Is Eating Healthy Bearable?
Examining Children's Transfer of Health-Related Concepts from a Storybook

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Abstract

Many parents believe reading books is important for children's cognitive development. Thus, it is no surprise most 4- to 6-year-olds in the United States are read to, on average, over 45 minutes per day (Rideout, Vandewater, & Wartella, 2003). Prior research has demonstrated that these parent-child reading interactions afford benefits in literacy, vocabulary, and writing. Far less attention has been devoted to the content children learn from storybooks and the circumstances promoting and hindering learning, particularly with trade books. This dissertation filled gaps in existing literature by (1) examining whether 4- and 5-year-olds gleaned an intended message (i.e., theme) from a story and used it to guide behavior; (2) assessing anthropomorphized story characters' impact on Aim 1; and (3) examining whether medium-specific differences accounted for differences in children's ability to extract thematic content and behaviorally apply it. Results revealed that children adeptly identified thematic content, but failed to generate abstract thematic statements and generalize thematic content. Anthropomorphic bears were most effective at encouraging theme-consistent behavior, particularly when children were familiar with them. Similarly, children more readily transferred a modeled behavior conveyed through a storybook than a matched video when they were familiar with the bears. Theme comprehension positively influenced behavior for those children who viewed a video, but had no effects on behavior across storybook conditions. In sum, the current studies are the first to my knowledge to concurrently examine the relationship (or lack thereof) between children's ability to extract thematic content and behaviorally apply it. The resultant dissociative relationship between theme extraction and behavioral application domains inspired a hot/cold model explaining these processes. Crucially, these systems function independently and contribute to the field's understanding of how children learn from storybooks.

Dedication

This work is dedicated to my parents, Beth and Bob Smith. I am forever grateful for your unwavering support and encouragement throughout the journey leading to this point. You taught me the value of hard work and to never give up, instrumental lessons that aided this achievement. Finally, thank you for introducing me to Mama, Papa, Brother, and Sister Bear many years ago.

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Chapter 1

1 Introduction

1.1 Overview.

> "Books are the quietest and most constant of friends; they are the most accessible and wisest of counselors, and the most patient of teachers" (Eliot, 1896, p. 20).

Books, or in this case the fictional narratives that sometimes fill them, occupy a special place for humans the world over. This sentiment rings no truer than for noted literature scholar Boyd (2009), for whom the fictional narrative represents a form of art evolved over thousands of years for learning and enjoyment. Others emphasize the iterative role-playing experience associated with fiction, where readers try on diverse roles, mindsets, and emotions, perhaps even enhancing cognitive skills, such as Theory of Mind, in the process (Oatley, 2011; Zunshine, 2006). Still others advance a more visceral interpretation, highlighting the pleasure evoked by a medium that is more interesting, faster, and—via the level of omniscience commonly granted to the reader—power-inducing than reality (Bloom, 2010).

Children's entry into the world of narrative is often paved with days and nights on the laps of family members, who introduce them to vivid literary landscapes like Sendak's island jungle or Dr. Seuss' Whoville, and the beloved (or disliked) characters who inhabit them. Indeed, the overwhelming majority (94%) of 4- to 6-year-olds are read to (or read themselves) at least several days a week for, on average, over 45 minutes a day (Rideout, Vandewater, & Wartella,

2003).[1] Further, almost all parents (96%) think reading books is important for children's cognitive development (Rideout et al., 2003).

Parents are not the only ones championing reading to children from an early age; cognitive developmentalists and educators alike have demonstrated that joint parent-child reading interactions afford benefits in several domains, such as literacy (Justice & Ezell, 2000; Mason, 1980; Sénéchal & LeFevre, 2001; Sulzby, 1985; Whitehurst & Lonigan, 1998); vocabulary (Debaryshe, 1993; Mol, Bus, De Jong, & Smeets, 2008; Sénéchal & LeFevre, 2002; Sénéchal & Cornell, 1993; Whitehurst et al., 1994); and writing (Bus, van IJzendoorn, & Pellegrini, 1995; Scarborough & Dobrich, 1994; Sénéchal, LeFevre, Thomas, & Daley, 1998; Whitehurst & Lonigan, 1998). Although a large literature establishes the benefits associated with parent-child storybook interactions, none of these studies address what children *learn* from a given storybook exposure; that is, can children extract, generalize, and even apply the words, facts, or lessons the author of the storybook intends to convey?

Until recently, little empirical work addressed this question. Yet researchers have long recognized the potential pedagogical value of storybooks.[2] Over 35 years ago, Shantz (1975) proposed stories serve as a medium through which children acquire an understanding of others' thoughts, emotions, and views. More recently, Bennett (1995) championed the power of stories to convey moral lessons. In contrast, both Leming (1997) and Narvaez (2002) concluded that similar claims were unfounded given extant empirical evidence. Despite academic rebuttals, one need not search long to deduce the prevailing parental perspective: Storybooks help children

[1] Throughout the dissertation references to "parents" and "children" pertain to those from middle-class families residing in the United States, which constitute the majority of parents and children in my culture. Others are important to study as well, but are not the focus of the present research.

[2] Stories serve many purposes beyond pedagogy; however I focus on their pedagogical power throughout the dissertation.

learn important lessons. For example, a recent viewing of Amazon feedback for books within the popular children's storybook series, The Berenstain Bears, yielded the following:

> With delightfully detailed illustrations, this book educates the reader and/or listener about the importance of eating healthy and exercising to maintain a healthy body through a fun story of a family of bears. This book presents some information about how the digestive system works, which is an enjoyable discovery for children. Having been used to eating a lot of junk food, the bear family decides to make healthier diet and fitness choices, which help them to have healthier bodies. This book is truly a childhood classic and one that will be read for many years (Kennedy, 2011).
>
> My three-year old son loves the Berenstein [sic] Bears so I decided to buy him this book and teach him not to eat so much junk food…So now when his daddy buys chips and other junk food home to eat by himself, my son would happily chastise him for eating junk food because it is bad for us to eat it (Wong, 2012).
>
> When my own kids were small we had a huge collection of Berenstain Bear books that they loved, including this one. Now I have a couple of grandsons who don't have the best eating habits. I bought this as much for their mother as I did for them. The whole family is eating better now. As with all the Berenstain Bear books it makes its point without being preachy (Carolzozs, 2013).

Parental anecdotes only further fuel the need to empirically examine the question posed earlier: Do children learn from stories and use the knowledge gained to guide actions in the "real" world?

In the current study, I investigated this question using a commercially available storybook and television episode: *The Berenstain Bears and Too Much Junk Food*. Specifically,

Study 1 investigated (1) whether children gleaned an intended message (i.e., theme) from the story and used it to guide behavior; and (2) anthropomorphized story characters' impact on Aim 1. Study 2 examined whether there are medium-specific differences in children's thematic comprehension and behavioral application of content conveyed through a storybook or a television show.

The current work contributes to the literature in at least three unique ways. First, although what children learn from stories is an emerging question in the field (e.g., Ganea, Bloom Pickard, & DeLoache, 2008; Walker, Walker, & Ganea, 2013), few have investigated children's propensities to extract and behaviorally apply story themes. The investigators who have done so used researcher-created books, not the trade books children are most apt to encounter in their homes or schools. Second, the Berenstain Bears storybook series features characters that walk upright, don clothes, and prefer sweets like candy and cola. In this sense, they are not abnormal: 7 of the 10 all-time top-selling children's books involve anthropomorphized protagonists ranging from cats to trains (Turvey, 2001), yet the effect anthropomorphic content has on children has only recently begun to be explored in the storybook context (e.g., Ganea, Canfield, Simons-Ghafari, & Chou, 2014), with most work involving researcher-created books. Third, although the thematic content children learn from stories (e.g., Goldman, Reyes, & Varnhagen, 1984; Jose, D'Anna, & Krieg, 2005; Lehr, 1988) and television (e.g., Mares & Acosta, 2008) has been investigated, few studies to my knowledge have directly pitted these two forms of media against one another in a closely matched design.

As background to Study 1, next I review prior research on children's learning from storybooks and children's interactions with anthropomorphic characters.

1.2 Stories' pedagogical payoffs (or losses) and underlying contexts. Researchers have investigated children's abilities to learn content from both picture books and stories. Below, I review research from each of these domains.

1.2.1 Picture books: The gateway to stories.

Object labels, symbols, and facts. The simplest form of storybook is the picture book, where text is minimal, if present at all. In a seminal study exploring whether children learn from this medium, 15- and 18-month-olds encountered familiar and novel objects of varying iconicity (e.g., photographs, drawings, and cartoons) in picture book format, and their abilities to recognize (i.e., identify a 2D target), extend (i.e., identify a 3D target), and generalize (i.e., identify new 3D forms of the target) these novel targets were assessed (Ganea et al., 2008). Generally, all children recognized the target, regardless of its iconicity. However, when asked to extend a 2D depiction to a 3D form, 15-month-olds only performed above chance when the target appeared in photograph or drawing form, whereas 18-month-olds evidenced above-chance performance across all levels of iconicity. Further, younger children failed to generalize to other 3D forms at any level of iconicity, whereas 18-month-olds only succeeded when the target appeared in photographic or drawing form. A second study examining transfer of real objects to picture book representations revealed similar effects. Interestingly, a similar study conducted in Tanzania, where experience with photographs is uncommon, suggests children's capacity to learn from photographic picture books there develops later, in the third year (Walker et al., 2013). In sum, Ganea and colleagues demonstrated children could learn from storybooks and revealed the role iconicity plays in the process, although these results should be interpreted through a cultural lens.

Of course, picture books vary in more dimensions than the iconicity of the artifacts and natural kinds represented on their pages. For example, some picture books offer the opportunity to manipulate page content (e.g., pull tabs to reveal a hidden object, or make a pictured object move). Researchers have investigated the efficacy, or lack thereof, of these features by pitting a standard picture book with photos against one with less iconographic drawings and one with pop-up manipulative features (Tare, Chiong, Ganea, & DeLoache, 2010). Of interest was whether 20-month-olds would recognize and generalize a novel animal introduced in the storybook. Children who interacted with the book featuring manipulative content performed significantly worse on such measures than peers in both the photograph and drawing conditions. The researchers replicated and extended this initial result with 27- to 39-month-olds, and concluded that manipulable features were also deleterious to acquiring facts conveyed verbally during picture book interactions.

Building upon this prior work, Chiong and DeLoache (2013) demonstrated that a manipulative book intended to teach children the ABCs was not as efficacious for 30- and 36-month-olds as a similar book lacking manipulable features. Moreover, even when researchers incorporated a manipulable feature (e.g., texture) intended to increase children's attention to a letter, pedagogical gains did not occur (though decrements did not either).

Thus, in their second year of life children evidence the ability to learn object labels, symbols, and facts from picture books, an early form of storybook. Importantly, without exception, certain features permitted learning in the studies reviewed: iconic representations and nonmanipulable content.

Action sequences. A second body of research explores the efficacy with which action sequences can be acquired from storybooks. For example, Simcock and DeLoache (2006)

showed 18-, 24-, and 30-month-olds a novel action sequence (e.g., how to make a rattle) through a picture book that varied in iconicity (e.g., photographs or color drawings), and then prompted them to recreate the action. The two oldest age groups did so in all cases, whereas 18-month-olds succeeded only after exposure to the most iconic picture book: that containing photographs. Yet, even 24-month-olds failed to reproduce the action sequence if the picture book images were less iconographic (i.e., black and white line drawings instead of photographs) than in the first study. Simcock and DeLoache (2008) showed that after repeated exposures, 18-month-olds did transfer from a less iconographic picture book. Further, 18-month-olds demonstrated accurate rattle production rates 2 weeks after the initial exposure to photographic picture books, and 24-months-olds retained the sequence for 4 weeks (Brito, Barr, McIntyre, & Simcock, 2012). Taken together, these studies show that children as young as 18 months learn novel action sequences originally conveyed in highly iconic picture books and retain that knowledge for at least 2 weeks (but see Simcock & Dooley, 2007).

Much of the research reviewed thus far has incorporated meaningful narration (e.g., "Look, this is a blicket. See a blicket. It's shiny and goes round and round. Yeah, that's a blicket" [Ganea et al., 2008, p. 51]). Simcock, Garrity, and Barr (2011) demonstrated that young children learn from picture books even in the absence of such narrative content. They removed all meaningful content from the aforementioned rattle picture books, replacing it with meaningless alternatives (e.g., "Look at what Linda is doing!" [p. 1610]). Both 18- and 24-month-olds still demonstrated an ability to learn action sequences under these circumstances. Moreover, same age peers even demonstrated the ability to learn without the provision of any pictures when meaningful narration was included.

These studies demonstrate that young children can learn novel actions from picture books under varying conditions (e.g., with pictures and meaningful narration, with pictures but without meaningful narration, and without pictures but with meaningful narration). Next, I consider research examining the content children can learn from stories.

1.2.2 Stories: Pedagogical tools or pastimes?

Analogical problem solving. Although researchers have long used stories to explore children's propensities to reason analogically, efforts to control story-specific aspects (i.e., characters, contexts, etc.) have been secondary to the conditions promoting children's analogical transfer abilities themselves. I provide only a brief review of such studies here before discussing more systematic examinations. One early study used fantastical source stories involving a genie, Miss Piggy, or Snoopy, to explore preschoolers' abilities to transfer problem solutions (Holyoak, Junn, & Billman, 1984). Researchers varied perceptual similarity (i.e., similar objects) and context (e.g., characters involved and goals) between the source story and problem, determining that concordance in both domains aided transfer. In related work, again involving fantastical characters, the identification and repetition of protagonist and goal-relevant actions (i.e., goal, obstacle, and solution), and similar goal objects (e.g., ball) prompted 5-year-olds to transfer solutions (Brown, Kane, & Echols, 1986; Daehler & Chen, 1993). Finally, similar contextual and procedural details between the source story and problem aided 6- and 8-year-olds' analogical skills (Chen, 1996). This literature suggests that certain elements (e.g., contextual or procedural memory) may promote story-based analogical reasoning, but the lack of balance between characteristics of source stories and other variables limits the strength of conclusions.

To address weaknesses within prior analogical transfer work, researchers read 3½- to 5-year-olds carefully matched source stories with fantastic or realistic characters and examined

their ability to transfer problem solutions (Richert, Shawber, Hoffman, & Taylor, 2009). Children either attempted to solve problems involving characters of similar or opposite reality status as the source story (Study 1 and 2), or used a fantastic or realistic source story to personally solve a problem (Study 3). Although children generally failed to transfer solutions conveyed through source stories with fantasy characters, such protagonists were not uniformly deleterious. Older children (4;8 – 5;7 years) who stated that they preferred source stories with fantastical characters used them to their benefit, evidencing elevated transfer rates over peers who either disliked that form of story or remained neutral. However, younger children (3;5 – 4;6 years) who preferred fantastical source stories performed significantly worse than similar age peers.

A similar study involving longer source stories showed that 3½- to 5½-year-olds were again more apt to transfer solutions from realistic than fantastic source stories (Richert & Smith, 2011). Moreover, children who did transfer from fantasy source stories were less fantasy oriented (e.g., no imaginary companion, less apt to act out plays for others, etc.). In sum, in these more tightly controlled studies, realistic characters and contexts promoted analogical transfer from stories. However, even under ideal conditions children's transfer rates were sometimes low across these studies (e.g., 27.5%), suggesting children's abilities to extract and apply problem solving techniques modeled in stories are still tenuous.

Concepts and causal relationships. In addition to examining whether children learn facts, words, or problem solving techniques from stories, researchers have examined whether stories can effectively convey concepts and/or causal relationships.

