GENDER STEREOTYPES WITHIN TV SHOWS FOR PRESCHOOLERS AND THEIR EFFECTS ON CHILDREN'S STEREOTYPES

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DEDICATION

My dissertation is dedicated to Madison, Jordan, Abby, Hannah, Mica, Kari, Kai, Kimo, Charlie, Reid, Cade, Chappell, Hina, Sebastian, Cody, Livia, Havana, Jazz, Ellie, Kūaolama, Miliopuna, Avary, Thea, Liam, and the countless other young children who have invited me to participate in their worlds throughout the years. Your willingness to share your observations and ideas has fueled my fascination with this topic. Your hugs, smiles, and insights have buoyed me in rough waters. And to Edith, whose ever-stronger kicks motivated me during the writing of this dissertation, whose birth was the greatest post-defense gift, and whose newborn snuggles helped with the edits. You promise to be my most meaningful adventure in child development.

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ABSTRACT

This project investigates gender representations and stereotypes in television shows specifically designed for preschool aged children. Importantly, it includes both a content analysis of the most popular 22 shows (Study 1) as well as an experimental investigation of how children's stereotyped beliefs may be affected by these stereotype depictions on television (Study 2). Study 1 found that male characters are over-represented and speak more in children's shows; additionally, there are more gender stereotypes depicted than counter-stereotypes. However, there are differences depending on the gender of the main character of the shows: specifically, shows with female main characters showed less gender bias compared to shows with male main characters or ensemble casts. Study 2 found that, when children (ages 3.5- to 6-years-old) were exposed to a series of counter-stereotype depictions from these shows, they expressed stronger gender stereotypes compared to when they were exposed to a series of stereotype depictions or a combination (control); these effects were especially strong in girls. Results offer important contributions to current theories of children's gender stereotype development as well as practical suggestions for the creation of more gender egalitarian children's media.

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CHAPTER 1: GENERAL INTRODUCTION

Gender is a powerful categorization tool in our society. Parents announce the gender of a baby, oftentimes before she or he is even born. Clothing stores (even ones that cater exclusively to children) are divided into male and female sections. Hundreds of books have been written about the differences between men and women. In some communities, there is little room for deviation from the gender norms, which are cultural beliefs about how each gender should behave. Such gender stereotypes can lead to gender discrimination in neighborhoods, workplaces, and educational settings. Given the fact that increased gender equality leads to beneficial societal outcomes such as improvements in child health and decreased levels of poverty (LeVine, LeVine, Schnell-Anzola, Rowe, & Dexter, 2012; UNICEF, 2006), it is important to examine the process through which young children learn about gender stereotypes.

It is important to make the distinction between sex (which is the chromosomal makeup that identifies people as biologically male or female) and gender (which are the characteristics of males and females ascribed by a given culture). The present project is largely concerned with *gender* effects and stereotypes. However, some of the past literature has used the term *sex* to describe characteristics of males and females (as was historically acceptable); in this paper, their language has been changed to *gender* to reflect their intent to describe cultural characteristics of males and females. The term, *sex*, will be used in this paper when talking about the biological aspect.

By six-years-old, children are able to identify their own and others' genders, have a sophisticated knowledge of the gender roles and expectations inherent in their society, and understand that biological sex cannot change (e.g., giving a purse to a boy does not make him a girl). But how do they come to understand these concepts and how do they use them in their

everyday life? To address this question, three different theories are first presented that guide the current project: Gender Schema Theory, Social-Cognitive Theory, and Developmental Intergroup Theory. Then, these theories guide an examination of research on how young children acquire and use gender stereotypes in their lives. Finally, the dissertation studies are introduced, which examine how young children learn about gender stereotypes from television shows aimed at their age group.

Three Major Theories of Gender Stereotype Development

This project focuses on three main theories of gender stereotype development. Broadly, Gender Schema Theory suggests that children form schemas (organized patterns, thoughts, and theories) about gender and then use these schemas to understand and organize knowledge about gender (e.g., Martin, 1989). Social-Cognitive Theory focuses on how social aspects of a child's life (e.g., parents, media, peers) influence these cognitive representations of gender (e.g., Bussey & Bandura, 1999). Finally, Developmental Intergroup Theory specifically looks at how social contexts lead children to develop stereotypes about specific social groups (e.g., Bigler & Liben, 2007).

Gender Schema Theory

Gender Schema Theory focuses on two main processes children go through in understanding gender: evaluations of themselves (and others) based on gender category membership and how these evaluations motivate their behaviors (Martin & Ruble, 2004). In general, this theory maintains that children must first learn how to label themselves and others based on whether they belong to the "male" or "female" category. Then, they begin to organize information about genders (e.g., what they should look like, how they should act). Finally,

children integrate their label and gender knowledge and use this information to evaluate their own and others' behaviors.

