0	0	0	Large

(Table 1 continued)

Show	Format	Channel	Type	Target age	Clarity	Integration	Distance	
	1=Cumulative; 2=Magazine	1=PBS; 2=Nick; 3=Disney; 4=Cartoon Network; 5=Other	1=Network; 2=Public	1=Preschool; 2=Elementary; 3=(Pre)Teen	0=low; 1=med; 2=high	0=low; 1=med; 2=high	Score	Category
Ned's Declassified School Survivial Guide	2	2	1	3	1	0	1	Large
Ni Hao Kai-Lan	2	2	1	1	2	2	4	Small
Phineas and Ferb	1	3	1	2	1	0	1	Large
Samarai Jack	1	4	1	3	0	0	0	Large
Sesame Street	2	1	2	1	2	2	4	Small
Sid the Science Kid	1	1	2	1	2	2	4	Small
Signing Time	2	5	2	1	2	2	4	Small
Sonny With a Chance	1	3	1	3	0	1	1	Large
SpongeBob SquarePants	1	2	1	2	1	1	2	Large
Squirrel Boy	1	4	1	2	1	1	2	Large
Star Wars: The Clone Wars	1	4	1	2	0	0	0	Large
Strawberry Shortcake	1	5	1	1	2	2	4	Small
Super Why!	1	1	2	1	2	2	4	Small
Sushi Pack	1			2	2	2	4	Small
Tak and the Power of Juju	1	2	1	2	0	0	0	Large
That's So Raven	1	3	1	3	1	1	2	Large
The Adventures of Jimmy Neutron, Boy Genius	1	2	1	2	1	1	2	Large
The Backyardigans	1	2	1	1	2	1	3	Small
The Emperors New School	1	3	1	2	2	2	4	Small
The Marvelous Misadventures of Flapjack	1	4	1	2	1	1	2	Large
The Naked Brothers Band	1	2	1	3	1	1	2	Large
The Proud Family	1	3	1	3	1	1	2	Large
The Replacements	1	3	1	2	1	1	2	Large
The Secret Saturdays	1	4	1	2	0	0	0	Large
The Suite Life of Zack and Cody	1	3	1	3	1	2	3	Small
The Suite Like on Deck	1	3	1	3	1	1	2	Large
Thomas & Friends	1	1	2	1	2	2	4	Small
Total Drama Island	1	4	1	2	0	0	0	Large
True Jackson, VP	1	2	1	3	1	1	2	Large
Unfabulous	1	2	1	3	1	2	3	Small
Veggie Tales	1	5	1	2	2	2	4	Small
Will & Dewitt	1	1	1	1	1	2	3	Small
Wizards of Waverly Place	1	3	1	3	1	2	3	Small
Wonder Pets	1	2	1	1	1	1	2	Large
Word Girl	1	1	2	1	2	1	3	Small
Word World	2	1	2	1	2	2	4	Small
Yin Yang Yo!	1	3	1	2	0	0	0	Large
YoGabbaGabba	2	2	1	1	2	1	3	Small
Zoey 101	1	2	1	3	1	2	3	Small

Next, the four stated hypotheses were tested using one-way analysis of variance (ANOVAs). The ANOVAs examined show format (story, magazine), station type (network, public television), or target age (preschool, elementary school, preteen/teen) with the distance score as within-subjects factors.

The first hypothesis expected the means of the distance of programs to be different depending on the target audience. The results indicated significant differences (F (2, 97) = 25.79, $p < 0.001$) between the groups, with programs targeting the preschool group (n = 35) had a small distance ($M = 3.46$, SD = 0.886), programs targeting elementary-aged children (n = 45) had a larger distance ($M = 1.42$, SD = 1.50), and programs that targeted preteens/teens (n = 20) had the largest distance of the three ($M = 1.20$, SD = 0.270), supporting H1.

The second hypothesis expected the means of the distance of programs to be different depending on the type of show. The results indicated significant differences (F (1, 98) = 17.48, $p < 0.001$) between the groups, where programs with a story format (n = 77) had a large distance ($M = 1.97$, SD = 1.55); whereas, programs with a magazine format (n = 23) had a smaller distance ($M = 3.39$, SD = 0.891), thus supporting H2.