Ganea, Ma, and DeLoache (2011) investigated 3- to 4-year-olds' abilities to learn about camouflage through a storybook. Researchers first assessed children's existing knowledge of

camouflage and then read them storybooks explaining why a predator could or could not locate its prey. Finally, children's comprehension of camouflage was assessed through transfer tasks involving live animals or photographs of animals. Although 4-year-olds performed above chance on a task assessing camouflage comprehension following story exposure and mentioned the concept when justifying their responses, 3-year-olds only attained the former benchmark. However, there was a limit to the depth of 4-year-olds' conceptual understanding: They performed better on camouflage-related tasks when those tasks involved pictures rather than live animals. The authors suggested this result could have been due to the fact children were read the storybook in a different context than they were tested (i.e., testing occurred in a different room than storybook exposure). In another study revealing the limitations underlying transfer, researchers investigated whether preschoolers evidenced transfer of causal knowledge encountered in a story. The researchers presented 3-, 4-, and 5-year-olds with novel causal information (e.g., smelling a "popple flower" causes one to hiccup) and assessed their willingness to generalize it beyond the fictional realm. Children did generalize, but only when the target causal chain was couched within a realistic story (Walker, Ganea, & Gopnik, 2012). This result not only complements Richert and Smith's (2011) analogical transfer work, but is also consistent with research demonstrating that 4-year-olds are sensitive to global story structure, choosing to extend both ordinary and improbable stories with concordant events when alternatives are presented (Weisberg & Sobel, 2012).

Evolution concepts also appear to be effectively conveyed through realistic storybooks. Kelemen, Emmons, Schillaci, and Ganea (2014) created a storybook with realistic pictures conveying target natural selection concepts (e.g., variation in traits among a population) within a novel species. Five- and 6-year-olds' comprehension and generalization of natural selection was

tested immediately and after a 3-month delay, and children demonstrated significantly enhanced comprehension at both time points, compared to pretest performance. In sum, under specific conditions (i.e., realistic stories), children as young as 3 years old evidence transfer of conceptual and causal knowledge. Next I examine if transfer occurs for concepts and relationships concerning health.

Health-related understanding and behavior. One of the primary aims of the current research proposal is to investigate whether children demonstrate health-related behavioral change after a select storybook exposure: *The Berenstain Bears and Too Much Junk Food*. Several studies are relevant to this question. In one of the most recent, researchers conducted a 10-12 week intervention exposing 4-year-olds to either five experimenter-constructed, realistic storybooks that emphasized nutrients, food groups, and digestion, or control stories (e.g., publically-accessible USDA storybooks on healthy eating; Gripshover & Markman, 2013). Of particular importance was children's understanding of nutritional concepts, but researchers also noted vegetable consumption throughout the intervention. When compared to peers in the control group, children in the intervention group evidenced superior conceptual understanding in selected nutritional domains and even ate more vegetables, compared to their performance at pretest. Yet, the researchers used special storybooks that differed from commonly available trade books. Furthermore, the intervention involved five books on various related topics, effectively eliminating the possibility of identifying particular aspects of the books or the interactions with the books themselves that may have driven the effects.

Byrne and Nitzke (2002) also examined whether storybooks encouraged vegetable consumption, but diverged from the prior study by choosing a novel vegetable (e.g., kohlrabi) as their focus and manipulating an experimenter-created storybook character's preference for it.

Three- to 5-year-olds heard a realistic story in which a boy visiting a family member's garden discovered that he did or did not like kohlrabi, or heard a control story without any mention of kohlrabi. Children's willingness to try kohlrabi at a delayed posttest two days later served as the outcome variable of interest. However, approximately 75% of children across conditions were willing to try kohlrabi before even hearing the story, perhaps due to its sheer novelty. Although children's willingness to taste kohlrabi at a delayed posttest significantly differed between the positive storybook and control group, this effect resulted from a drop in control participants' willingness to eat kohlrabi instead of a boost in the positive story condition, where pre- and posttest kohlrabi consumption remained equivalent.

Whereas the prior studies involved preschoolers, there has also been pertinent work carried out in this domain with toddlers. For example, 19- to 27-month-olds exposed to a book featuring unfamiliar fruits and vegetables across several weeks later demonstrated a looking-time preference for the fruits and vegetables present in the book (Houston-Price et al., 2009a). This effect was not tied to the exact pictures found within the original book, as the preferential looking test included new images of the same fruits and vegetables. Another study with toddlers in the same age range examined whether repeated exposure to a picture book featuring a liked, disliked, or unfamiliar fruit or vegetable would impact children's looking time preferences and the quantity of the target food consumed (Heath, Houston-Price, & Kennedy, 2014; see also Houston-Price et al., 2009b). Toddlers again demonstrated a preferential looking pattern towards the fruits and vegetables within the book, but the effects were strongest for children exposed to books containing initially unfamiliar fruits or vegetables. The same pattern of results held for children's consumption behavior. Notably, parents were responsible for introducing the books to their toddlers at home in these studies, thus it is impossible to parse effects associated with

exposure to the books and those driven by parental contributions (e.g., social referencing or introduction to the fruit/vegetable).

Not all empirical investigations in this domain couched messages in realistic contexts. For example, a researcher who used fairy tales that pitted positive (e.g., vegetables make you healthy), negative (e.g., illness stems from avoiding vegetables), or control messages against one another determined that both of the former, when compared to the latter, boosted vegetable consumption (Lawatsch, 1990). However, because Lawatsch did not assess children's comprehension of the fairy tales, it remained unclear whether story valence, conceptualizations of the stories, a combination of both, or something separate from these characteristics drove the effect. Duncker (1938) explored whether hearing a story detailing a heroic figure's preference for a bitter-tasting food later affected 4-year-olds' preference for it. He found that when learning that the hero in the story preferred the most bitter of two foods, children preferred that food over a sweeter alternative, even 12 days after the initial story exposure. Finally, 4- to 6-year-olds who listened to storybooks with an anthropomorphic animal who consumed carrots in order to save a friend consumed greater proportions of carrots than peers in a baseline group who did not hear the story; however, the story did not affect the proportion of an unhealthy salty snack consumed (de Droog, Buijzen, & Valkenburg, 2014).

In sum, storybooks have influenced children's later vegetable consumption (or food consumption more generally). However, we know little about what features of the books were responsible. The only large-scale intervention study used multiple books that were created in the lab, obscuring the characteristics of the books (and/or the interactions they initiated) that contributed most to the evidenced behavioral modification and reducing ecological validity (Gripshover & Markman, 2013). Still other researchers determined that fantasy stories affected

children's food preferences, but did not examine whether story context or depth of conceptual understanding (i.e., theme extraction) was responsible (de Droog, Buijzen, & Valkenburg, 2014; Duncker, 1938; Lawatsch, 1990). Clearly, this issue is far from resolved. Empirical investigations examining the effects of children's trade books, compared to similar books with specific characteristics manipulated, would greatly inform (1) how well children transfer health-related lessons; (2) which storybook characteristics bolster transfer (if any); and, consequently, (3) whether (and, if so, how) publicly available storybooks can be used to improve children's health behaviors.

The seductive allure of stories. Throughout child development and across domains, the research reviewed above reveals the pedagogical power of stories. Yet, there are also studies highlighting detrimental effects associated with stories, namely children learning inaccurate information. For example, 5½-, 6½-, and 7½-year-olds listened to stories with accurate (e.g., "autumn is another word for fall") and erroneous (e.g., "autumn is another word for spring") facts embedded, and the oldest children, but not the two younger groups, were most apt to later provide incorrect answers during a cued recall test (e.g., "What's another name for fall?"; Fazio & Marsh, 2008). The authors explained this effect as stemming from older children's advanced source memory capabilities: They remembered that they had encountered the fact in the story and were thus apt to respond in the manner presented in the story. Marsh and her colleagues replicated and extended this result with 7-year-olds. Again, children at this age were not only more apt to provide inaccurate answers than 5-year-olds, but to do so both on multiple choice tests, where the correct answer was always among the answer choices, and short-answer recall questions, as in the original study (Goswick, Mullet, & Marsh, 2013). A redeeming quality of stories was revealed when considering children's overall memory of accurate facts: Compared to

peers who did not hear the stories, children of all ages across both studies evidenced heightened recall for accurate story information.

Assessing story content. The aforementioned studies focus on children's willingness to transfer information from a story. This work suggests that children are more likely to assess stories characterized by realistic contexts (e.g., Ganea et al., 2008; Richert & Smith, 2011; Walker et al., 2012) as useful to their day-to-day lives, yet never directly assesses children's reality status judgments of characters or events. Two studies directly inform how children view story events and protagonists. In the first, Woolley and Vaden (2007) exposed 3- to 5-year-olds to realistic (e.g., a child interacting with his family), fantastic (e.g., a boy fighting a monster), or religious stories (e.g., God rescuing an individual from impending danger) and then asked them to judge whether the characters and events were real. All children were skeptical of the reality status of story characters and events; even the oldest children claimed only 60% of events from realistic stories could really occur. Interestingly, familial religiosity positively related to children's reality status judgments of events within religious stories. Woolley and Cox (2011) further investigated 4- and 6-year-olds' conceptualizations of story events by pitting religious stories against matched stories without references to religious characters. Religious content influenced children's reality judgments, such that its presence led older children to judge story characters and events as real. Again, this effect was strengthened by familial religiosity. Together, these studies suggest that children are skeptical of story characters and events, with religious stories (especially those encountered by children from religious families) representing a special exception to this rule.

Extracting themes from stories. The work reviewed thus far suggests that under certain conditions storybooks function as powerful pedagogical tools. However, researchers have

typically examined the transmission of concrete information in this work (e.g., words, facts, and concepts). Do children extract more abstract information embedded within stories, such as thematic content?

Before reviewing the literature on preschoolers' abilities to extract thematic meaning from stories, one must first define "theme." Researchers have defined the concept in a variety of ways. Lenhart and colleagues proposed the thematic affect unit (TAU), an idea removed from story-specific contexts, but still reflecting the plot of a given story (e.g., prosociality; Lehnert, Dyer, Johnson, Yang, & Harley, 1983). Similarly, others have grouped theme in a category termed "text-external reasoning": "reasoning about the story as a whole in relationship to abstract rules of behavior, morals, and principles that the particular text might exemplify" (Goldman, 1985, p. 247). Moreover, Lukens (1982) defined theme as "the idea that holds the story together, such as a comment about...society, human nature, or the human condition" (p. 101). These definitions (see also Dorfman & Brewer, 1994; Kintsch & Van Dijk, 1978) demand abstraction; that is, effective processing of text-specific elements (e.g., actions, intentions, and outcomes) facilitating synthesis of a thematic statement characterized by its externality to the story. What conditions, if any, prompt children to identify abstract, external thematic content from stories?

In one of the earliest investigations of young children's abilities to correctly identify story themes, kindergarteners through sixth graders listened to several Aesop's fables and were prompted to report the lesson that each particular story taught (Goldman et al., 1984). Although children in third grade and beyond tended to extract target themes (e.g., correct response rate $\geq$ 80%), not a single kindergartner did so. In fact, only 26% of children abstracted any story content, with simple rule-based behavioral responses (e.g., be good) most common. The majority

of kindergarteners (60%) either failed to generate any response or provided text-specific summary details. More recently, researchers read kindergartners through eighth graders common Aesop's fables (e.g., The Tortoise and the Hare) and asked them whether each story had a moral (i.e., lesson; Jose et al., 2005). If children replied affirmatively, they were asked to state the lesson, which was scored according to its quality. Kindergartners were significantly less likely than older children to state that the stories had a moral (i.e., lesson) and when they did generate a moral, the quality of their responses was significantly poorer than that of older peers.

In these prior studies, children attempted to generate the theme of a given story. Researchers have also explored the identification of themes and thematic commonalities between stories. For example, kindergarten, third, and fifth grade students in a Christian school listened to Bible stories with one of three general themes: helping, not being afraid, and obeying (Johnson & Goldman, 1987). After children heard all of the stories, they were asked to group the stories that "[told] the same kind of story" (p. 209). Again, kindergarteners evidenced poorer performance than older students: Only 22% of the youngest children, as opposed to 50% of the older children, grouped the stories in a thematic fashion. However, children of all ages performed well when provided a given rule (e.g., not being afraid) and asked to identify all stories pertaining to it, suggesting kindergarteners have a nascent ability to identify a story's theme.

Similarly, Lehr (1988) investigated kindergarten, second, and fourth grade students' abilities to group stories by theme, but included stories from both realistic (e.g., *The Carrot Seed*) and folktale (e.g., *The Gingerbread Boy*) genres. She also assessed participants' exposure to children's literature by administering a title recognition test (see Lehr, 1987). Participants successfully chose books with common themes in the realistic genre, but responses were

inconsistent for the folktale genre. Importantly, though, when kindergarteners were asked to justify their selections, a familiar pattern emerged: only 30% explicitly mentioned themes of books in either genre, and those who did had more exposure to children's literature, as indicated by the title recognition task. Instead of focusing on abstract thematic structure, most kindergarteners guided their choices according to concrete story details, like the 5-year-old who concluded *The Three Little Pigs* and *The Gingerbread Boy* deserved to be grouped because "they both get eaten up" (p. 347). Thus, although Lehr claimed that kindergartners categorized realistic books according to theme, children's verbal justifications suggest they might have done so for nonthematic reasons.

Investigations of younger children's abilities to identify story themes have yielded inconsistent results. Although kindergartners faltered in paradigms requiring theme generation (Jose et al., 2005), they accurately identified stories when supplied with an underlying theme (Johnson & Goldman, 1987). Finally, 5-year-olds grouped realistic stories by theme, but justifications for those groupings revolved around concrete story content rather than abstractions (Lehr, 1988). The proposed project will add much needed data on preschoolers' abilities to both generate and recognize story themes to the literature.

1.2.3 Stories and pedagogical effects: An epilogue. This section began with a simple question: Do children learn content from storybooks, and, if so, what do they learn and under what conditions? The review of the literature demonstrates that children can certainly learn words, facts, actions, problem-solving techniques, concepts, causal information, and even health-related information from stories. As for conditions which promote such learning, 18- to 30-month-olds seem most affected by picture books that are iconic (e.g., Ganea et al., 2008), simple

(i.e., manipulables absent; Tare et al., 2010), and read repeatedly (e.g., Simcock & DeLoache, 2008).

However, research with older children (i.e., 4- to 5-year-olds) reveals a more ambiguous picture. Whereas realistic contexts aided analogical problem solving (e.g., Richert & Smith, 2011), conceptual development (e.g., Gripshover & Markman, 2013), and causal learning (Walker et al., 2012), knowledge acquired from fantastic contexts also transferred (e.g., Duncker, 1938; Lawatsch, 1990; Richert et al., 2009). Of particular significance to the first aim of the current proposal, the few researchers who examined 5-year-olds' abilities to identify story themes generated mixed results with regard to both ability and features of contexts most apt to foster success (e.g., Johnson & Goldman, 1987; Lehr, 1988). The proposed project will provide data further elucidating whether children can identify abstract themes. Extending prior research involving fables or Bible stories, I will examine children's theme identification in a trade book. A trade book is the form of the medium children are most apt to encounter in their homes, and using one will strengthen generalizability of the findings.

One of the characteristics that may influence children's ability to extract and behaviorally apply thematic content from storybooks is character type, specifically human or anthropomorphized animal. In the next section I grapple with what anthropomorphic content means for the 4- and 5-year-old storybook consumer.

1.3 Anthropomorphism in children's storybooks. Characters directly impact how events in stories unfold. In children's literature, anthropomorphic characters are common; 7 of the 10 all-time top-selling children's books contain animals or artifacts evidencing anthropomorphism (Turvey, 2001). Just what does it mean for a character to have anthropomorphic traits?

Anthropomorphizing is the "characterization of nonhuman behavior or inanimate objects in human terms" (Horowitz & Bekoff, 2007, p. 23). In storybook contexts, this commonly involves granting animals human qualities, such as an ability to walk upright, wear clothes, and carry out actions based on higher-order mental states (e.g., beliefs, desires, and intentions). Researchers have investigated anthropomorphism from comparative (e.g., Burghardt, 1985), neuroscientific (e.g., Castelli, Happé, Frith, & Frith, 2000; Schultz et al., 2003), and social psychological (e.g., Heider & Simmel, 1944; Waytz et al., 2010) perspectives, considering both its merits and disadvantages. There has been substantively less empirical interest in anthropomorphism as it pertains to storybooks. This is surprising since many storybook characters (e.g., Peter Rabbit, The Cat in the Hat, The Poky Little Puppy) are anthropomorphized animals. Below, I consider how anthropomorphic animal storybook characters may positively or negatively impact children's abilities to extract relevant knowledge from the medium and apply it in their lives.