One central question for gender schema theorists has been the order in which children acquire, build, and use these schemas. In a seminal study, Martin, Wood, and Little (1990) tackled the question of whether general gender knowledge (i.e., the ability to label gender in self and others) or knowledge of gender stereotypes (e.g., "boys should play with trucks") came first. Their cross-sectional study showed that children first learned to label themselves and others (at 35- to 45-months-old) followed by learning the content of gender stereotypes (at 45- to 52-months-old). At an even later age (53- to 65-months-old), children grasped the idea that gender was constant and could not change. Therefore, from a gender schema perspective, children first learn to label their different schemas, and then fill in knowledge about what each gender is supposed to do (and not do). After constructing this elaborate organizational system, children come to the conclusion that gender remains constant.

Overall, Gender Schema Theory focuses on the ways children construct cognitive organization systems to make sense of gender differences. The theory pays special attention to the order in which children acquire different aspects of gender knowledge (e.g., labels, stereotypes, constancy) and much of the previous research has focused on how children use one cognitive aspect to gain understanding of another aspect. However, one important criticism of Gender Schema Theory has been that it fails to fully acknowledge social factors (e.g., media) in children's development of knowledge about gender and that it may focus more on normative development whereas Social-Cognitive Theory is more cognizant of individual differences.

Social-Cognitive Theory of Gender Development

Whereas Gender Schema Theory focuses on cognitive processes of understanding gender and using those understandings to guide behavior, Social-Cognitive Theory focuses on how elements of a child's social world (e.g., parents, media) serve as mechanisms to learn about gender and gender stereotypes. For example, Bussey and Bandura (1999) describe children's learning about gender as a "multi-faceted social transmission model" where gender knowledge is transmitted within a vast array of social systems. In their model, children must pay attention to modeled events, retain the information, and produce the behavior themselves. In line with Bussey and Bandura's model, Friedman, Leaper, and Bigler (2007) found that younger children (ages three- to five-years-old) were likely to have gender beliefs that correlated with their parents. However, older children (ages six- to seven-years-old) did not show this same pattern, which suggests that, throughout development, social influences on children's gender cognitions change, contributing to the multi-faceted nature of the model.

One of the earliest and most salient social influences on children's cognitive understanding of gender is their caregiver. Research has shown that parents transmit ideas about gender explicitly (Peretti & Sydney, 1984) and implicitly, through interacting with daughters differently than sons (e.g., Crowley, Callanan, Tenenbaum, & Allen, 2001). Children's media also plays a role in shaping children's ideas about gender. For example, books and television programs aimed at young children have been shown to over-represent males and under-represent females (Hamilton, Anderson, Broaddus, & Young, 2006; Thompson & Zerbinos, 1997) and research suggests that these unequal representations may influence children's gender cognitions (Aubrey & Harrison, 2004; Pike & Jennings, 2005).

Developmental Intergroup Theory

Developmental Intergroup Theory (DIT) is closely related to social-cognitive theory but focuses specifically on how children learn about stereotypes and prejudice (Bigler & Liben, 2007). In particular, researchers testing this theory often use experimental methods where children are asked to make judgments about novel groups of people (e.g., wearing yellow or red shirts). One way that DIT differs from the other two theories is that it particularly relies on the establishment of psychological salience of an attribute before stereotypes can be formed about that social group. Given the overwhelming salience of gender as a social category for young children, this theory is especially valuable to the present studies, which examine how children acquire and use gender stereotypes.

How Do Children Acquire Knowledge About Gender and Stereotypes?

In order for children to apply gender stereotype knowledge to their everyday lives, they must first acquire knowledge about the differences between genders as well as the stereotypes associated with each gender. Traditionally, three general milestones have been studied in the developmental progression of gender knowledge: labeling gender, assigning meaning to gender, and understanding gender constancy. Children's ability to label themselves and other as "boys" or "girls" happens in the first few months after their second birthday. Once children have achieved the ability to label themselves and others according to gender, they began to acquire knowledge about what those labels mean. The most common way children assign meaning to labels is by learning gender stereotypes for categories such as activities, toys, and behaviors. For example, children may identify trucks as being "for boys" while dolls are "for girls." Another important milestone in children's developmental progression of gender knowledge is the ability to understand gender constancy, which is the idea that someone's gender does not change even if

they engage in counter-stereotypical behaviors (e.g., a girl playing with a truck, a boy wearing a dress). Gender schema researchers have been especially interested in the order in which these milestones occur and how they influence one another (i.e., does a child who learns to label gender earlier also acquire knowledge about stereotypes earlier?). Social-Cognitive and Developmental Intergroup researchers have also added to our understanding of these developmental processes by looking at social factors that influence children's learning. Below, these theories are discussed within the context of these three major milestones: labeling, assigning meaning through learning stereotypes, and gender constancy.