The third hypothesis expected the means of the distance of programs to be different depending on the channel from which it was being broadcast. The data showed significant differences (F (4, 95) = 12.14, p <0.001) between the groups, where programs airing on PBS (n = 23) had the smallest distance ($M = 3.48$, SD = 1.04) and programs on other channels had larger distances. Disney (n = 22) had the next smallest distance (M = 2.41, SD = 1.18), followed by other networks (n = 13) (M = 2.46, SD = 1.71), Nickelodeon (n = 25) (M = 2.16, SD = 1.41), and finally Cartoon Network (n = 17) ($M = 0.65$, SD = 1.11), with the largest distance, thus supporting H3.

The final hypothesis expected the means of the distance of programs to be different depending on the type of stations. The one-way ANOVAs comparing the distance of the program among the stations (network, public TV) indicated significant differences (F (1, 98) = 25.61, $p < 0.001$) between the groups. The analysis revealed that programs broadcast from a network station (n = 76) had a large distance ($M = 1.91$, SD = 1.47); whereas programs broadcast on public television (n = 24) had a smaller distance ($M = 3.54$, SD = 1.02), supporting H4.

Discussion

Edutainment for children is neither completely educational nor completely detrimental—it is likely somewhere between the two. Although the ideal distance for optimal learning has yet to be determined, this study may help develop the understanding of how the tangential nature of educational and narrative content can influence educational quality of programs. By doing so, “parents can select well-designed, age-appropriate programs and view the programs with their children to maximize the positive effects of educational media” (Kirkorian, Wartella, & Anderson, 2008, p. 39), thus emphasizing positive impact and mitigating negative effects.

The results of this study indicated several things. First, when examining the relationship between distance and age of the target audience, significant differences were found. Programs targeting younger children had smaller distances between educational and narrative content. That is, the educational content was closely integrated into the plotline of the program and helped further the story. However, as the target audiences’ age grew older (i.e., from preschool to elementary school aged and from elementary to preteen/teen), the educational content became more tangential to the narrative content and was less tied to the plotline of the

program. This may be related to the concept that as children mature, comprehension of narrative and educational content improves with age (Huston & Wright, 1997). Research has shown that as children mature, salient formal features have less of impact; therefore, as children understand the context of a show more easily, the educational content may become less reliant on the narrative content for processing. This finding may help establish a better understanding about the nature of children's television, and thus answers RQ2.

Show format is alsoa factor in the tangential relationship between educational and narrative content, as the "story" format had a larger, more tangential distance than the "magazine" format. Since a "story" format presents information in a larger, more meaningful plotline (Fisch, 2001), the tangential nature of the large distance would make it more difficult for children to process the educational content. Additionally, both station type and channel are related to how distance is portrayed on children's television. Programs aired from a public broadcasting station had a small distance, and the educational content was highly integrated with the narrative. This may be due to the number of curricular programs, as well as educational focus of the station. Networks that have greater edutainment focus, such as Nickelodeon and Disney, did have a larger distance than PBS, but the data suggested that a moderate amount of integration was occurring. One network—Cartoon Network—stood out as having an extremely large distance, which appeared to be entertainment focused. Educational content was extremely tangential to the plot and would be difficult for a child to process.

Although many people believe that children's shows are educational, little research has been developed to examine how distance influences the acquisition of information or the effects it may have on children (Bickham et al., 2001). Despite the concept that many of these programs do have positive effects associated with them, not all "educational" shows are created equal (Wilson et al., 2008). Some children's programs, such as *Sesame Street,* which had one of the smallest distances, are curriculum based, and have scholarly research to back up their claims (Huston, Anderson, Wright, Linebarger, & Schmitt, 2000). However, other programs that are extremely popular with children, such as *The Secret Saturdays*, may have a large distance. For some children, this large distance may make retaining the educational content difficult, and will cause them to default retaining the narrative content only. This may indicate that the television industry is merely maintaining the standards required by the FCC, and not necessarily developing curriculum based shows that are easy for children to process. Parents should be aware that just because their child is watching a kids station, it does not mean that every program being offered: (1)is intended for their child, (2) is presented in a way that their children can process the content, or (3) is educational at all. By examining the distance in popular children's programs, we can develop a better understanding of the content to which children and adolescents are exposed.

Finally, it is important to note that although distance is an important aspect of understating children's programs through the capacity model, it is not the only influencing factor in children's processing of the content. Numerous areas are still open to exploration and further development. For example, many opportunities exist for the analysis of children's television through the capacity model, specifically in relation to the complexity of the narrative, the educational quality of the program, and the cognitive ability of the child. Future studies should explore how these factors influence information acquisition not only with television, but also with other media, such as on-line games, interactive media, and even programming for the adult audience.

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