1.3.1 The case for anthropomorphized animals. One argument in favor of incorporating animals that behave like humans in storybooks is children's preference for such characters. When Boyd and Mandler (1955) read stories otherwise matched in all aspects except character, 74% of their third grade participants preferred animal to human protagonists. Children's preferences for animal characters could stem from an ability to better relate to them. Researchers have emphasized animal protagonists' amorphous races, genders, and ethnicities, which, in turn, might present fewer barriers to children assuming their perspectives (Krueger & Krueger, 2005; McCrindle & Odendaal, 1994). To this latter point, although perspective taking readily occurs when story protagonists are human (e.g., Rall & Harris, 2000; Ziegler, Mitchell, & Currie, 2005),

whether animal protagonists evoke analogous simulatory processes remains an empirical question.

Of particular interest to the current proposal, Ganea et al. (2011) compared children's abilities to learn about camouflage from a storybook containing either intentional language describing the actions of animals or a factual storybook without such language. Intentional language neither aided nor hindered children's understanding of an abstract concept. However, there is evidence that anthropomorphic characters influence behavior. A storybook with anthropomorphic animal characters led children to consume significantly greater quantities of a vegetable (i.e., carrots) that figured prominently in the storyline (de Droog et al., 2014). Furthermore, there is evidence that such characters influence children's tendency to reason from humans to animals (i.e., to consider humans as the prototypical animal). A brief interaction with a Berenstain Bear book led 5-year-olds to take an anthropocentric biological stance when applying a novel trait to a bear, suggesting that even though the Bear family is fantastic children view them as human (Waxman, Herrmann, Woodring, & Medin, 2014). Taken together, the support in favor of anthropomorphic storybook protagonists rests on empirical evidence of children's preference for them, their abilities to encourage vegetable consumption, and their promotion of human-centric reasoning.

Although there is limited evidence suggesting that anthropomorphic animal characters aid children's understanding of storybooks, there is mounting evidence that animals occupy a privileged position in children's lives outside fictional realms. E.O. Wilson (1984) suggested a shared evolutionary bond exists between humans and animals (e.g., "biophilia"). LoBue and DeLoache (LoBue, 2010; LoBue & DeLoache, 2008, 2010) offered support for this claim through a series of studies pitting the detection of potentially harmful animals (e.g., snakes and

spiders) against flowers, mushrooms, and other animals (e.g., frogs, caterpillars, cockroaches). Although these researchers used a variety of methods, with participants across a wide age spectrum (infants, preschoolers, and adults) a clear pattern emerged: Threat-relevant animals evoked quicker responses than comparison items (which included animals). In addition, across three studies, children preferred to interact with live animals over toys when both were present (Kidd & Kidd, 1987; LoBue, Bloom Pickard, Sherman, Axford, & DeLoache, 2013; Ricard & Allard, 1993). Thus, animals in nonfictional contexts attract children's attention, leading infants and preschoolers to preferentially interact with them over entertaining alternatives. Despite the deep-seated attention animals evoke in children, and the evidence in support of anthropomorphized storybook characters reviewed above, contradictory evidence exists suggesting the presence of these characters in storybooks may not be beneficial.

1.3.2 The case against anthropomorphized animals. In order for children to extract a theme from a storybook (e.g., *The Berenstain Bears and Too Much Junk Food*) and use it to guide their own behavior, they must realize characters (e.g., Brother or Sister Bear) within the story represent humans like themselves. The ability to view a symbol (e.g., anthropomorphized bear) while keeping in mind its referent (e.g., human) is termed dual representation (e.g., DeLoache, 1987, 2000, 2004). Young children struggle to achieve dual representations across a variety of situations, such as when tasked to retrieve a toy from a location originally shown using a model (e.g., DeLoache, 2000) or when interacting with picture books (e.g., Tare et al., 2010). If children fail to recognize that anthropomorphic bears represent humans, they may erroneously conclude that storybook content is not applicable to their own lives. This will in turn increase the likelihood of generating thematic statements that are (1) too concrete (e.g., *bears* should not eat

candy) and that (2) lack the requisite level of abstraction (e.g., *you* need to eat healthy foods, so *your* body is strong and *you* always have the energy *you* need).

Beyond the elevated dual representational demands elicited by anthropomorphized animals, these characters are by definition unrealistic. Unlike members of the Berenstain family, real bears do not compete in distance running, take trips to their local physician's office, or wrestle with the urge to consume candy. Fantastic elements could limit children's willingness to transfer content, thematic or otherwise. Section 1.2.2 reviewed numerous instances where fantastic content, including protagonists and story contexts, hindered children's transfer from storybooks to reality (e.g., Lehr, 1988; Richert & Smith, 2011; Walker et al., 2012).

One recent study offers empirical evidence that some anthropomorphic storybook content may negatively affect children's ability to transfer facts (Ganea et al., 2014). In this study, researchers examined 3- and 5-year-olds' abilities to learn facts about novel animals from storybooks containing anthropomorphic images paired with realistic language (e.g., "At night, they sleep in a small cave") or anthropomorphic images paired with anthropomorphic language (e.g., "Mother cavy tucks her babies into bed in a small cave"). Although children in both conditions learned facts from both storybooks, those in the anthropomorphized text and image condition recalled significantly fewer facts than those who encountered anthropomorphized images coupled with realistic text. Notably, however, children in both conditions demonstrated significantly greater factual knowledge about the animals than a baseline group who did not listen to the story.

Although there is limited empirical evidence speaking to the deleterious nature of anthropomorphized animal characters, the strain they place on children's dual representational

capacities coupled with their fantastic nature leads to the hypothesis that they may be less efficacious messengers than humans couched within realistic contexts.

1.3.3 Anthropomorphized animals: The jury is still out. The empirical attention that anthropomorphized storybook characters have received renders it presumptuous to conclude they are deleterious. Indeed, children prefer them to human characters (Boyd & Mandler, 1955). Further, anthropomorphized animal characters avoid prospective identification roadblocks (Krueger & Krueger, 2005; McCrindle & Odendaal, 1994), encourage anthropocentric reasoning (Waxman et al., 2014), and prompt vegetable consumption (de Droog et al., 2014). Yet, through their fantastic behavior, they violate children's expectations, tax children's dual representational capacities, and when coupled with anthropomorphic text hinder children's learning (Ganea et al., 2014). The current project informs the case for or against anthropomorphized animal characters by pitting them against human protagonists while matching story content. Empirical data informing this is sorely needed: Are the anthropomorphized animals in trade books that authors, parents, and teachers entrust to convey lessons efficacious messengers?

Chapter 2

2 Study One

Study 1 sought to address two principal questions: (1) Do children have the ability to identify thematic content in a storybook and use it to guide their behaviors in the real world? and (2) Do anthropomorphized animal characters influence the conveyance of thematic content, such that they improve or hinder children's ability to identify and behaviorally apply that content?

To address these questions, I recruited 4- and 5-year-olds and assessed their ability to identify and transfer thematic content from *The Berenstain Bears and Too Much Junk Food*. This age group was appropriate for this study for two reasons. First, prior researchers examining children's abilities to both identify thematic content (e.g., Johnson & Goldman, 1987; Jose et al., 2005; Lehr, 1988) and transfer such content (e.g., Gripshover & Markman, 2013; Richert & Smith, 2011; Walker et al., 2012) from stories focused on these ages. Second, the USDA is particularly interested in encouraging preschoolers' healthy diets (see http://www.choosemyplate.gov/preschoolers.html).

Although there are many storybooks that focus on important issues in the lives of 4- and 5-year-olds, *The Berenstain Bears and Too Much Junk Food* was a particularly appropriate storybook for this study. First, the USDA endorses it as a storybook that helps children learn about healthy eating ("Food and Nutrition Fun for Preschoolers," March 2013). Second, it contains anthropomorphic animal characters, permitting the empirical examination of their efficacy conveying thematic content and prompting behavioral transfer. Third, since it is a trade book, parents may purchase it.

2.1 Method.

2.1.1 Participants. Forty-five 4- to 5-year-olds were randomly assigned to one of three storybooks (aka conditions): (1) *The Berenstain Bears and Too Much Junk Food* with animal protagonists (bear: n = 15, 8 girls, M = 59.4, range = 48.5 – 70.5); (2) *The Berenstain Bears and Too Much Junk Food* with human protagonists (human: n = 15, 8 girls, M = 60.6, range = 49.8 – 71.9); and (3) *The Berenstain Bears and the Trouble with Friends* (control: n = 15, 7 girls, M = 60.3, range = 48.0 – 71.5). All parents/guardians provided informed consent prior to their children participating. A majority of participants were Caucasian and came from middle- to upper-middle class backgrounds.

2.1.2 Materials. *The Berenstain Bears and Too Much Junk Food*, is a 32-page illustrated storybook featuring anthropomorphized bears living in Bear Country. In the story, Brother, Sister, and Papa Bear frequently consume junk food (e.g., Sweetsie-Cola, Sugar Balls, and Choco-Chums). They change their eating habits, however, after Mama Bear confiscates all junk food and the family makes a trip to Dr. Grizzly's office, where they learn about body systems and food groups. Finally, the Bear family successfully completes a distance run. The bear condition used the standard version, whereas the human condition used a modified version featuring humans instead of anthropomorphized bears. Participants in the control condition listened to the *The Berenstain Bears and the Trouble with Friends*, where Sister Bear befriends a new neighbor, Lizzy Bruin. Sister Bear and Lizzy get along well initially, but tensions rise when the two friends disagree over who should assume the teacher role during an episode of make believe. Both Sister Bear and Lizzy learn that friendships require compromise and the story ends with both cubs running off to engage in a play session. The story does not contain any consumption of food, nor is food featured in any of the illustrations.

Carrots, cucumbers, and Skittles were used in the food preference and consumption tests described in detail below (Section 2.2.3).

2.1.3 Procedure. The study consisted of four components: (1) food preference test; (2) storybook exposure; (3) assessment of children's theme-consistent behavior (i.e., food consumption) and theme comprehension; and (4) assessment of receptive vocabulary. Participants completed all phases of the study during one testing occasion lasting approximately 45 minutes. Each of these phases is described below.

Food preference task. Participants indicated initial food preferences upon arrival at the lab. Participants encountered three bowls with approximately equal-sized servings of carrots, cucumbers, and Skittles. Participants were first asked to name each food item, and were corrected if they made any errors. Next, participants selected the item they most preferred (i.e., "Which one of these foods would you like to eat the most?") and it was covered with a sheet of paper. The researcher confirmed the choice then repeated the question (i.e., "Okay, so that's your favorite. Now, let's just say your favorite was not here [cover top of first-choice food]; if that food wasn't here and you had to choose one of these two, which would you most like to eat then?"), yielding participants' most favored, neutral, and least favored item. Food presentation order was static within participants, but systematically varied between participants. Next, the researcher led them to a room to listen to the storybook.

Storybook exposure. The researcher read the story within a predetermined approximate time window (i.e., *The Berenstain Bears and Too Much Junk Food*: 9 minutes; *The Berenstain Bears and the Trouble with Friends*: 9 minutes) to participants who were encouraged to listen carefully. All participants then completed the following assessments administered by the researcher in the order listed: 1) transfer of theme-consistent behavior; 2) theme generation,

recognition, and generalization;[3] 3) story memory; 4) story familiarity; and 5) receptive vocabulary.

Transfer of theme-consistent behavior. The researcher presented the three bowls of food participants initially ranked in the same order as they appeared in the pretest, invited participants to eat the foods, and proceeded to leave the room for 2½ minutes (i.e., "Look! I have these foods here that you can eat. Oops, I forgot something, so I am going to go get it. While I am gone you can eat any of these foods."). Of interest was whether participants consumed items in the researcher's absence and the amount of food items consumed.

Theme generation. To assess children's abilities to generate the correct storybook theme, the researcher asked participants whether the storybook had a lesson (i.e., "Some stories have a lesson that they are trying to tell us—something that the people who wrote the book wanted us to learn. Do you think this story had a lesson for us to learn?"). If participants answered yes, the researcher prompted them further (i.e., "What do you think that lesson was?").

Theme recognition. The researcher asked participants to select the response that most closely matched the theme of the story they listened to earlier (i.e., "Remember how we talked about how some stories have a lesson? I'm going to read you three lessons, and I want you to listen to all three and then tell me which is the lesson of the story you listened to earlier."). Participants in the bear and human conditions received the following three response options, in systematically varied orders: (1) "If you do something wrong, like eat chocolate chip cookies when told not to, you should tell the truth." (2) "When you first start running it is hard, but if you eat many candy bars it will get easier." (3) "You need to eat healthy foods so your body is strong and you always have the energy you need." Response options for those in the control condition

[3] Mares and Acosta's (2008) investigation of children's thematic understanding of *Clifford: The Big Red Dog*, a TV show, informed the theme generation, recognition, and generalization tasks.

included the following: 1) “If your friend does something wrong, you should always tell the truth, even if they will get in trouble.” 2) “When you start running it is really hard, but if you run with a friend it will get easier.” 3) “In order to get along with your friend, you need to remember that you cannot always get your way.”

Theme generalization. The researcher asked participants to generalize the theme of the story they listened to earlier by selecting the most concordant storybook synopsis (i.e., “Okay, now I’ll tell you about three new storybooks. One of these new storybooks has the same lesson as the story you heard. I want you to pick which of these new storybooks has the same lesson as the story you listened to earlier.”). In the bear and human conditions three response options were given, with pronouns matched to participant gender, in systematically varied orders: (1) “Jamie goes to his (her) favorite pizza shop near his (her) house. He (she) learns how to make a really good pepperoni pizza for his (her) parents.” (2) “Jamie really wants chocolate ice cream, but he (she) does not have enough money to buy a cone. He (she) learns to save his (her) money.” (3) “Jamie drinks a milkshake, but after he (she) is too tired to play. He (she) learns to eat the right food so he (she) can play.” Participants in the control condition choose between the following: (1) “Jamie and his (her) friend go to a big park near their homes. They learn how to swing really high on the swing set.” (2) “Jamie and his (her) friend want to buy a birthday present, but they do not have enough money. They learn to save their money.” (3) “Jamie and his (her) friend put together a hard puzzle. They learn it is easiest to find the right pieces when they take turns.”

Next, participants completed two memory assessments to examine whether memory for story events and the order in which they occur affected performance on the behavioral and theme tasks.

Event discrimination. The researcher placed six illustrations before the participant in a fixed order. Three illustrations depicted events in *The Berenstain Bears and Too Much Junk Food* (bear and human conditions) or *The Berenstain Bears and the Trouble with Friends* (control condition), and three distractor illustrations depicted events in other Berenstain Bears storybooks. Illustrations used for the bear and human conditions included food, and illustrations in the human condition depicted humans. The participant was prompted to select only those events which occurred in the story they listened to earlier (i.e., "Okay, these pictures show Brother, Sister, Mama, and Papa. Some of these pictures were in the story you listened to earlier and some were not. Please give me all the pictures that were in the storybook you listened to earlier."). All participants received one final prompt before the researcher moved to the next task (i.e., "Are there any more pictures that were in the story you listened to earlier?").

Temporal accuracy. The researcher placed five unique illustrations of events from *The Berenstain Bears and Too Much Junk Food* (human and bear conditions) or *The Berenstain Bears and the Trouble with Friends* (control condition) before the participant in a fixed order and participants received a prompt to place the illustrations in the order in which they appeared in the story (i.e., "Okay, here are some pictures from the story you listened to earlier. Please show me which picture shows the first thing that happened. What happened next? And then what happened? What happened after that?").