Labeling

Labeling gender may not be a singular process but instead a series of skills that children learn in developmental succession. For example, Thompson (1975) identifies three specific steps in learning to label gender. First, children must learn that there are two genders and that there are labels associated with them, which children have mastered by 24-months-old. Then, children learn to apply the labels to other people (by 25- to 30-months-old) before they are able to label themselves (by 31- to 36-months-old).

As with any developmental process, the average age of gender labeling of others (27-months-old) is subject to a wide range of individual variation and the timing of gender labeling affects how children later use gender schemas to dictate their own behavior. For example, Fagot and Leinbach (1989) classified children in their longitudinal study as *early labelers* (passing the task at or before 27-months-old) or *late labelers* (passing the task at or after 28-months-old) based on their performance on a task that asked them to label gender in pictures of other children. *Early labeler*s showed significantly more sex-typed play at 27-months-old than their *late labeler* counterparts and had higher sex-role stereotype awareness at 4-years-old.

What might cause children to be early or late labelers? It is important to note that there were no differences in observations of sex-typed play at 18-months-old between children who would later become *early labelers* and those who would later become *late labelers* (Fagot & Leinbach, 1989). However, consistent with social cognitive theory, there were differences in parent behavior toward children at 18-months-old that predicted whether their child would become an *early* or *late labeler.* Specifically, mothers of *early labelers* gave more feedback (both positive and negative) to their 18-month-olds about sex-typed play. These results suggest that parents who give more feedback about sex-typed play have children who learn to label gender at an earlier age and that parental feedback about early sex-typed play behaviors indirectly affects later stereotype knowledge.

There is also evidence that children's ability to label gender in others is related to their own sex-typed behavior. Fagot, Leinbach, and Hagan (1986) completed naturalistic observations of young children in a preschool setting and coded for choice of playmates, aggression, and activity and toy choice. Children's ability to label other children's gender in the task predicted their choice of playmates and levels of aggression. Specifically, those who were able to label others' gender chose same-gender playmates more often. Boys who labeled showed more aggression and girls who labeled showed less aggression, with no differences in children who did not label gender in others. However, children's ability to label others did not predict their choice in playing with gender-stereotyped toys; boys played with more boy-stereotyped toys and girls played with more girl-stereotyped toys regardless of whether they could label other children or not. Follow-up research found that children who were able to pass the gender-labeling task (at 24- to 30-months-old) had higher knowledge of gender stereotypes than those who were unable to pass it (Fagot, Leinbach, & O'Boyle, 1992). Consistent with Gender Schema Theory, these

results suggest that, once children have gained the ability to labels themselves and others according to gender, they can begin to learn the stereotypes associated with the labels.

Assigning Meaning to Labels by Learning Gender Stereotypes

Whereas recent work has discovered that children may have a rudimentary knowledge of gender stereotypes before they are able to verbally label gender (Bauer, 1993; Hill & Flom, 2007), most studies have investigated how children assign meanings to the gender labels that they learn. In regards to a developmental progression, Martin and Little (1990) found that children's learning to label their own and others' gender (around 27-months-old) led to general knowledge about gender and stereotypes (emerging around 46- to 52-months-old) which led to their understanding of gender constancy (discussed in the next section). Levy and Carter (1989) also found that children's gender schematization (i.e., assigning meaning to gender categories) preceded their understanding of gender constancy. However, Levy and Carter (1989) noted important differences in stereotype knowledge for male versus female stereotypes. In their study, children with higher levels of gender schematization also had higher levels of gender stereotype knowledge; however, this effect was limited to female gender stereotypes.

In addition to the findings from Levy and Carter (1989), recent research supports the idea that children may go through different processes in learning about male and female stereotypes. One reason for the different processes of learning male and female stereotypes may be society's portrayal of male stereotypes in a more uniform way (as well as more push-back when boys do not meet stereotypes) whereas female stereotypes are broader (O'Brien, Peyton, Mistry, Hruda, Jacobs, Caldera, Huston, & Roy, 2000). O'Brien and colleagues (2000) measured children's (36-months-old) gender labeling (overall, girls performed better) and knowledge of stereotypes. *Knowledge of stereotypes* was measured by showing children pictures of common objects (e.g.,

bat and ball, needle and thread) and asking if they were “more for boys” or “more for girls.” Boys and girls were not significantly different on their knowledge of male stereotypes but girls performed significantly better for knowledge of female stereotypes. Therefore, this study supports the idea that children may go through different processes when learning about male versus female stereotypes, specifically that boys and girls learn male stereotypes at similar times, but that girls learn female stereotypes before boys do. This phenomenon may be linked to other studies (Bigler, Brown, & Markell, 2001) which show high-status groups (e.g., males) may show increased knowledge of in-group stereotypes whereas low-status groups (e.g., females) show similar levels of knowledge of both in-group and out-group stereotypes.