Storybook familiarity. Familiarity with the storybook could have impacted children's performance. The researcher assessed prior storybook exposure by asking participants to indicate approximately how often they listened to the story before their visit (i.e., "Okay, now I would like you to tell me how many times you heard the story before today."). Response options

included the following: 1) never heard the story before today; 2) heard the story a few times before today; and 3) heard the story many times before today.

Language assessment. Language comprehension differences may have affected participants' comprehension of storybook material. Participants completed the Peabody Picture Vocabulary Test—Fourth Edition (Dunn & Dunn, 2007), a measure of receptive vocabulary, to allow this relationship to be tested.

Parental questionnaire. Parents completed a brief questionnaire while their child participated (see Appendix A). The purpose of this questionnaire was threefold. First, in an effort to guard against possible experimenter effects during the food preference task, parents ranked their child's preferences for the three foods used in the study. Second, parents provided the lesson of the exact storybook read to their child, and rated how effectively the storybook conveyed the lesson and their confidence their child would ascertain the lesson. Finally, a series of questions sought to assess their child's familiarity with the *The Berenstain Bears and Too Much Junk Food*, and with Berenstain Bear books more generally, as well as their daily storybook exposure.

2.1.4 Coding.

Transfer of theme-consistent behavior. The foods participants consumed during the researcher's absence were noted. Each serving of food was weighed before and after the consumption period to yield the quantity consumed in ounces. A proportion consumed score (i.e., ounces consumed/ounces administered) was calculated for each food to allow for comparisons across foods.

Theme generation. Participants' responses were transcribed and coded offline according to a 4-point scheme: *wrong/do not know* (0); *too concrete* (1; e.g., bears should eat healthy);

underdeveloped abstraction (2; e.g., need to eat vegetables; do not eat candy); *developed abstraction* (3; e.g., we should eat healthy to have the energy we need).

Theme recognition. Participants earned 1 point if they selected the correct response (range: 0 – 1).

Theme generalization. Participants earned 1 point if they selected the correct response (range: 0 – 1).

Event discrimination. Participants earned 1 point for each correct illustration they identified and lost 1 point for each incorrect illustration they identified (range: -3 – 3).

Temporal accuracy. Participants earned 1 point for each correctly ordered successive event (range: 0 – 4). For example, suppose a participant ordered the five events as follows: 5, 1, 2, 3, 4. This participant received 3 points, one for each correct successive pair (i.e., 1-2, 2-3, and 3-4).

Storybook familiarity. Participants' responses were coded according to a 3-point scheme: (0 = *never heard the story before today*; 1 = *heard the story a few times before today*; 2 = *heard the story many times before today*).

2.2 Results.

2.2.1 Analysis objectives. The two aims of Study 1 stipulated the analyses. Aim 1 concerned children's abilities to extract a theme from a storybook and later behave in a manner concordant with it; thus there were two issues: theme extraction and behavioral transfer. Furthermore, examining how anthropomorphic storybook characters affected these two prongs addressed Aim 2.

2.2.2 Demographic and control variables. A series of ANOVAs revealed no significant differences between conditions in age, familiarity with *The Berenstain Bears and Too Much Junk*

Food or the Berenstain Bears series more generally, daily storybook exposure, memory measures, or receptive vocabulary, $Fs(2, 42) \leq 1.80$, $ps \geq .18$.

2.2.3 Theme extraction. Children's performance on the theme generation, identification, and generalization measures informed whether they extracted the theme from the storybook. Of interest were the following inquiries: (1) How well do 4- and 5- year olds perform on these tasks? Specifically, were 4- and 5-year-olds' theme generation scores significantly different from each of the scoring levels in that task? (2) Was there a relationship between age and theme generation, identification, and generalization performance? (3) What circumstances (e.g., character form) influenced children's performance on theme comprehension measures? Below, I address each of these questions in turn by task, limiting discussion to the experimental groups (bear and human) to avoid confounding storybook theme.

Theme generation task. Considering the sample as a whole, a majority of children (67%) provided an underdeveloped abstraction (e.g., do not eat candy). An independent samples *t*-test, revealed a significant age difference on the theme generation task, $t(28) = -2.16$, $p = .04$, $d = -.97$, such that 4-year-olds ($M = 1.00$) performed worse than 5-year-olds ($M = 1.71$). Four-year olds scored significantly above 0 (i.e., *no response/wrong*), $t(15) = 3.87$, $p = .002$, $d = 0.97$, but not significantly different from 1 (i.e., *too concrete*), $t(15) = 0$, $p = 1$, $d = 0$. In contrast, 5-year-olds scored significantly above 0, $t(13) = 8.83$, $p < .001$, $d = 2.34$, and 1, $t(13) = 3.68$, $p = .003$, $d = .97$, but their scores were not significantly different from 2 (i.e., *underdeveloped abstraction*), $t(13) = -1.47$, $p = .16$, $d = -.40$.

An important aim of this study was to identify predictors of children's theme generation performance. Children provided either an incorrect response or underdeveloped abstraction, thus a logistic regression analysis was conducted with theme generation performance serving as the

response variable. Given the aforementioned effect of age, it was entered first in the model. Unsurprisingly, age was a significant predictor, with older children demonstrating a greater probability of providing an underdeveloped abstraction, Wald $\chi^2(1, N = 30) = 4.93$, $p = .026$, Odd Ratio = 1.17 [1.02, 1.35]. Specifically, the odds of an average 5-year-old ($M = 66.3$) providing an underdeveloped abstraction were approximately 7 times that of the average 4-year-old ($M = 54.5$). Elevated multicollinearity prevented entering multiple predictors in the logistic regression simultaneously, thus an alternative independent samples *t*-test framework was employed, with group 1 including children who provided an incorrect response and group 2 consisting of those who provided an underdeveloped abstraction. There were no significant differences between these groups with regard to familiarity with *The Berenstain Bears and Too Much Junk Food* and the Berenstain Bears series more generally, daily exposure to storybooks, memory measures, or receptive vocabulary, $ts(28) \leq 1.33$, $ps \geq .20$. A chi-square test of independence failed to reveal a significant effect of condition, thus anthropomorphic characters neither aided nor hindered children's performance.

Theme identification task. Children did well on the theme identification task, choosing the correct theme significantly more often than chance, $\chi^2(1, N = 30) = 29.40$, $p < .001$, $\phi_c = 0.99$. A logistic regression analysis failed to identify any significant predictors of task performance.

Theme generalization task. Participants chose the correct response from the three response options only 33% of the time (i.e., chance performance). To identify predictors of children's theme generation performance, a logistic regression was conducted. Theme generalization performance served as the response variable, with age entered as the first predictor. Children's age significantly predicted theme generalization performance, with older children demonstrating a greater probability of selecting the correct response, Wald $\chi^2(1, N = 30)$

= 5.20, p = .023, Odds Ratio = 1.19 [1.02, 1.38]. Specifically, the odds of an average 5-year-old correctly generalizing the theme were approximately 8 times that of the average 4-year-old. As with the theme generation task, elevated multicollinearity prevented entering any further predictors in the logistic regression, requiring the adoption of an independent samples *t*-test framework, with group 1 consisting of participants who failed to generalize theme and group 2 containing those who succeeded. These analyses revealed a significant effect of temporal accuracy, $t(28) = -2.90$, $p = .007$, $d = -1.12$, such that those participants who failed to generalize the theme correctly ordered fewer successive events ($M = 2.05$) than peers who did generalize the theme ($M = 3.60$). There were no significant differences between these groups with regard to familiarity with *The Berenstain Bears and Too Much Junk Food* or the Berenstain Bears series more generally, daily exposure to storybooks, or receptive vocabulary, $ts(28) \leq -1.32$, $ps \geq .22$. A chi-square test of independence failed to reveal a significant effect of condition, thus anthropomorphic characters neither aided nor hindered children's performance.

2.2.4 Behavioral transfer. Data from the immediate posttest addressed questions in this domain. Of particular interest was the following: (1) the conditions affecting children's willingness to consume each food option; and (2) seeking predictors of the proportion of food consumed.

Foods consumed. Overall, Skittles were most frequently consumed, with approximately 89% of participants eating the candy at some point during the 2½ minute consumption period. A series of chi-square goodness of fit tests were carried out to investigate whether participants in the bear and/or human conditions demonstrated a significantly different pattern of consumption than the control group, which was not exposed to a story about eating healthily. Participants in the human condition demonstrated similar patterns of consumption as the control group for all

foods, whereas participants in the bear condition demonstrated significantly different patterns of consumption than the control group with regard to cucumbers, $\chi^2(1, N = 15) = 5.45$, $p = .02$, $\phi c = .60$, but neither skittles nor carrots. Specifically, standardized residuals indicated more children in the bear condition ate cucumbers than would be expected from the control condition ($z = 2.34$, $p = .02$). Table 1 shows overall counts of children who consumed each food by condition.

To investigate the role of character form in children's food consumption three chi-square tests of independence were conducted comparing bear and human conditions, one for each food. Each of these tests was nonsignificant. Finally, a series of logistic regressions and chi-square tests of independence revealed that theme assessment performance, familiarity with *The Berenstain Bears and Too Much Junk Food* or the Berenstain Bears series more generally, daily exposure to storybooks, memory measures, and receptive vocabulary were not related to whether children consumed foods.

Quantity of foods consumed. Of particular interest was whether hearing a storybook about healthy eating would affect the amount of candy and vegetables consumed by participants. To investigate this question, two hierarchical regression models were constructed, one where proportion of Skittles consumed served as the response variable and another predicting proportion of vegetables consumed. Both models adhered to a four-step procedure. Control variables (e.g., age, gender, receptive vocabulary, food preferences, etc.) were entered in the first step, and the second step was devoted to examining the contribution, if any, of children's performance on the theme generation, identification, and generalization tasks. Third, condition differences were examined along with interactions between condition and any variables in the model. Fourth, because whether theme comprehension impacted theme-consistent behavior was of interest, interactions between theme assessment performance and condition were examined.

After each step, nonsignificant and multicollinear predictors (i.e., variance inflation factor above 10; Hair, Anderson, Tatham, & Black, 1995; Marquardt, 1970) were removed.

Proportion of Skittles consumed. Before conducting the four-step model construction procedure outlined above, the Skittles consumption data was examined for outliers. This revealed one participant in the bear condition whose Skittles consumption was 3.64 standard deviations above the sample mean and 3.12 standard deviations above the condition mean, thus this participant was excluded from the regression analyses predicting proportion of Skittles consumed. In Step 1, time of day and children's familiarity with Berenstain Bears books were significant predictors. Step 2 revealed children's performance on the theme tasks did not predict Skittles consumption, thus these variables were removed from the model. In Step 3, condition and a Condition x Berenstain Bear Familiarity interaction term explained unique variance beyond the demographic variables entered in Step 1. No additional interaction effects were detected in Step 4. The resulting model, shown in Table 2, explained 51% of the variance in the proportion of Skittles participants consumed, $F(6,37) = 6.46$, $p = .0001$.

The positive regression weight for time of day indicates that those children who participated in the afternoon ate a greater proportion of Skittles than those who participated in the morning. The presence of Condition x Berenstain Bear Familiarity interaction term renders interpreting main effects of condition and Berenstain Bear familiarity inappropriate. After probing the interaction term further, it was determined that the more frequently parents reported reading the Berenstain Bears to children in the bear condition the less Skittles they consumed, proportionally, and the regression slope was significantly different from that for the human group. Importantly, the human and control conditions did not significantly differ from one another.

Proportion of vegetables consumed. The same model construction procedure was followed for predicting proportion of vegetables consumed. In Step 1, age and children's familiarity with *The Berenstain Bears and Too Much Junk Food* were significant predictors. Step 2 revealed children's performance on the theme tasks did not predict vegetable consumption, thus these variables were removed from the model. In Step 3, condition and a Condition x Storybook Familiarity interaction explained unique variance beyond the demographic variables entered in Step 1. Again, no additional effects were detected in Step 4. The resulting model, shown in Table 3, explained 53% of the variance in the proportion of Skittles participants consumed, $F(6,38) = 7.04$, $p < .0001$.

The positive regression weight for age indicates that older children ate a greater proportion of vegetables than younger peers. The presence of Condition x Storybook Familiarity interaction term renders interpreting main effects of condition and storybook familiarity inappropriate. After probing the interaction term further, it was determined that the more frequently parents reported reading the *The Berenstain Bears and Too Much Junk Food* to children in the bear condition the more vegetables they consumed, proportionally, and the regression slope was significantly different from that for the control group, where the effect of storybook familiarity was near 0. Importantly, the slope for the human conditions did not differ from that of the control.

Weighted proportion of foods consumed. Although models examining the proportion of Skittles and vegetables participants consumed elucidate significant predictors of transferring theme-consistent behavior, they do not consider transfer distance. To account for transfer distance, proportions of food consumed were weighted by values reflecting transfer distance, and a sum of these three weighted scores was calculated for each participant.

The Berenstain Bears and Too Much Junk Food includes references to carrots, but not cucumbers. Consequently, eating carrots is a demonstration of near transfer of theme-consistent behavior, as no generalization of information in the book is required. Eating cucumbers requires a more difficult type of transfer. The Berenstains never eat or reference cucumbers in the book, although they do learn about eating healthier foods in general, like fruits and vegetables. Thus, eating cucumbers requires that the participant generalize the theme to food not directly referenced in the story, an example of far transfer. To reflect the theoretical value associated with eating each type of food, proportion of cucumbers consumed was weighted more than proportion of carrots consumed (i.e., 2 vs. 1), as the former reflected a case of far transfer of theme-consistent behavior, whereas the latter qualified as near transfer. In contrast, proportion of Skittles consumed was negatively weighted (i.e., -1), as engaging in this behavior was counter to the storybook theme. The 4-step model construction procedure predicting weighted proportion of foods consumed yielded similar predictors as the model explaining proportion of vegetables consumed (see Table 4). Children familiar with the storybook in the bear condition had the highest weighted proportion scores, indicating a larger proportion of vegetables consumed and a lower proportion of Skittles consumed.

2.2.5 Parental survey. In addition to providing demographic information (e.g., children's familiarity with *The Berenstain Bears and Too Much Junk Food*) the parental survey informed the following: (1) whether adults successfully generated the theme of the story; (2) parents' assessment of how effectively the storybook conveyed the theme; and (3) parents' confidence that their child would identify the lesson conveyed in the storybook. Each of these is discussed below, in turn.

Theme identification. Overall, parents successfully identified the theme of *The Berenstain Bears and Too Much Junk Food*. Specifically, after coding the themes generated by the parents according to the same 4-point scheme used with the child data (0 = *wrong/do not know;* 3 = *developed abstraction*) parents often generated developed abstractions (M = 2.77, SD = .43). Theme generation scores did not significantly differ as a function of character form.

Storybook effectiveness. Parents thought the storybook effectively conveyed the theme, with over 86% responding with a 5 (n = 19) or 6 (n = 7) on the 6-point rating scale (1 = *extremely ineffective*; 6 = *extremely effective*) across the experimental groups. Parents' effectiveness ratings did not differ as a function of character form.

Confidence in child theme identification. Overall, parents were optimistic about their children's ability to identify the lesson conveyed, with over 76% responding with a 5 (n = 14) or 6 (n = 9) on the 6-point rating scale (1 = *extremely unconfident*; 6 = *extremely confident*). Parents' ratings did not differ as a function of condition.

2.3 Discussion. This study sought to examine (1) children's ability to identify thematic content in a storybook and use it to guide their behavior; and (2) whether anthropomorphized animal characters were efficacious or deleterious to the conveyance of thematic content. The results demonstrate that although children often failed to generate an abstract theme and generalize the theme to another context, they were quite successful at selecting the target theme among distractors. Children's performance cannot be attributed to low-level characteristics of the stimuli, as references to food appeared uniformly across choices presented to children in the theme identification task. Anthropomorphic characters neither aided nor hindered children's performance on any of the theme tasks.