Whereas much of the research on children’s acquisition of knowledge about gender and stereotypes has focused on the cognitive structures that change as understanding grows, a complementary line of research has also looked at how social factors, especially parental influence, may influence children’s growing knowledge. For example, research has examined how parent beliefs, conversations, and play behavior may influence children’s cognitions and behaviors related to gender stereotyping. Research has also examined media portrayals of gender in material aimed at young children in an effort to analyze gender messages children may be receiving from books and television.

Bussey and Bandura (1999) claim that children are receiving messages about gender through a vast array of social systems that are all interacting with each other. In their Social-Cognitive Theory, children must first attend to the social influence, then form cognitive structures and theories based on these observations, and finally have sufficient motivation to produce these behaviors themselves. Below, the research on parental and media influence on gender knowledge are summarized.

Learning from parents. Parents begin to socialize children's gender roles from a very young age, from the way they describe them in utero (Sweeney & Bradbard, 1988) to the colors they dress them in (Shakin, Shakin, & Sternglanz, 1985) to the toys they choose to play with them (Firsch, 1977; Sidorowicz & Lunney, 1980). Given that young children spend a majority of their time with parents, it makes sense that children would look to parents as models of gender roles from a very early age. In fact, Caldera, Huston, and O'Brien (1989) found when children are as young as 18-months-old, parents non-verbally react more favorably (e.g., greater level of excitement upon first seeing toy) when their children are playing with toys that are stereotypically appropriate for their gender. Additionally, research has shown that, by preschool, when parents have more egalitarian roles at home (e.g., both do chores around the house), girls have greater career aspirations (Croft, Schmader, Block, & Baron, 2014). Peretti and Sydney (1984) demonstrated that most parents explicitly prefer their children to play with gender-stereotyped toys. However, more recent research (Freeman, 2007) found that, whereas parents' explicit gender beliefs (e.g., "I feel upset when boys put on a dress for dress-up") were largely egalitarian, their three- and five-year-old children showed rigid gender stereotype beliefs. How, then, are parents socializing children's gender beliefs? To investigate the possibility that parents are explicitly espousing gender egalitarian views while implicitly transmitting less egalitarian views to their child, several research projects have examined parent behavior within specific situations where they may talk about gender differences with their child or may interact with their children differently based on their gender.

One area of research in gender differences within parent-child interactions has shown that parents converse with boys differently than girls during talk about math and science. In analyses of CHILDES transcripts, Chang, Sandhofer, and Brown (2011) found that parents were much

more likely to talk to their young sons about numbers (both in general, and as explicit cardinal entities) than their daughters. Crowley and colleagues (2001) examined how children (ages 1- to 8-years-old) interacted with their parents at a science museum exhibit. Parents interacted with sons differently than daughters by offering more causal explanations to boys than girls across all age groups. These differences were not driven by a gender difference in children's questions (8% of boys and 6% of girls asked questions). Given the importance of explanations for fostering future engagement in topics, these results suggest that parents may be contributing to gender disparities in math and science from the time their child is very young.

In addition to math and science, parents may provide more explanations to boys than girls across a wide variety of domains. For example, Cervantes and Callanan (1998) found gender differences in emotion talk during parent-child conversations while reading a storybook: parents asked girls more questions about emotions but gave more causal explanations to boys. The implications of these differences are unclear but perhaps parents are socializing children to learn that women should know more about emotions (i.e., be able to answer questions about them) whereas boys do not have as much knowledge. It could also be that parents recognize girls' greater competence in emotion talk, or perhaps they are socialized to give boys more causal explanations across a variety of domains. In an effort to combine parent-child conversation literature with gender development literature, Friedman and colleagues (2007) examined the connections between mothers' gender beliefs, children's gender stereotyping, and mothers' gender-related comments during a book-reading task. Mothers and children (aged three- to seven-years-old) each completed surveys about their gender attitudes. Then, mothers read a book with their child ("Fun at the Farm"), which included nine gender-typed and nine cross-gender-typed representations of traits or behaviors. Overall, mothers were more likely to reference their

own child's gender and used more counter-stereotypical comments with girls but used more stereotypical comments with boys. Relatedly, mothers with more gender egalitarian beliefs made more counter-stereotypical comments. However, mothers' use of stereotypical or counter-stereotypical language did not predict children's own stereotyped beliefs. This research shows that parents may socialize their children differently according to the child's gender. s

There is evidence that parental influence on gender socialization may be different depending on the age of the child. For example, Friedman and colleagues (2007) found a significant correlation between mothers' and younger (three- to five-years-old) children's gender beliefs, but the relation did not hold for older children (five- to seven-years old). As described earlier, Fagot and Leinbach (1989) found that differences in parent behavior toward children at 18-months-old indirectly affected their child's gender stereotype awareness at 4-years-old. Together, these findings suggest that parental socialization may have a stronger influence on children's gender-typed behavior at younger ages. Given these findings that parental influence on children's gender stereotype knowledge may change as children grow older (Freidman et al., 2007) or may indirectly affect children through other skills (Fagot & Leinbach, 1989), it is important to examine other social influences as well, especially ones that yield more influence as children grow, such as media aimed at young children.