In contrast to the theme comprehension results, anthropomorphic characters did aid children's behavioral application of thematic content. Specifically, participants in the bear condition, particularly those who were more familiar with the Berenstain Bears storybook series, ate significantly smaller proportions of Skittles than participants in the human and control conditions. Similarly, participants in the bear condition, particularly who were more familiar with the *The Berenstain Bears and Too Much Junk Food*, ate a significantly greater proportion of vegetables than peers in the human and control conditions. Thus, children in the bear condition applied thematic content in two ways that children in the human condition did not: (1) eating less of the unhealthy food (i.e., Skittles); and (2) eating more of the healthy foods (i.e., cucumbers and carrots). Additionally, this beneficial effect of the anthropomorphic bear characters was stronger for children more familiar with the Berenstain Bears series generally and especially for those familiar with the *Berenstain Bears and Too Much Junk Food* storybook, respectively. Finally, these effects held when accounting for transfer distance of theme-consistent behavior.

Taken together, the results revealed a dissociation between anthropomorphic characters' role in storybooks: Their presence appeared irrelevant to conveying thematic content, but significant to guiding behavior.

If neither anthropomorphic characters nor the host of other demographic characteristics explored in the current study affect the extraction of thematic content, what does? To begin to address this question it is helpful to examine Mares and Acosta (2008), the study that informed the thematic tasks used in the current study. Mares and Acosta found a substantially different pattern of theme data in their study. For example, 81% of 5-year-olds gave an incorrect response when asked to generate the theme (e.g., "there was no lesson"), whereas 86% of 5-year-olds in the current study generated an underdeveloped abstraction (e.g., "don't eat junk food"). The

same pattern of results holds across the theme identification (Mares & Acosta: 81% incorrect; Study 1: 21% incorrect) and generalization tasks (Mares & Acosta: 75% incorrect; Study 1: 66% incorrect); participants perform uniformly worse in Mares and Acosta. This may be due to the nature of the theme investigated, namely a health-related theme in the current study versus a peer inclusion theme in Mares and Acosta. Alternatively, the discordant results could be the result of medium-specific differences in children's ability to extract thematic content, as the current study involved storybooks and Mares and Acosta used a television episode of *Clifford the Big Red Dog*. It is this latter possibility that Study 2 sought to examine. Next I review prior research on children's learning from television as an introduction to Study 2.

Chapter 3

3 Tune in and…learn?

A large body of literature examines whether infants and toddlers acquire information from television sources (see Troseth, 2010). This work reveals a common theme: video sources are less efficacious than live interactions (i.e., video deficit effect; Anderson & Pempek, 2005). Evidence for a video deficit effect in infants and toddlers spans imitation (e.g., Hayne, Herbert, & Simcock, 2003), object retrieval (e.g., Schmitt & Anderson, 2002; Suddendorf, 2003; Troseth & DeLoache, 1998), and language (e.g., DeLoache et al., 2010; Kuhl, Tsao, and Liu, 2003) domains. The video deficit is only briefly mentioned here to preface this chapter's principal questions: (1) What content, if any, do 4- and 5-year-olds learn from television? (2) What conditions promote that learning, particularly understanding show themes? (3) How do children view the reality status of television content? In an effort to provide background for Study 2, literature addressing each of these questions is reviewed in turn.

3.1 Television's effects on children. Researchers have explored television's impact on preschool children in at least four domains: (1) racial biases; (2) prosocial behaviors; (3) aggression; and (4) food preferences and consumption. A body of literature also exists on preschooler's ability to learn words from television (e.g., Fisch, Truglio, & Cole, 1999; Rice, Huston, Truglio, & Wright, 1990; Rice & Woodsmall, 1988; Thakkar, Garrison, & Christakis, 2006), but is beyond the scope of the current dissertation. Below, I review literature from each of these four domains.

3.1.1 Racial biases. Several studies have explored whether television programming effectively reduces racial prejudice. One of the earliest empirical investigations on this topic demonstrated that 3- through 5-year-olds who viewed two 2½ minute episodes of *Sesame Street*

that reinforced integration between races (e.g., Caucasians and non-Caucasians playing together in a park) later expressed a preference to play with multiracial children over Caucasian children, whereas children in a control group who did not view the episode demonstrated a same-race bias (Gorn, Goldberg, & Kanungo, 1976). Importantly, children viewed each episode at least twice and were tested immediately following viewing. In a follow-up study examining the duration of this effect, Goldberg and Gorn (1979) replicated their earlier finding when testing occurred immediately following exposure, but not after a 24-hour delay. Researchers have also examined whether other programming beyond *Sesame Street* effectively reduces children's racial biases. For example, Houser (1978) showed 5- through 9-year-olds Anti-Defamation League films emphasizing that race should not be crucial when choosing social partners. After viewing the films, children demonstrated a significant decrease, as compared to pre-viewing, in same-race biases.

Not all studies in this area have yielded positive effects. Persson and Musher-Eizenman (2003) showed that viewing pro-diversity programming for 3 weeks did not affect 3- through 6-years-olds' same-race biases. These researchers also examined children's understanding of the program content and found that although comprehension improved over the viewing period, it was unrelated to changes in children's racial biases. Further, Cole et al. (2003) documented a deleterious effect associated with viewing pro-diversity content: Palestinian 4- and 5-year-olds described Israelis using more negative attributes after viewing than before. In sum, researchers who have used television programming as a means to intervene on preschooler's racial biases have experienced success in some cases (e.g., Gorn et al., 1976), null results on other occasions (e.g., Persson & Musher-Eizenman, 2003), and even reverse effects (e.g., Cole et al., 2003).

Importantly, even studies yielding positive effects have demonstrated such effects are ephemeral, disappearing after only 24 hours.

3.1.2 Prosocial behaviors. A large number of researchers have investigated whether there is a link between viewing prosocial content on television and children's later prosocial behavior. In two meta-analyses, Hearold (1986) and Mares (2005) reached the same conclusion: There is a moderate relationship between exposure to prosocial content on television and children's expression of prosocial behaviors and/or attitudes (but see Thakkar et al., 2006). However, over 95% of studies in Mare's meta-analysis examined post-viewing effects less than 24 after initial exposure. Researchers who have included longer delays between exposure and testing often report no significant effects (e.g., Friedrich-Cofer, Huston-Stein, McBride Kipnis, Susman, & Clewett, 1979; Friedrich, & Stein, 1973; Tower, Singer, Singer, & Biggs, 1979). Importantly, Mares' meta-analysis revealed a significant age effect, such that the peak efficacy of the medium appeared to occur when children were approximately 7 years old, suggesting that younger children might not stand to benefit as much from the medium. This is consistent with Mares and Acosta (2008), who demonstrated that 5-year-olds who viewed an episode of *Clifford the Big Red Dog,* where Clifford and his friends accepted a three-legged dog into their group, failed to generate, recognize, and generalize the theme.

In sum, there is a significant body of research demonstrating that viewing prosocial content on television results in prosocial behavior thereafter. However, as with studies investigating television's use as a means to reduce racial biases, the majority of researchers used immediate posttest measures, and those who did not failed to demonstrate significant effects.

3.1.3 Aggression. One of the earliest and most striking examples of television's influence on aggressive behavior examined 3- through 6-year-olds' imitation of novel aggressive actions

conveyed through live demonstration or film (Bandura, Ross, & Ross, 1963). Viewing aggressive acts on television resulted in similar levels of imitation as viewing the same aggressive acts carried out live, and both of these exposure groups demonstrated significantly greater levels of aggression than a control group which did not view the acts. Moreover, characteristics of the individual (i.e., gender) who modeled the behavior affected the nature and content of participants' imitative behavior.

In the 50 years since Bandura and colleagues' original work, longitudinal studies (e.g., Christakis & Zimmerman, 2007) and meta-analyses (e.g., Paik & Comstock, 1994; Wood, Wong, & Chachere, 1991) have demonstrated a generalized relationship between viewing aggressive content on television and subsequent aggressive acts. However, the proper comparison for the current dissertation is a single viewing event. Excepting my own work (Smith & Lillard, in preparation), few studies have directly pitted aggression conveyed through film against matched aggressive acts present in a storybook. In my study, 4-year-olds who listened to a storybook with a gender-matched character who carried out the same aggressive acts used in Bandura et al. (1963) were significantly more likely to imitate the aggressive acts than a control group not exposed to the acts. In contrast to the storybook condition and the results from Bandura et al. (1963), participants who viewed the aggressive acts on television did not differ from the control group. Notably, groups did not differ on a parent-assessed measure of children's temperament.

Taken together, there is a well-established relationship between viewing violent television acts and subsequent aggressive behavior, but in the only study to my knowledge which examined transfer of matched, aggressive content from television *and* storybooks, only the latter resulted in a rate of transfer that significantly differed from the control condition. This suggests,

at least when considering transmission of aggressive acts, storybooks may be a more potent conveyor of information than television.

3.1.4 Food preferences and consumption. A number of empirical studies have examined the role television might play in children's food preferences. Many of these studies focus on the role that viewing commercial advertisements plays in children's food consumption, reporting that children prefer to consume advertised foods (see Coon & Tucker, 2002; Hastings et al., 2003; Story & French, 2004). Although these studies address how television affects children's food consumption, they stress a secondary component of the medium (i.e., commercials). Substantively fewer empirical studies address how television programs themselves affect children's food preferences and consumption, but I review the few that do below.

In an early study from this literature, Harris and Baudin (1972) examined whether viewing *Popeye the Sailor* influenced 5½ through 7½-year-olds' spinach consumption. Children who viewed the television show once opted to consume spinach more often than those who did not view the show; however, the proportion of spinach consumed did not differ between the experimental and control groups. A larger-scale study investigated whether showing 5- and 6-year-olds programs emphasizing the importance of eating healthily (e.g., *Slim Goodbody*, *Mulligan Stew*, and *Sesame Street*) led to improved health knowledge and/or increased consumption of healthy foods (Peterson, Jeffrey, Bridgwater, & Dawson, 1984). Although children's health knowledge improved relative to that of children who did not view the programs, their consumption of healthy foods did not increase. In contrast, researchers who showed first graders a 20-minute episode of *Fat Albert,* in which characters ate too much candy and did not have enough energy to play in a football game documented a positive effect associated with viewing the show (Goldberg, Gorn, & Gibson, 1978). Specifically, when

children who viewed the show were prompted to select foods they would like to eat, they selected a greater number of healthy foods (e.g., apples and carrots) over unhealthy alternatives (e.g., Crackerjacks and Fruity Pebbles), compared to peers who did not view the show. Thus, the studies that have examined children's response to television programming emphasizing healthy eating have yielded inconsistent results.

3.1.5 Summarizing television's effects on children. Television clearly affects children's prosocial (e.g., Mares, 2005) and aggressive (e.g., Paik & Comstock, 1994) behaviors, although empirical evidence related to the former indicates the effect is likely ephemeral and limited by age. In contrast, research from the racial bias and food preference/consumption domains is ambiguous: Some researchers report positive effects of the medium (e.g., Goldberg et al., 1978; Gorn et al., 1976), others negative effects (e.g., Cole et al., 2003), and still others fail to find significant effects at all (e.g., Peterson et al., 1984). Of particular significance to the current dissertation, it is clear that more work needs to examine whether children who view television shows promoting healthy eating behaviors comprehend the message and apply it in their daily lives. Next, I review characteristics of the medium and of preschoolers that may affect their ability to transfer and apply content from television programs.

3.2 Factors underlying television's effects on children. In this section I discuss the potential mechanisms underlying children's ability, or lack thereof, to transfer content from television programming. Specifically, I focus on cognitive characteristics of preschoolers and the medium itself to elucidate what may be responsible for successful (or unsuccessful) transfer of television content.

3.2.1 Memory and theme extraction. One aspect that may affect children's ability to transfer content from television programming is what they recall about the shows they view.

Researchers examined 4- through 6-year-olds' memory for *Sesame Street* episodes, exploring whether there were developmental differences in the content children and adults recalled from the shows (van den Broek, Lorch, & Thurlow, 1996). Results revealed marked developmental differences, with children significantly less apt to focus on the goals and intentions of characters in television shows than the adult comparison group. Further, younger children recalled significantly fewer events deemed to be causally linked to story events than older children. Together, these findings reveal that young preschool television consumers recall noncausal story events and often fail to consider characters' goals and intentions. Adding further support to this claim, when 5-year-olds summarized what occurred in a violent and aggressive television show, the majority of recollections focused on the violent actions themselves and, compared to older children, included significantly fewer mentions of the motivations underlying those actions (Collins, Berndt, & Hess, 1974).

In addition to exploring children's memory for television shows, researchers have investigated whether the form of educational content on television impacts preschooler's ability to comprehend programming. For example, 3- to 5-year-olds' comprehension of both theme-specific problems and solutions following exposure to television shows with concrete (i.e., cooperation) or abstract (i.e., honesty) themes yielded telling results. Specifically, although older children demonstrated significantly better comprehension of both episodes than younger children, the concrete theme was more readily comprehended across the sample than the abstract theme (Fisch, McCann Brown, & Cohen, 2001). Importantly, the show used in this study, *Koki*, featured an anthropomorphic family of chickens, making it similar to the content used both in the current study and Mares and Acosta (2008).

In sum, the studies reviewed in this section directly inform the current dissertation: If children fail to recall causal events from the Berenstain Bears television show, they may fail to recognize the causal connection between Papa, Brother, and Sister's junk food consumption and the Berenstains' poor running abilities (e.g., van den Broek et al., 1996). Further, children could focus on the junk food (or healthy food), failing to grasp the motivations for the Berenstains' avoidance of sweets and attraction to fruits and vegetables (e.g., Collins et al., 1974). Finally, the concrete theme of *The Berenstain Bears and Too Much Junk Food* may permit children to grasp it more readily in televised form than other abstract themes (e.g., social inclusion; Mares & Acosta, 2008).

Next, I consider preschooler's reality judgments of television content. If children judge content on television as unrealistic, they may be more likely to cordon off thematic content gleaned from programs, concluding it does not apply to real situations.

3.2.2 Reality status. Whether preschoolers transfer knowledge from televised sources could in large part depend on the extent to which they believe television programs reflect reality. Research in this domain has explored children's comprehension of the symbolic nature of television, revealing that before age 4 children often fail to make a distinction between television and reality. For example, when 2-year-olds viewed an egg being broken on television they attempted to clean it up (Jaglom & Gardner, 1981). Further, when asked what would happen to a bowl of popcorn on television if the television were turned over, 3-year-olds believed popcorn would spill out of the bowl (Flavell, Flavell, Green, & Korfmacher, 1990). These reality confusions become infrequent with age, with most reported in children younger than 4 years old. Below, I review the limited work examining 4- and 5-year-old's beliefs about the reality of television.

In the most extensive study in this area, researchers recruited 5- and 7-year-olds and asked them a number of questions about their favorite television shows (Wright, Huston, Reitz, & Piemyat, 1994). In addition, children viewed clips of news broadcasts, documentaries, and matched fantastical content (e.g., a documentary about making *The Wizard of Oz* versus matched scenes from the movie). Results pertaining to children's favorite shows demonstrated that they most often acknowledged that these shows happened only on television and not in real life. However, 7-year-olds were more likely than 5-year-olds to report that characters in their favorite show were like people in the real world. Although children in both age groups differentiated between realistic and fantastic clips, 5-year-olds were more likely to demonstrate a bias towards responding that real events (e.g., launching of space shuttle) occurred just on television and not in real life, consistent with related studies (e.g., Hawkins, 1977). Thus, 5-year-olds appear to assume that even realistic television content does not occur in real life, reflecting evidence from the storybook literature (see Section 1.2.2).

Nikken and Peeters (1988) extended Wright et al.'s study by examining 4- to 7-year-olds' judgments not only on the reality status of *Sesame Street* content, but also on medium-specific aspects of the show, such as the ability to communicate with characters (e.g., "If you hold a drawing in front of the television can [character] see the drawing?") and whether characters are confined to the television set (e.g., "If [character] is on television, can you take her out of the television?"). Results revealed that age, particularly for 4- to 6-year-olds, affected reality judgments, with older children more apt than younger peers to recognize that they could not communicate with *Sesame Street* characters (and that those characters could not cross the television-reality boundary).