Learning from media. The majority of research on children's media has been content analyses, with theoretical implications for children's gender stereotype knowledge. One type of media that has been extensively examined is children's storybooks. An early content analysis (Weitzman, Eifler, Hokada, & Ross, 1972) found that children's picture books depicted male characters significantly more often than female characters. In addition, males were also shown to be more active and independent whereas females were depicted as more passive. Several follow-

up studies show that this under-representation of female characters still exists, despite cultural norms moving towards more egalitarian gender themes (Gooden & Gooden, 2001; Hamilton et al., 2006; Powell & Abels, 2002; Tepper & Cassidy, 1999).

More recently, Hamilton and colleagues (2006) and Gooden and Gooden (2001) performed content analyses of best-selling and award-winning children's books. They coded the number of characters of each gender as well as stereotyped behaviors. As found in previous studies, there were significantly more male than female main characters, and also differences in behavior. For example, Hamilton and colleagues (2006) found that female characters, overall, were more likely to be portrayed as nurturing or caring for another character, and were marginally more likely to be portrayed indoors versus outdoors. Gooden and Gooden (2001) found male characters were portrayed in a wider variety of occupations (25 different ones) than females (14 different ones). In both studies, female characters were sometimes shown in stereotypically male roles such as doctors and chefs, but male characters were very rarely shown in stereotypically female roles such as grocery shopping.

Gender stereotypes are also prevalent in children's coloring books. Like storybooks, male characters are more prevalent than female characters overall (Fitzpatrick & MacPherson, 2010). Males frequently engage in gender-neutral behavior (e.g., reading, walking, eating, sleeping) whereas females frequently engage in stereotypically female behavior (e.g., cooking, sewing, caring for infant). Similar to previous studies of storybooks (e.g., Weitzman et al., 1972), Fitzpatrick and MacPherson (2010) also found that males were depicted as significantly more active than females in coloring books. Overall, these results illustrate that books (both storybooks and coloring books) depict significantly more male characters and also tend to depict characters doing more gender stereotypical activities than counter-stereotypical. Given the

prevalence of books in children's lives, further research is clearly needed to determine the effects these depictions have on young children's gender stereotype acquisition and understanding.

Researchers have also analyzed children's movies (Smith, Pieper, Granados, & Choueiti, 2010) and television shows (Leaper, Breed, Hoffman, & Perlman, 2002; Powell & Abels, 2002; Thompson & Zerbinos, 1997) for gender stereotypes that children may be exposed to in media. Similar to content analyses of storybooks, children's films contain significantly more male characters than female characters (Smith et al., 2010) and portray males and females in gender-stereotypical roles, although females were more likely to engage in cross-stereotypical behavior than males. Children's television shows also contain a disproportionately high number of male characters relative to female characters (Aubrey & Harrison, 2004; Leaper et al., 2002; Thompson & Zerbinos, 1997) and depict females performing male-stereotypical behaviors (e.g., being assertive) significantly more often than males performing stereotypically female behaviors (e.g., being nurturing) on television shows aimed at young children (Baker & Raney, 2007; Leaper et al., 2002; Thompson & Zerbinos, 1997). Together, these results suggest that children are being exposed to a greater number of male characters in movies and television shows and are also being exposed to a myriad of gender-stereotypical behavior, along with the message that females can participate in counter-stereotypical behavior more conventionally than males.

How much are children using these media portrayals in their understanding of gender? To examine this question, Aubrey and Harrison (2004) interviewed 6- to 9-year-old children about their favorite television characters as well as their gender-stereotyped behavior and beliefs. Children were asked to name their favorite characters as well as answer questions about how important it was to be good at certain behaviors. The gender stereotypicality of participants' favorite characters (computed based on a content analysis of behaviors in the shows) was

positively related to boys' endorsement of being good at stereotypically male behaviors; there were no significant associations for girls. These results suggest boys and girls may go through different processes with regard to the association between their favorite characters and their own beliefs about gender-stereotyped behavior. An alternative explanation is that there are different processes for learning norms for male- versus female-stereotyped behavior (Levy & Carter, 1989; O'Brien et al., 2000). Perhaps these differences in learning stereotyped behavior could partially be accounted for by the variable portrayals in media aimed at children.

Gender Constancy and Gender Essentialism

Kohlberg (1966) claimed that children's understanding of gender constancy (the idea that gender does not change with superficial shifts such as wearing a purse or engaging in counter-stereotypical behaviors) drives their learning of stereotypes. However, gender schema and social cognitive researchers have found that children engage in gender-typed behavior before they master the concept of gender constancy. For example, Bussey and Bandura (1992) compared children's level of gender constancy understanding with their gender-typed behaviors. Gender constancy was measured with a task from Slaby and Frey (1975) wherein participants were asked questions about themselves and male and female dolls (e.g., "When you were a baby, were you a boy or a girl?," "If you played boys games, would you be a boy?," "If this boy wanted to be a girl, could he be?") and classified as either having no understanding or some understanding of gender constancy. Consistent with a developmental progression, older children had higher levels of gender constancy understanding. However, unlike Kohlberg (1966) theorized, level of gender constancy did not predict the amount of time children spent with gender-typed toys (either during free play or a forced choice situation). Therefore, it appears gender constancy is not a

prerequisite to children engaging in gender-typed behaviors, and that children may demonstrate partial understanding of gender constancy before they have completely mastered it.

Indeed, many studies have corroborated the idea of a transitional period of knowledge about gender constancy. For example, Bem (1989) found that children ages three-, four-, and five-years-old could have *some* understanding of gender constancy without fully passing all gender constancy tasks. A longitudinal study of children ages four- to seven-years-old found that, over time, children gave more constancy explanations when asked about superficial changes (Emmerich, Goldman, Kirsh, & Sharabany, 1977). Notably, a recent study has found that it is crucial to code children's explanations (not just forced-choice answers) to gender constancy questions in order to get a clearer picture of how gender constancy relates to other gender-typed beliefs (Ruble, Taylor, Cyphers, Greulich, Lurye, & Shrout, 2007).

A related topic that has inspired recent research is gender essentialism, the idea that children view gender as a natural category predictive of other properties (Gelman, 2003; Gelman & Taylor, 2000). Researchers use similar methods to Slaby and Frey (1975) to evaluate children's knowledge of gender essentialism. For example, young children are asked, "When you were a baby, were you a boy or a girl?" as well as shown pictures of children and adults and asked, "When this child grows up, will they be a man or a woman?" Importantly, children are also asked to *explain* their answers, and the explanations are coded for whether they contain and understanding of essentialism.

The idea of gender essentialism has been helpful in developing research to experimentally test the effect of an understanding of constancy on children's stereotype knowledge. For example, Arthur, Bigler, and Ruble (2009) developed an experimental paradigm to test the causal relationship between essentialism and gender-typing. In their study, children

were given a pretest (Preschool Occupations Activities and Traits- Personal Measure or POAT-PM from Liben & Bigler, 2002) to measure the level of their gender-typing of themselves. Then, they were randomly assigned to receive training in either pro-constancy or anti-constancy lessons. Both groups received lessons on biological traits (e.g., skin, hair, gender, eyes, body shape) that were identical except for their focus on stability of the trait over time. In the pro-constancy group, lessons focused on how these biological traits stayed the same over time, whereas anti-constancy lessons focused on how these traits changed over time. After the lessons, children in the pro-constancy groups showed higher levels of gender constancy than children in the anti-constancy groups. Children were also given several measures of gender-typing including the POAT-PM (same as pretest), a measure of peer preferences for their classmates, an opportunity to dress in cross-gender-typed clothing, a sticker choice task, and a test of the rigidity of their gender typing. There were no significant differences in any of the gender-typing tasks between conditions immediately after training or three months later. Therefore, the question of whether children's understanding of gender constancy or essentialism relates to their gender-typing behavior remains open.

How do Children Use Knowledge About Gender and Stereotypes?

Children acquire and construct knowledge about gender and stereotypes as they progress through early childhood. With this new knowledge, they also begin to use these stereotypes to guide their behavior. Developmental Intergroup Theory states that children use the category (e.g., age, gender) that is made most salient to them when they are deciding who in their environment to imitate (Grace, David, & Ryan, 2008). Given the high salience of gender in young children's environments (e.g., books, television, movies), it is not surprising that they often use gender as a way to inform their behavioral decisions. Additionally, Patterson and

Bigler (2006) showed that preschool-aged children can develop in-group attitudes from seemingly arbitrary groups in a short amount of time, which suggests that gender—a non-arbitrary category socialized from birth –is an especially easy group about which children develop in-group attitudes. Children use their newfound gender knowledge when selecting what and with whom to play, as well as which occupations are available to them.

Toy Choice

Children use their knowledge of gender stereotypes when deciding the types of toys with which to play. Methodologically, presenting children with a choice of gender-stereotyped toys is a way to measure the extent to which they hold stereotypes and their flexibility with those stereotypes (DeLucia, 1963). Many studies have attempted to link children's toy choice with various levels of gender knowledge; results show differences depending on where children are in their development of gender understanding (e.g., labeling, stereotyping, constancy). For example, children's level of gender-typed toy choice is not related to their ability to label their own (and others') gender (Fagot et al., 1986) but is positively correlated with their level of knowledge of gender stereotypes (Carter & Levy, 1988). Children also show greater preference for gender-appropriate toys if they understand the concept of gender constancy (Eaton, Von Bargen, & Keats, 1981). Therefore, learning how to label gender is not enough for children to start preferring gender appropriate toys; they must also have some knowledge of gender stereotypes and understand gender constancy.