Taken together, the limited research on how preschoolers view the reality status of television content reveals a developmental progression: Children first struggle with representational issues, failing to separate television content from reality (Jaglom & Gardner, 1981; Flavell et al., 1990). Around 5 years old, children distinguish between television and reality, sometimes too staunchly (Hawkins, 1977; Wright et al., 1994). If children maintain an overly strict boundary between television content and reality it may limit their willingness to view content from the Berenstain Bears television show as applicable to their own lives.

3.2.3 Parasocial relationships. Children may be more apt to learn from television programming if they are familiar with the characters on the show, effectively treating them as trusted informants. Developing a close relationship with an on-screen or narrative character is referred to as a parasocial relationship (Giles, 2002). Only two studies examine the hypothesis that familiarity with fictional television characters may affect how preschoolers learn from television programming (but see Lauricella, Gola, & Calvert, 2011).

In the first study, 4-year-olds viewed an episode of *Dora the Explorer,* where the main character demonstrated divergent thinking when solving a problem (Calvert, Strong, Jacobs, & Conger, 2007). Next, they completed tasks assessing divergent thinking, and self-similarity to and identification with Dora. They found that 4-year-olds who thought they were similar to Dora performed significantly better on the divergent thinking task than peers who felt they were different from Dora. In the second study, researchers recruited 2- to 5-year-olds either familiar with Blue, the main character in the children's television show *Blue's Clues*, or unfamiliar with the character (Anderson et al., 2000). Those familiar with Blue continued to watch the television show throughout the study, with their viewing patterns tracked. Standardized cognitive assessments were administered throughout the longitudinal study (e.g., Kaufman Assessment

Battery for Children and Kaufman Brief Intelligence Test), and children familiar with *Blue's Clues* performed significantly better than age-matched peers who had not seen the show. However, the researchers did not examine whether liking *Blue's Clues* or Blue herself resulted in differential performance on the measures, thus it remains uncertain whether these factors contributed to the results.

In sum, self-assessed similarity to a television show character resulted in the transfer of behavior modeled by that character. Further, the only study to investigate the acquisition of general cognitive abilities failed to parse apart whether the gains demonstrated were attributable to children's relationship with the main character. Certainly, more research is needed to elucidate whether relationships with television characters affect children's ability to learn from the medium and apply this knowledge to behavior.

Study 1 raised the following question: Does medium have something to do with children's generally poor ability to extract thematic content from a story? The research on television reviewed in this chapter suggests that children are capable of extracting thematic content and behaving in a manner consistent with that information, at least in some circumstances for abbreviated spans of time. Taken together, this set the stage for Study 2, in which a commercial television show was pitted against a matched storybook to determine if medium itself influences children's ability to extract and apply thematic content.

Chapter 4

4 Study Two

Study 1 revealed that 5-year-olds, on average, performed better on all theme assessments than 5-year-olds in Mares and Acosta (2008). The medium through which the thematic content was conveyed could have been one reason for the dissociation: Study 1 involved a storybook, whereas Mares and Acosta used a television episode. One way to test this hypothesis is to use matched thematic content conveyed through each medium, effectively examining whether children's ability to identify thematic content and use it to guide their behaviors in the real world is contingent on the medium through which the thematic content is conveyed.

4.1 Method.

4.1.1 Participants. Twenty-nine 4- to 5-year-olds were randomly assigned to one of two conditions: (1) storybook, where children were read a modified version of *The Berenstain Bears and Too Much Junk Food* (storybook: n = 15, 7 girls, M = 58.6, range = 48.4 – 70.7); or (2) video, where participants watched a professionally-produced television episode of *The Berenstain Bears and Too Much Junk Food* (video: n = 14, 8 girls, M = 62.4, range = 48.6 – 71.8). All parents/guardians provided informed consent prior to their children participating. A majority of participants were Caucasian and came from middle- to upper-middle class backgrounds.

4.1.2 Materials. Although the thematic content was retained, *The Berenstain Bears and Too Much Junk Food* television episode focused on the Berenstain family's preparation to run in the Bear Country Three Mile Race and featured Papa as the family member who struggled with junk food consumption the most, whereas the original book focused less on the race and more on Brother, Sister, and Papa struggling with junk food consumption. For these reasons a modified

storybook was used in the current study. The dialogue in the storybook was matched to that in the television episode and images within the storybook were stills from the episode. Both the television episode and the storybook reading were similar in length, with the latter, on average, lasting 40 seconds longer than the former.

Carrots, cucumbers, and Skittles were used in the food preference and consumption tests.

4.1.3 Procedure. The procedure and scoring for Study 2 followed that of Study 1 with two exceptions. First, participants assigned to the video condition viewed the *Berenstain Bears and Too Much Junk Food* episode on a 13" laptop. Second, two versions of the parental questionnaire were used in the current study, one for parents of children assigned to the storybook condition (see Appendix A) and one for parents of children assigned to the video condition (see Appendix B).

4.2 Analysis plan. Analyses for this study examined whether the medium through which thematic content was conveyed affected (1) children's ability to extract a theme; and (2) transfer of theme-consistent behavior. These issues are addressed in turn.

4.3 Results.

4.3.1 Demographic variables. A series of ANOVAs failed to reveal any significant differences between conditions with regard to age, receptive vocabulary, familiarity with *The Berenstain Bears and Too Much Junk Food* or the Berenstain Bears series more generally, daily storybook exposure, or memory measures, $Fs(1, 27) \leq 2.58$, $ps \geq .12$.

4.3.2 Theme extraction.

Theme generation task. Overall, a majority of children (74%) provided an underdeveloped abstraction (e.g., "Don't eat candy"). An independent-samples *t*-test revealed significant age-related performance differences, $t(27) = -4.00$, $p < .0001$, $d = -1.10$, such that 4-

year-olds (M = 0.93) performed worse than 5-year-olds (M = 2.07). Four-year olds scored significantly above 0 (i.e., *no response/wrong*), $t(14) = 3.50$, $p = .004$, $d = 0.90$, but not significantly different from 1 (i.e., *too concrete*), $t(14) = -0.25$, $p = .80$, $d = -.07$. In contrast, 5-year-olds scored significantly above 0, $t(13) = 29$, $p < .001$, $d = 7.66$, and 1, $t(13) = 15$, $p < .001$, $d = 1.04$, but their scores did not significantly differ from 2 (i.e., *underdeveloped abstraction*), $t(13) = 1.00$, $p = .34$, $d = 0.07$.

To investigate whether condition was a significant predictor, a logistic regression framework was employed, with theme generation performance recoded as in Study 1 and entered as the response variable. Age was entered first in the model, given the results of the independent samples *t*-test, and was a significant predictor, such that older children were more likely than younger children to provide an underdeveloped abstraction, Wald $\chi^2(1, N = 29) = 8.89$, $p = .003$, Odds Ratio = 1.21 [1.04, 1.41]. The odds of an average 5-year-old (M = 67.5) providing an underdeveloped abstraction, rather than an incorrect response, were approximately 14 times that of the average 4-year-old (M = 53.9). Multicollinearity prevented adding additional predictors, thus a series of independent samples *t*-tests were conducted to examine group differences between children who gave an incorrect response and those who generated an abstraction. These tests revealed significant group differences in expressive vocabulary, $t(27) = -2.71$, $p = .012$, $d = -0.91$, and familiarity with *The Berenstain Bears and Too Much Junk Food*, $t(27) = 2.04$, $p = .052$, $d = 0.59$, such that children who generated an abstraction had higher expressive vocabulary scores and were less familiar with *The Berenstain Bears and Too Much Junk Food* than peers who gave an incorrect response. Additional *t*-tests and chi-square analyses failed to reveal significant differences related to condition, familiarity with the Berenstain Bears series, daily exposure to storybooks, or memory, $ts(27) \leq .73$, $ps \geq .47$.

Theme identification. Across conditions, participants performed well on the theme identification measure, selecting the correct theme significantly more often than chance, $\chi^2(1, N = 29) = 31.88$, $p < .001$, $\phi_c = 1.05$. A chi-square test of independence revealed that theme identification differed as a function of condition, $\chi^2(1, N = 29) = 4.21$, $p = .04$, $\phi_c = 0.38$. Specifically, 100% of the children in the storybook condition identified the correct theme, whereas only 64% of the children in the video condition did so.

To identify significant predictors of theme identification performance a logistic regression was conducted, with theme identification as the response variable. This analysis failed to reveal any statistically significant predictors of theme identification.

Theme generalization. Performance on this task was low, with participants selecting the correct response 31% of the time, approximately at chance (i.e., 33%). A logistic regression failed to identify any significant predictors of theme generalization task performance.

4.3.3 Behavioral transfer.

Consumption behavior. Across conditions, Skittles were the most frequently consumed food, with 83% of participants consuming the candy during the consumption period. To examine whether consumption patterns differed as a function of condition, a series of chi-square tests of independence was conducted. These tests revealed a trend with regard to carrot consumption, $\chi^2(1, N = 29) = 3.55$, $p = .06$, $\phi c = .35$, such that approximately 47% of participants consumed carrots in the storybook condition, whereas approximately 14% of participants consumed this vegetable in the video condition. No condition differences emerged with regard to cucumber or Skittles consumption. Table 5 shows overall counts of food consumed by condition

Next, in an effort to identify predictors of food consumption, a series of logistic regressions were carried out, with whether participants consumed each of the foods serving as

the response variables. These analyses failed to identify any significant predictors of consuming cucumbers or Skittles. However, familiarity with Berenstain Bears series, condition, and a Condition x Berenstain Bear Familiarity interaction term emerged as significant predictors of consuming carrots. The presence of an interaction term renders interpretation of the main effects inappropriate; however, it is possible to probe the interaction. As Table 6 shows, familiarity with the Berenstain Bears series differentially affected participants' probability of consuming carrots as a function of condition, with familiarity increasing the probability of consumption in the storybook condition and decreasing probability of consumption in the video condition.

Quantity of foods consumed. Proportion scores were calculated for Skittles and vegetables by dividing the quantity of food(s) eaten in ounces by the quantity of food(s) provided in ounces. Three hierarchical regressions were carried out to investigate predictors of the following: (1) proportion of Skittles consumed; (2) proportion of vegetables consumed; and (3) weighted proportion of foods consumed. These models adhered to the model selection process outlined in Study 1 (see Section 2.3.3). Below, I discuss the results of each of these models.

Proportion of Skittles consumed. Inspection of the data revealed one outlier. A participant in the storybook condition had a proportion of Skittles consumed score that was 4.18 standard deviations above the sample mean ($SD = 0.17$) and 3.10 standard deviations above the storybook condition's mean ($SD = 0.21$). Thus, the outlier was removed and model construction ensued. In Step 1, child-provided Skittle preference, age, time of day, and temporal memory task performance were all significant predictors. Steps 2 and 3 failed to identify any significant contribution of the theme assessments or condition, respectively. Step 4 did not yield any significant interaction effects between condition and theme assessments. The resulting model,

shown in Table 7, explained 61% of the variance in the proportion of Skittles participants consumed, $F(4,23) = 9.03$, $p = .0002$.

The positive regression weight of age demonstrates that older children ate more of the candy than younger peers. The negative regression weight of child-provided Skittle preference indicates that those children who preferred Skittles ate more than those who did not. The positive regression weight of time of day reveals children who participated in the afternoon ate a greater proportion of Skittles than those who participated in the morning. Finally, the negative regression weight of temporal memory performance indicates that the more successive events participants ordered the less Skittles they consumed.

Proportion of vegetables consumed. The data did not contain any outliers, thus model construction ensued. Step 1 revealed that parent-provided cucumber preference and familiarity with the Berenstain Bear series were significant predictors. In Steps 2 and 3, neither theme assessment performance nor condition explained significant unique variance, thus these variables were removed from the model. No additional effects were found in Step 4. The resulting model, shown in Table 8, explained 25% of the variance in the proportion of vegetables participants consumed, $F(2,25) = 4.14$, $p = .03$.

The negative regression weight of parent-provided cucumber preference indicates that children of parents who responded that their preschoolers preferred cucumbers ate more vegetables than children of parents who responded that their preschooler did not prefer cucumbers. The positive regression weight of Berenstain Bear familiarity suggests that children ate more vegetables the more familiar they were with the Berenstain Bear series.

Weighted proportion of food consumed. The last model constructed simultaneously examined the proportion of each food consumed weighted by transfer distance. Recall, *The*

Berenstain Bears and Too much Junk Food includes references to carrots, but not cucumbers. The response variable in the final model accounted for this by weighting far transfer (i.e., cucumber consumption) more than near transfer (i.e., carrot consumption) and penalizing transfer of behavior inconsistent with the theme (i.e., Skittles consumption).

Step 1 revealed that child-provided cucumber and Skittles preferences, age, and temporal memory were significant predictors. Step 2 failed to reveal any significant predictors. Step 3 revealed children's performance on the theme generation task predicted weighted food consumption. Step 4 revealed a significant effect of video and a Video x Theme Generation interaction. The resulting model, shown in Table 9, explained 68% of the variance in weighted proportion of food consumed, $F(7,21) = 6.34$, $p = .0004$.

The negative regression weight of child-provided cucumber preference indicates that the more children preferred the vegetable the more weighted proportion of food they consumed, whereas the positive regression weight of child-provided Skittles preference shows that the less children preferred the candy the more weighted proportion of food they consumed. The negative regression weight of age indicates that weighted proportion of food consumed scores decreased with participant age. The positive regression weight of temporal memory performance demonstrates the more successive events children ordered the greater the weighted proportion of food they consumed. The positive Video x Theme Generation interaction demonstrates that those participants in the video condition who scored better on the theme generation assessment had greater weighted proportion of food consumed scores. In the storybook condition, the effect of theme generation was much closer to zero, though slightly negative.

4.3.4 Parental survey. Responses on the parental survey informed (1) parents' ability to identify the theme; (2) parents' assessment of how effective the theme was conveyed; and (3)

parents' confidence that their children would detect the theme conveyed. Each of these points is discussed below.

Theme generation. Across the storybook and video conditions, parents successfully identified theme: When parents' responses were coded using the same 4-point coding scheme applied to children's theme generation scores (0 = *wrong/do no know;* 3 = *developed abstraction*), developed abstractions emerged as the modal response ($M = 2.89$, $SD = .32$). Although parents were quite adept at generating the theme, a significant condition effect emerged, $t(25) = 2.15$, $p = .04$, $d = 0.56$, such that parents who read the storybook ($M = 3.00$) received higher theme generation scores than those who viewed the video ($M = 2.75$).

Conveyance of theme. Parents who read the storybook or viewed the video generally agreed on how effective the theme was conveyed, with over 79% responding with a 5 ($n = 17$) or 6 ($n = 5$) on the 6-point rating scale (1 = *extremely ineffective*; 6 = *extremely effective*). Parents' ratings did not differ as a function of condition.

Confidence in child theme identification. On average, parents were optimistic about their children's ability to identify the lesson conveyed, with over 59% responding with a 5 ($n = 9$) or 6 ($n = 7$) on the 6-point rating scale (1 = *extremely unconfident*; 6 = *extremely confident*). Parents' ratings did not differ as a function of condition.

4.4 Discussion. This study examined the dissociation between the results of Study 1 and Mares and Acosta (2008). Specifically, Study 2 explored whether the medium through which thematic content was conveyed affected (1) children's ability to identify thematic content and (2) children's behavioral application of thematic content. Similar to Study 1, the current study revealed that children generally struggled to generate an abstract theme and generalize it to new contexts. Although children performed well overall on the thematic identification measure, a

significant effect of medium emerged, such that every child in the storybook condition successfully identified the correct theme, whereas only 64% of children in the video condition did so. In sum, medium influenced children's ability to identify thematic content, but young children were generally poor at generating and generalizing the theme; only performance on the theme identification measure was affected by whether children listened to the storybook or viewed the video, with ceiling performance present in children who encountered thematic content in storybook form. Interestingly, medium did affect parents' ability to generate a developed abstraction, with parents who viewed the video performing worse than those who read the storybook.