Social-cognitive theorists have examined how children's toy choices are related to their environments, especially their parents' beliefs about the appropriateness of toys for each gender. However, neither Raag and Rackliff (1998) nor Freeman (2007) found any relationship between parents' explicit beliefs and their children's toy choices. Instead, Freeman (2007) found an age

difference, with 5-year-olds expressing more rigid gender stereotyped choices than 3-year-olds, regardless of their parents' beliefs.

How does media play a role in children's choice of toys? Pike and Jennings (2005) manipulated children's context by presenting participants with commercials for gender neutral toys; one group saw only boys playing with the toys, one group saw only girls playing with the toys, and one group saw commercials that did not depict toy play (instead, they saw advertisements for a popular juice drink). When children were later interviewed about a variety of toys (including the ones in the video), they were asked to identify whether each toy was "only for boys," "only for girls," or "for both boys and girls." Children who had seen the commercial with all boys were much more likely to say the toys were "only for boys" whereas children who had seen the commercial with all girls were much more likely to say the toys were "for both boys and girls." Interestingly, these findings were stronger for boys than for girls. Pike and Jennings (2005) conclude that their findings show that children (especially boys) are especially attuned to gender portrayals as they construct knowledge about who should play with gender-neutral toys.

Motivation for Difficult Tasks and Occupations

Gender stereotypes can affect many behaviors in young children, including persistence on a difficult task (McArthur & Eisen, 1976) and their motivation to pursue mathematics (Cvencek, Meltzoff, & Greenwald, 2011). In particular, stereotypes about a school subject (e.g., math, science) can affect children's motivational approach towards it (DeBacker & Nelson, 2000). For example, if a girl believes she is not supposed to be good at science simply because she is a girl, she is likely to not persist in science tasks after initial failure (Dweck, 1986). These early motivational approaches (including persistence on a difficult task) have been shown to affect

academic trajectories into late elementary school, and possibly beyond (Li-Grining, Votruba-Drzal, Maldonado-Carreno, & Haas, 2010).

Relatedly, when children start to think about what occupations are available to them and which they might like to pursue, they incorporate their knowledge of gender stereotypes into their decisions. These ideas may be affected by the occupational portrayals they see on television (Durkin & Nugent, 1998). Researchers showed children (ages four- and five-years old) several short television clips. At the end of each clip, an action related to an occupation was needed (e.g., fix a car, be a nurse); actions were either male- or female-stereotyped. Children watched one clip, and then were asked three questions. First, they were asked to choose who would complete the action from three drawings (a male, a female, or both). Children overwhelmingly chose the stereotypical choice for their gender. Then, they were asked who they thought would be the best at an action. Boys were more likely than girls to say the male would be better at male-stereotyped actions; there were no significant differences for the female-stereotyped actions. Additionally, older children (five-year-olds) expressed more traditionally stereotyped responses to the question of who would be best at an action. Lastly, children were also asked whether they themselves would be able to perform this action when they grew up. Overall, girls were more confident they could perform female-stereotyped occupations whereas there was a developmental change for boys (with older boys less confident they could perform the actions). For male-stereotyped behaviors, most children were confident in their abilities but there was a developmental change for girls (with older girls less confident). These results suggest that girls and boys are being socialized to be less confident in counter-stereotyped occupations. However, more work is clearly needed to see how children are learning and applying knowledge about stereotypes to their own behavior.

The Current Study

Through my dissertation studies, I aim to add to the extensive literature on children's development of gender stereotypes. In particular, I examine what kinds of gendered messages children may be exposed to in their television watching and how those messages affect children's own beliefs and behaviors. In two studies, I address three main questions: what shows are children watching? How prevalent are gender stereotypes within these television programs aimed at preschoolers? What effects do these portrayals of gender stereotypes have on children's own beliefs and motivations? By using multiple methods (survey, content analysis, experimental manipulation), I have gained a clearer picture of how children are learning from television.

Broadly, Study 1 consists of a parent survey about children's television viewing habits and a thorough content analysis of the top 22 shows designed for preschoolers. Study 2 is an experimental manipulation where children ages 3- to 6-years-old were shown clips from television shows (coded as stereotypical or counter-stereotypical) and then measured on stereotype knowledge, willingness to engage in a cross-stereotyped behavior, gender constancy, and motivation to persist in a difficult task. Together, these studies shed new light on the relationship between television designed for preschoolers and children's beliefs and behaviors.