Analyses examining children's behavioral application of thematic content revealed a dissociation between the proportion of foods consumed and the weighted proportion of food consumed. On one hand, the medium through which the thematic content was conveyed did not affect the proportion of Skittles or vegetables children consumed at a level that reached statistical significance; only the demographic variables (e.g., food preferences, age, time of day, temporal memory) were significant predictors. Yet after accounting for transfer distance by weighting the proportion of each food consumed, a significant effect of medium did emerge, with children in the video condition demonstrating significantly lower weighted proportion scores than those in the storybook condition, controlling for effects of all other significant predictors. Notably, this deleterious effect of viewing thematic content in video form was qualified by an interaction: Participants in the video condition who performed better on the theme generation task had higher weighted proportion scores than those who struggled to generate a theme.

Chapter 5

5 General Discussion

The current dissertation sought to examine three questions: (1) Do children extract thematic content and use it to guide their behavior in a theme-consistent manner? (2) Do anthropomorphized animal characters influence how effectively thematic content is conveyed, such that their presence bolsters or hinders children's ability to detect and behaviorally apply thematic content? (3) Does the medium through which thematic content is conveyed influence children's ability to extract thematic content and behaviorally apply it?

In this section I address how the current studies inform each of these questions. The two components of the first question, theme extraction and application, are discussed in Sections 5.1 and 5.2, respectively, considering results from both studies. Question two, addressed in Study 1, is discussed in Section 5.3, and question three, addressed in Study 2, is discussed in Section 5.4. The discussion closes with an account that borrows from the established hot/cool framework (Metcalfe & Mischel, 1999) to lay a foundation for a future program of research examining transfer of information from storybooks.

5.1 Extracting thematic content. Past research with 5-year-olds has demonstrated that children this age largely fail to extract thematic information from stories (e.g., Goldman et al., 1984; Jose et al., 2005; Lehr, 1988). The current studies explored children's ability to generate, recognize, and generalize the theme of *The Berenstain Bears and Too Much Junk Food*. Several aspects of children's thematic extraction abilities were consistent across both studies. These more robust findings are discussed here, whereas study specific thematic extraction effects are discussed in Sections 5.3 and 5.4.

The current studies, involving both 4- and 5-year-olds, revealed a developmental progression in children's thematic generation ability. Specifically, 5-year-olds performed significantly better than 4-year-olds when asked to generate the theme of *The Berenstain Bears and Too Much Junk Food*, regardless of the manner in which the thematic content was conveyed (i.e., trade storybook, lab storybook, or video). However, even these older children failed to provide developed abstractions (e.g., "We should eat healthy to have the energy we need"); an underdeveloped abstraction (e.g., "Don't eat candy") was the modal response across both studies. Although children failed to provide developed abstractions when asked to generate themes, the frequency with which they provided an abstraction, albeit underdeveloped, exceeded what would be expected given prior research (e.g., Mares & Acosta, 2008). A potential reason for children's elevated performance in the current studies concerns the concrete nature of the thematic content. For example, eating healthy in order to provide the body with sufficient nutrients might have been easier for children to detect, and in turn generate, than Mares and Acosta's theme of peer inclusion. To inform this detection hypothesis, I consider results from the theme recognition task.

Overall, children performed significantly above chance on the theme recognition assessment across both studies, successfully identifying the correct theme over two distractor themes that also referenced food. Anthropomorphic storybook characters did not influence theme recognition, but the medium used to convey the theme did. This effect is discussed in detail in Section 5.3. As in the theme generation task, children's performance on the theme recognition task exceeded the performance of children in Mares and Acosta's study, adding credence to the proposed detection hypothesis. Future research closely examining a range of concrete to abstract themes from biological and social domains is needed to reveal the degree to which the concreteness of thematic content affects children's abilities to generate themes.

Children in the current studies were less able to generalize the theme to new contexts. Unlike the first two measures of thematic extraction, this result was consistent with Mares and Acosta. Although children generally performed poorly on this measure, in Study 1 both age and memory influenced performance on the generalization task; however Study 2 failed to replicate these results with the video and lab-produced storybook.

Taken together, results from the three theme comprehension assessments revealed that children both failed to provide developed abstractions or generalize the theme to another context. Yet their overall performance on the generation task exceeded that of children in a study that used a similar assessment (Mares & Acosta, 2008). Children also performed well on the theme identification task. I suggested a potential reason for this performance difference could be concrete thematic content.

5.2 Applying thematic content. Although thematic extraction performance was relatively stable across the two studies, anthropomorphic characters and medium differentially affected children's ability to apply the extracted thematic content to behavior. The type of character (i.e., anthropomorphized bear vs. human) in each book had a robust effect on children's application of thematic content to their own eating behaviors, consistently qualified by general (i.e., Berenstain Bears series) or focal (i.e., *The Berenstain Bears and Too Much Junk Food*) familiarity. The medium of delivery—commercial video versus a lab-produced storybook using stills from that video—also influenced behavioral transfer. However, the effect of medium on children's eating behaviors was qualified by unique interaction terms: general familiarity and theme generation. Given the disparity between studies, no across-study summary of theme-consistent behavior is provided. Rather, children's ability to apply thematic content to behavior,

and predictors of this ability, are discussed in each study separately in the following two sections.

5.3 Bear necessities: Anthropomorphic characters and theme-consistent behavior. Type of storybook character had no influence on children's ability to recognize, generate, or generalize thematic content; however, effects were detected on children's ability to apply that content. Thus, thematic extraction is not discussed further in the context of Study 1, and I shift focus to theme-consistent behavior.

Prior research had demonstrated that anthropomorphic characters increase vegetable consumption (de Droog et al., 2014). However, in that study the researchers did not manipulate character form. Study 1 is the first study to my knowledge to match a trade book's content while simultaneously manipulating character form, pitting the Berenstain Bears against a human family. Transfer of theme-consistent behavior was assessed in two ways: children's consumption of each food and the quantity of each food consumed. Results from each of these domains are discussed in turn.

Whether children heard the storybook with the Berenstain Bears or the humans impacted 4- and 5-year-olds' consumption. For example, the pattern of cucumber consumption for children in the bear condition significantly differed from the control and human conditions, respectively. Specifically, more children in the bear condition, when compared to the control and human conditions, demonstrated far transfer by consuming a vegetable not referred to in the storybook. Although children's pattern of carrot consumption, a vegetable referred to in the storybook, did not reach statistical significance, the participants in the bear condition were also more apt to consume it than peers in the control and human conditions.

Examining the quantity of Skittles and vegetables consumed also elucidated children's theme-consistent behavior. Study 1 revealed that condition was a significant predictor of the proportion of Skittles consumed, the proportion of vegetables consumed, and a weighted composite that penalized negative transfer (i.e., Skittles consumption) and doubled weights for far transfer (i.e., cucumber consumption). Importantly, condition was always qualified by an interaction term between condition and familiarity with the Berenstain Bears series (proportion of Skittles consumed) or *The Berenstain Bears and Too Much Junk Food* (proportion of vegetable consumed and weighted proportion of foods consumed). Children in the bear condition who were more familiar with the Berenstain Bears series were most successful at applying thematic content by consuming less candy. Children more familiar with the specific storybook used here*, The Berenstain Bears and Too Much Junk Food*, who were exposed to the original storybook were most successful at applying thematic content by consuming more healthy foods. Hence anthropomorphic characters most readily aided theme-consistent behaviors when children had either general or focal familiarity with the storybook characters.

Although results from Study 1 suggest that the presence of anthropomorphic characters affected children's food consumption and the proportion of foods they consumed, the Berenstain Bears did not influence 4- and 5-year-olds' theme task performance. Why might anthropomorphic characters affect theme-consistent behavior, but fail to impact theme extraction? The answer might hinge on differences between the theme and behavioral tasks, a theory informed by the Condition x Familiarity interaction findings and developed more fully in Section 5.6.

5.4 Medium-specific differences in theme extraction and theme-consistent behavior. Children in Study 1 performed better on theme assessments than children in a prior study who

viewed a video instead of listening to a storybook (Mares & Acosta, 2008). Study 2 examined whether this difference was attributable to the medium through which the thematic content was conveyed, pitting a commercial video of *The Berenstain Bears and Too Much Junk Food* against a matched storybook created in the lab, using stills and narrative from the video.

A medium-specific effect emerged, such that all children in the storybook condition identified the theme, whereas only 64% of children in the video condition did so. One possible reason for this effect could be related to children's medium-specific expectations. Salomon (1984) presented sixth graders with matched content through film or text. Participants expressed greater self-efficacy within the film domain, stating, for example, that learning about a famous person's life would be more easily accomplished by viewing a film than reading a book. Similarly, those who viewed the video provided significantly lower scores on a subjective measure of invested mental effort (AIME; e.g., "How much did you concentrate while watching [reading]?" and "How hard did you try to understand the film [story]?"). Thus, participants expected it would be easier to learn from film than text and invested less mental effort when they viewed the film. This perceived self-efficacy backfired: Participants in the film condition, when compared to peers in the text condition, performed significantly worse on a measure assessing inferential reasoning (e.g., "What does the story [film] try to tell us?"). Although the film used in Salomon (1984) was silent, another study demonstrated similar effects with a film involving audio (Salomon & Leigh, 1984; but see Beentjes, 1989). It follows that a possible contributor to the medium-specific difference in theme identification found in Study 2 could be children's expectations about the mental effort required to learn from video.

Transfer of theme-consistent behavior did occur in Study 2, but predictors mainly included demographic or memory variables (e.g., food preferences, age, temporal recall). One

notable exception was the near transfer behavior of consuming carrots: Participants in the storybook condition who were more familiar with the Berenstain Bears series were more apt to consume carrots. Another medium-specific effect emerged when examining predictors of weighted proportion of foods consumed, such that participants in the video condition who performed better on the theme generation task had higher weighted consumption scores. This effect dovetails with the hypothesis advanced above concerning children's perceptions of the medium. Perhaps those children in the video condition who resisted the urge to tune out during the show were able to more deeply understand the theme, in turn behaving in theme-consistent manners on the strictest test of transfer behavior. Notably, the only instance in which one of the theme extraction measures (i.e., theme generation) had a significant influence over any of the consumption variables was one involving the video condition. While theme extraction and behavioral application measures appear to be largely independent of one another in the context of storybooks, these mechanisms may be qualitatively different in the context of video. I explore this separation of cognitive and behavioral performance further in Section 5.6.

More research is required to reveal the underlying mechanisms of transferring theme-consistent behavior from video, especially when the medium is pitted against a matched storybook. An ideal starting point would be to investigate whether children in the current study demonstrate significantly more theme-consistent behavior than peers who view a video of a commercial control episode of the Berenstain Bears that does not involve food, or peers who are read a lab created adaptation of the control episode, effectively creating a design similar to Study 1. Although differences between the video and storybook conditions in Study 2 are not very robust, it may be that children exposed to the lab-created storybook of *The Berenstain Bears and Too Much Junk Food* would be significantly more apt to transfer theme-consistent behavior than

peers in a control lab-created storybook condition, whereas children in the two video conditions would not significantly differ. These comparisons cannot be made without additional control groups. If these four groups fail to differ on theme extraction or behavioral application measures, there may be something particularly effective about trade books that future research must identify.

5.5 A tale of two storybooks. Study 1 used the trade book version of *The Berenstain Bears and Too Much Junk Food*, whereas Study 2 used a lab version of this storybook, created to match the professionally produced video of *The Berenstain Bears and Too Much Junk Food*. Carefully matching storybook to video content in Study 2 meant that not all aspects of Jan and Stan Berenstain's original storybook could be retained. For example, the storybook in Study 2, on average, included more text per page than the trade book used in Study 1. In addition, the images within the two storybooks differed, such that the trade book often incorporated text and images on each page, whereas the lab version kept text and images separate. Finally, the trade book included more food images than the lab version, particularly those showing the Berenstain cubs consuming foods, both healthy and unhealthy. Because Study 1 and Study 2 used storybooks it might be tempting to consider comparing the results from each study. The unique characteristics of each book prevent such a comparison. Of course it is possible to address results from both studies, noting findings that are robust across these distinct stimuli and those which are not, but conclusions about trade books cannot be drawn from results across the two studies. Only Study 1 results can inform inferences about the original trade book. Next, I propose a model of cognitive (theme) and behavioral (consumption) performance that synthesizes the results of the current studies.

5.6 The hot/cold hypothesis. The current studies revealed a robust dissociative pattern between children's ability to extract thematic content from storybooks and behaviorally apply it. In an effort to synthesize these findings, I propose "hot" affective components impact whether children behave in a theme-consistent manner. In contrast, the underlying mechanisms of theme extraction from storybooks are "cold" cognitive abilities. Importantly, the hot/cold framework has previously been applied to the delay of gratification task (e.g., Metcalfe & Mischel, 1999), but any similarities between that model and the one proposed here are only by chance. Below, I outline the hot and cold components of this theory and offer supporting evidence.

Both studies examined a variety of theme-consistent behaviors, ranging from a willingness to consume foods, to the quantity of foods consumed, and even to weighting the foods consumed by transfer distance, penalizing consumption of Skittles and rewarding far transfer of cucumbers. A recurring theme emerged from the data: Some degree of familiarity with the Berenstain Bears predicted behavior, often manifesting as an interaction with condition. For example, in Study 1 children in the bear condition who were more familiar with the Berenstain Bear book series (not necessarily *Too Much Junk Food*) ate proportionately less Skittles than children in that condition who were not as familiar with the book series. Similar results emerged for the proportion of vegetables children consumed in Study 2 and whether or not they were willing to consume carrots. One explanation for these results is that children are treating these anthropomorphized characters as trusted informants: "If Brother and Sister changed their ways and resisted the temptation to consume Skittles, so can I!" Supporting evidence for this hypothesis principally comes from work examining how familiarity with television characters affords children cognitive gains when viewing content that includes these characters (Anderson et al., 2000; Lauricella et al., 2011). The current results extend these

findings to a new medium (i.e., storybooks) and domain (i.e., healthy eating behavior). However, familiarity with the Berenstain Bears series need not necessarily denote a deep parasocial relationship with these characters. Future research should more carefully examine this possibility by testing whether children's identification with these characters, whether actual or wishful, affects behavioral transfer.

It bears mentioning that a more focal familiarity effect also predicted children's food consumption behaviors. Specifically, children's familiarity with *The Berenstain Bears and Too Much Junk Food* was a significant predictor of proportion of vegetables consumed and weighted proportion of food consumed in Study 1. These results do not necessarily refute the affective hypothesis, as familiarity with the book itself confounds character familiarity with theme familiarity. Consequently, the current data do not permit us to parse effects tied to identification with characters from those tied to repeated exposure to the theme. Future research must evaluate the relative contribution of each.

In striking contrast to the data addressing transference of theme-consistent behavior, children's ability to extract themes did not appear to be influenced by potential affective ties to the character. Instead, predictors of children's ability to extract thematic content either directly involved a cognitive component (e.g., age, PPVT, and temporal accuracy) or indirectly did so (e.g., medium-specific processing differences). Further, the boundary between "hot" and "cold" components was largely maintained. However, there were two notable exceptions to this rule: (1) familiarity with *The Berenstain Bears and Too Much Junk Food* hindered children's performance on the theme generation task in Study 2; and (2) children's theme generation scores influenced weighted proportion of food consumed for children in the video condition in Study 2, with more developed theme abstractions resulting in higher transfer-weighted consumption

proportion scores. The first exception only strengthens the hot/cold hypothesis, as it suggests that affective ties to the characters significantly hinder children's performance on a cold task when the stimuli differed from those the children were familiar with. The second exception is confined to the video domain, and thus does not apply to the hot/cold hypothesis. Videos may require different mechanisms for extracting and applying theme than storybooks.

5.7 Limitations. The two studies conducted have three main limitations. First, the current studies explored children's application of theme-consistent behavior only shortly following a single exposure. Consequently, it is unknown whether similar results would emerge if (1) children's food consumption behaviors were explored at a delayed posttest and (2) children were exposed to content on multiple occasions, though the effect of familiarity suggests multiple exposures may be beneficial. Although prior studies investigating whether children learn from storybooks have used immediate posttest designs (e.g., Ganea et al., in press; Ganea et al. 2011; Walker et al., 2013; Waxman et al., 2014), successful delayed posttest designs also exist (e.g., Gripshover & Markman, 2013; Keleman et al., 2014). Future research in this area should strive to incorporate delayed posttests to further elucidate the duration of any observed effects.

Second, only one trade book was used to investigate children's thematic comprehension and behavioral transfer. On one hand the fact that a trade book was used at all is a strength, especially given the prevalence of lab-created storybooks (e.g., Ganea et al., 2014; Ganea et al. 2011; Walker et al., 2013). On the other hand, it is unknown whether children's abilities to detect the theme were affected by the thematic content of the specific trade book used in this study, specifically by the concreteness of the theme. In future research, children's thematic comprehension should be explored across a wide range of trade books to more fully reveal children's theme extraction abilities (or lack thereof).

Finally, the storybook used in Study 2 was adapted from the video used in that study. Although the lab storybook enabled matched content it came at a cost: a storybook qualitatively different from the trade book used in Study 1. To more carefully examine medium-specific differences between storybook and video mediums in future research, trade versions of both that are matched on content should be simultaneously employed. Therefore, emergent medium-specific differences would be substantially less likely to be attributable to the artificiality of lab-adapted stimuli.

5.8 Strengths. In addition to the use of trade book, the current studies had several strengths. Although prior researchers examined children's theme extraction abilities (Goldman et al. 1984; Johnson & Goldman, 1987; Jose et al., 2005; Lehr, 1988) and willingness to consume vegetables following exposure to a book with anthropomorphic characters (de Droog et al., 2014), the current studies are the first to my knowledge to concurrently examine these abilities in 4- and 5-year-olds. As a result, the data inspired the formation of the hot/cold model, in turn proposing testable hypotheses that stand to elucidate whether affective responses to characters impact children's transfer of theme-consistent behavior.

Another strength of the current studies concerns the systematic nature in which character form was manipulated in Study 1. Great care was taken in ensuring that the human characters were drawn in the same style as the original Berenstain Bears. Further, a Berenstain Bear book without references to food or healthy eating served as a baseline comparison group from which strict tests of character form could be conducted. The result was the first data speaking to the role anthropomorphized characters have over human counterparts in the domain of healthy eating.

5.9 Conclusion. These studies are the first to my knowledge to concurrently examine whether children identify thematic content in storybooks and use it to guide their behaviors in the

real world. Moreover, the influence of anthropomorphic characters and medium on children's theme extraction and application of theme-consistent behavior were examined. Overall, theme extraction assessments revealed that 4- and 5-year-olds were generally adept at identifying thematic content, but 4-year-olds, in particular, failed to generate abstract themes. Both age groups rarely generalized the theme. Anthropomorphic characters robustly aided application of theme-consistent behavior, but their beneficial effect was qualified by children's familiarity with them generally, in other Berenstain Bears books, or focally, through *The Berenstain Bears and Too Much Junk Food*. The medium through which thematic content was conveyed aided application of two select theme-consistent behaviors qualified by either familiarity with the Berenstain Bears series or theme generation performance. Children's dissociative theme extraction and application abilities inspired a proposed hot/cold model. In sum, the current studies advanced our understanding of children's ability to extract themes from storybooks and their willingness to immediately transfer theme-consistent behavior.

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Table 1

Study 1: Food Consumption as a Function of Condition

	Control		Human		Bear	
Food	Did Not Eat	Ate	Did Not Eat	Ate	Did Not Eat	Ate
Cucumber	11	4	11	4	7	8
Carrot	10	5	10	5	8	7
Skittles	2	13	1	14	2	13

Note. Each cell contains the number of participants satisfying the criteria of interest.

Table 2

Study 1: Hierarchical Regression Analysis Predicting Proportion of Skittles Consumed

	B	SE	95% CI	*p*	β	Δ R^2
Intercept	0.10	0.04	[0.02, 0.19]	< .02		
Step 1						
Time of Day	0.12	0.04	[0.05, 0.20]	< .01	0.43	
Berenstain Series Familiarity	0.07	0.02	[0.02, 0.12]	< .01	0.48	0.24**
Step 2						
Condition						
Control	-0.06	0.03	[-0.13, 0.02]	> .10	-0.22	
Bear	-0.06	0.04	[-0.14, 0.01]	> .10	-0.24	
Condition x Berenstain Series Familiarity						
Control	0.02	0.04	[-0.06, 0.10]	> .10	0.08	
Bear	-0.13	0.04	[-0.22, -0.05]	< .01	-0.47	0.27**

** $p < .01$

Note. Final beta weights are reported. Model $R^2 = .51$, $F(6,37) = 6.46$, $p = .0001$. The intercept provides the predicted proportion of Skittles consumed by children in the human condition, who participated in the morning, and whose parents reported average familiarity with the Berestain Bears series. **Time of Day** (0 = *morning*, 1 = *afternoon*) was dummy coded according to a binary scheme. **Berenstain Series Familiarity** (i.e., frequency of exposure; 0 = *never*, 1 = *rarely*, 2 = *once a month*, 3 = *weekly*, 4 = *daily*) was centered before being entered into the model.

Table 3

Study 1: Hierarchical Regression Analysis Predicting Proportion of Vegetables Consumed

	B	SE	95% CI	*p*	β	Δ R^2
Intercept	0.05	0.02	[0.01, 0.09]	< .03		
Step 1						
Age	0.00	0.00	[0.00, 0.01]	< .03	0.27	
Storybook Familiarity	0.03	0.03	[-0.03, 0.10]	> .10	0.24	0.34**
Step 2						
Condition						
Human	0.03	0.03	[-0.03, 0.09]	> .10	0.13	
Bear	0.08	0.03	[0.03, 0.14]	< .01	0.38	
Condition x Storybook Familiarity						
Human	0.01	0.04	[-0.07, 0.09]	> .10	0.04	
Bear	0.09	0.04	[0.00, 0.18]	< .05	0.36	0.19*

* $p < .05$. ** $p < .01$.

Note. Final beta weights are reported. Model $R^2 = .53$, $F(6,38) = 7.04$, $p < .0001$. The intercept provides the predicted proportion of vegetables consumed by children in the control condition, who were of average age, and whose parents reported average familiarity with *The Berenstain Bears and Too Much Junk Food*. **Age** and **Storybook Familiarity** (i.e., frequency of exposure; 0 = *never*, 1 = *rarely*, 2 = *once a month*, 3 = *weekly*, 4 = *daily*) were centered before being entered into the model.

Table 4

Study 1: Hierarchical Regression Analysis Predicting Weighted Proportion of Foods Consumed

	B	SE	95% CI	*p*	β	Δ R^2
Intercept	-0.01	0.08	[-0.16, 0.15]	> .10		
Step 1						
Storybook Familiarity	0.08	0.12	[-0.17, 0.33]	> .10	0.18	0.13*
Step 2						
Condition						
Human	0.01	0.11	[-0.21, 0.22]	> .10	0.01	
Bear	0.25	0.11	[0.03, 0.46]	< .03	0.33	
Condition x Storybook Familiarity						
Human	-0.04	0.15	[-0.34, 0.25]	> .10	-0.07	
Bear	0.35	0.16	[0.03, 0.68]	< .04	0.42	0.26**

* $p < .05$. ** $p < .01$.

Note. Final beta weights are reported. Model $R^2 = .39$, $F(5,39) = 5.03$, $p < .002$. The intercept provides the predicted quantitiy of foods consumed by children in the control condition and whose parents reported average familiarity with *The Berenstain Bears and Too Much Junk Food.* **Storybook Familiarity** (i.e., frequency of exposure; 0 = *never*, 1 = *rarely*, 2 = *once a month*, 3 = *weekly*, 4 = *daily*) was centered before being entered into the model.

Table 5

Study 2: Food Consumption as a Function of Condition

	Storybook		Video	
Food	Did Not Eat	Ate	Did Not Eat	Ate
Cucumber	8	7	10	4
Carrot	8	7	12	2
Skittles	2	13	3	11

Note. Each cell contains the number of participants satisfying the criteria of interest.

Table 6

Study 2: Logistic Regression Analysis Predicting Carrot Consumption

	B	SE	*p*	*Odds Ratio*	95% CI	Δ Deviance
Intercept	-0.40	0.68	> .10	0.67		
Step 1						
Berenstain Series Familiarity	1.53	0.74	< .04	4.64	[1.08, 19.96]	4.28*
Step 2						
Condition						
Video	-1.81	1.21	> .10	0.16	[0.02, 1.75]	
Condition x Berenstain Series Familiarity						
Video	-2.88	1.42	< .05	0.06	[0.00, 0.91]	7.21*

* $p < .05$.

Note. Final regression weights are reported. Model deviance = 24.44, $\chi 2(3, N = 29) = 11.48$, $p < .01$. The intercept provides the predicted log odds of carrot consumption for children in the storybook condition whose parents reported average familiarity with the Berestain Bears series. **Berenstain Series Familiarity** (i.e., frequency of exposure; 0 = *never*, 1 = *rarely*, 2 = *once a month*, 3 = *weekly*, 4 = *daily*) was centered before being entered into the model.

Table 7

Study 2: Hierarchical Regression Analysis Predicting Proportion of Skittles Consumed

	B	SE	95% CI	*p*	β	R^2
Intercept	0.22	0.04	[0.14, 0.30]	< .01		
Step 1						
Age	0.01	0.00	[0.00, 0.01]	< .01	0.64	
Child-provided Skittles preference	-0.12	0.03	[-0.18, -0.07]	< .01	-0.74	
Time of Day	0.12	0.03	[0.06, 0.19]	< .01	0.55	
Temporal Memory	-0.03	0.01	[-0.05, -0.01]	< .01	-0.53	.61**

** $p < .01$.

Note. Final beta weights are reported. Model $R^2 = .61$, $F(4,23) = 9.03$, $p < .001$. The intercept provides the predicted proportion of Skittles consumed by children who were of average age, preferred Skittles, participated in the morning, and correctly ordered an average amount of successive events. **Age** and **Temporal Memory** were centered before being entered into the model. **Time of Day** (0 = *morning*, 1 = *afternoon*) was dummy coded according to a binary scheme.

Table 8

Study 2: Hierarchical Regression Analysis Predicting Proportion of Vegetables Consumed

	B	SE	95% CI	*p*	β	R^2
Intercept	0.21	0.06	[0.09, 0.33]	< .01		
Step 1						
Parent-provided cucumber preference	-0.06	0.02	[-0.10, -0.01]	< .02	-0.49	
Berenstain Series Familiarity	0.03	0.02	[0.00, 0.07]	< .04	0.44	.25*

* $p < .05$.

Note. Final beta weights are reported. Model $R^2 = .25$, $F(2,25) = 4.14$, $p < .05$. The intercept provides the predicted proportion of vegetables consumed by children who preferred cucumbers and whose parents reported average familiarity with the Berestain Bears series. **Berenstain Series Familiarity** (i.e., frequency of exposure; 0 = *never*, 1 = *rarely*, 2 = *once a month*, 3 = *weekly*, 4 = *daily*) was centered before being entered into the model.

Table 9

Study 2: Hierarchical Regression Analysis Predicting Weighted Proportion of Foods Consumed

	B	SE	95% CI	*p*	β	Δ R^2
Intercept	0.30	0.38	[-0.50, 1.09]	< .05		
Step 1						
Age	-0.03	0.01	[-0.05, -0.01]	< .02	-0.51	
Parent-provided Skittles preference	0.32	0.11	[0.09, 0.54]	< .01	0.52	
Parent-provided cucumber preference	-0.19	0.09	[-0.39, 0.01]	< .07	-0.32	
Temporal Memory	0.10	0.04	[0.03, 0.18]	< .01	0.48	0.57**
Step 2						
Theme Generation Score	-0.09	0.09	[-0.28, 0.10]	> .10	-0.21	0.02
Step 3						
Video	-0.46	0.20	[-0.87, -0.05]	< .04	-0.57	0.00
Step 4						
Video x Theme Generation Score	0.27	0.11	[0.04, 0.51]	< .03	0.69	0.09*

* $p < .05$. ** $p < .01$.

Note. Final beta weights are reported. Model $R^2 = .68$, $F(7,21) = 6.34$, $p < .001$. The intercept provides the predicted quantitiy of foods consumed by children in the storybook condition, of average age, who preferred cucumber and skittles, with average performance on the temporal memory task, and who generated an incorrect theme. **Age** and **Temporal Memory** were centered before being entered into the model.

Appendix A
Parental Questionnaire: Storybook

Directions: Please read the storybook provided with this questionnaire. After you have finished, please answer the following questions.

1. Children's storybooks often have a lesson. In the space below, please write the lesson conveyed in this storybook.

2. Using the scale provided, please rate how effective you think this storybook conveys the lesson. Note: Please circle only one number.

   1- - - - - - 2 - - - - - 3 - - - - - 4 - - - - - 5 - - - - - 6
   Extremely Ineffective — Extremely Effective

3. Using the scale provided, please rate your confidence that your child would identify the lesson conveyed in this storybook. Note: Please circle only one number.

   1- - - - - - 2 - - - - - 3 - - - - - 4 - - - - - 5 - - - - - 6
   Extremely Unconfident — Extremely Confident

4. Please circle how often you have read this *exact* storybook to your child.

   Never A Few Times (0-5 occasions) Many Times (6+ occasions)

5. Please circle how often you read *The Berenstain Bears and Too Much Junk Food* to your child.

   Never Rarely Once a Month Weekly Daily

6. Please circle how often you read Berenstain Bears books to your child.

   Never Rarely Once a Month Weekly Daily

7. Please rank your child's preferences for the following foods, with 1 indicating *most favored*, 2 indicating *neutral or second most favored*, and 3 indicating *least favored*.

   Carrots _____ Cucumbers _____ Skittles _____

8. Please circle the form of character that is most common in the books you read to your child. Note: Please circle only one response.

   Human Animal Vehicle

9. During a typical day, how long do you spend reading to your child? _____

Appendix B
Parental Questionnaire: Television Program

Directions: Please take a few minutes to view the TV show provided with this questionnaire. After you have finished, please answer the following questions.

1. Children's TV shows often have a lesson. In the space below, please write the lesson conveyed in this TV show.

2. Using the scale provided, please indicate how effective you think this TV show conveys the lesson. Note: Please circle only one number.

1- - - - - - 2 - - - - - 3 - - - - - 4 - - - - - 5 - - - - - 6	
Extremely Ineffective	Extremely Effective

3. Using the scale provided, please rate your confidence that your child would identify the lesson conveyed in this TV show. Note: Please circle only one number.

1- - - - - - 2 - - - - - 3 - - - - - 4 - - - - - 5 - - - - - 6	
Extremely Unconfident	Extremely Confident

4. Please circle how often your child has viewed this exact TV show.

   Never A Few Times (0-5 occasions) Many Times (6+ occasions)

5. Please circle how often your child watches *The Berenstain Bears and Too Much Junk Food*.

   Never Rarely Once a Month Weekly Daily

6. Please circle how often you read *The Berenstain Bears and Too Much Junk Food* to your child.

   Never Rarely Once a Month Weekly Daily

7. Please circle how often your child watches the Berenstain Bears TV show.

   Never Rarely Once a Month Weekly Daily

8. Please circle how often you read Berenstain Bears books to your child.

   Never Rarely Once a Month Weekly Daily

9. Please rank your child's preferences for the following foods, with 1 indicating *most favored*, 2 indicating *neutral or second most favored*, and 3 indicating *least favored*.

   Carrots _____ Cucumbers _____ Skittles _____

10. Please circle the form of character that is most common in the shows your child watches. Note: Please circle only one response.

    Human Animal Vehicle

11. Please circle the form of character that is most common in the books you read to your child. Note: Please circle only one response.

    Human Animal Vehicle

12. During a typical day, how long do you spend reading to your child? _____

13. During a typical day, how long does your child spend watching TV? _____