CHAPTER 2: CONTENT ANALYIS OF CHILDREN'S TELEVISION (STUDY 1)

Introduction

Which shows are preschool-aged children watching? In 1991, a New York Times article quoted then-vice president of children's programming for ABC, Jennie Trias, as saying, "It is well known that boys will watch a male lead and not a female lead…but girls are willing to watch a male lead" (Carter, 1991). Additionally, the vice president for children's programming at CBS cited focus groups where boys did not want to be seen as liking anything that girls do, which caused the network to shift their programming away from shows with female main characters. However, a different effect has been shown in academic settings. In contrast to the networks, Cherney and London (2006) found that, among 5- to 13-year-old children, boys watched more masculine and girls watched more feminine shows, and that this effect increased with age.

In addition to which shows children are choosing to watch, another important question is: how are children's television shows portraying gender stereotypes and counter-stereotypes? Research in Social-Cognitive Theory suggests that social contexts (e.g., media) provide rich learning opportunities for young children (Bussey & Bandura, 1999) and Developmental Intergroup Theory specifically suggests that these social contexts lead children to develop stereotypes about social groups such as gender (Bigler & Liben, 2007). Importantly, there is evidence that children's media may be over-representing male characters as well as portraying characters in gender stereotypical ways. For example, male characters are over-represented in children's coloring books and when females are depicted, they are often engaging in gender-stereotypical behavior (Fitzpatrick & MacPherson, 2010). Content analyses of children's storybooks also show that male characters are over-represented and that males are shown

engaging in a greater variety of roles whereas females are overwhelmingly shown in stereotyped roles such as mothers and caregivers (Hamilton et al., 2006).

Similar findings of representation and stereotypes are found in children's commercials and television shows (Aubrey & Harrison, 2004; Baker & Raney, 2007; Davis, 2003; Powell & Abels, 2002; Thompson & Zerbinos, 1995). Larson (2001) found that there were more children's commercials starring males than those starring females; Brown (1998) found male characters were especially over-represented in commercials for male-stereotyped and gender neutral products and that this disparity increased as the age of child characters also increased. In children's popular television shows, males are generally found to be over-represented compared to female characters and males speak more often than female characters (Aubrey & Harrison, 2004; Thompson & Zerbinos, 1995). Interestingly, Baker and Raney (2007) found that male superheroes outnumbered female superheroes but that, compared to male superheroes, female superheroes were more likely to ask questions within children's animated shows. Larson (2001) and Davis (2003) also found that, within television commercials aimed at children, female characters were depicted indoors at home more often than male characters.

Whereas educational programs, especially Sesame Street, have been shown to increase children's school readiness for over forty years (Baydar, Kagitcibasi, Kuntay, & Goksen, 2008; Fisch, 2004), little research has examined the gender stereotypes that may be present in these shows. Because of the documented gender differences in STEM fields, there has been an increased effort to create educational shows that encourage STEM learning (e.g., Sid the Science Kid, Mickey Mouse Clubhouse, Team Umizoomi) and show characters in counter-stereotypical roles (e.g., Doc McStuffins is a girl who wants to be a doctor). Importantly, though, no study has systematically examined how these educational shows actually portray female and male

characters. The current study updates the literature on which shows children are watching and how these shows portray both male and female characters across a number of domains including representation on screen (e.g., how often are male and female characters shown on the screen?), communicative behaviors (e.g., who talks more? Who asks more questions?), and gender stereotypes and counter-stereotypes.

Research Questions

Q1: Which are the most popular shows for preschool-aged children?

Q1a: Are there audience gender differences based on the gender of the main character of the show?

Q1b: Are there audience gender differences based on the focus of the show (e.g., STEM learning, socio-emotional learning)?

Q2: How do popular children's television shows portray male and female characters?

Q2a: Are there differences in how often males and females are shown on screen? Additionally, are males and females depicted in different settings on screen?

Q2b: Are there differences in the number of words spoken by male and female characters? Are there differences in the specific communicative behavior of asking questions?

Q2c: How often are male and female characters portrayed in gender stereotypical or counter-stereotypical occupations and activities?

Q2d: Are there differences in the above portrayals as a function of the main character or the topical focus of the show?

Method

Survey

The parent survey had three main parts. The first part asked parents to indicate the top five shows their child watched. The second part (not analyzed here) asked parents to indicate the show their child watched most often, and to describe how they interacted with their child while watching that show. In the third part, parents answered general demographic questions about themselves and their child. The full survey can be found in Appendix 1.

Participants. Parents (*n* = 302) of children ages 1- to 6-years-old were recruited via e-mail and social media to participate in this online survey; if parents had more than one child in this age range they were asked to focus on their child who was closest to 3- to 4-years-old. Thirty-four percent of the sample (*n* = 103) failed to provide complete demographic information. Of the 66% (*n* = 199) who did provide demographic information, 93% (*n* = 186) of the respondents were mothers. When reporting their child's gender, 45% (*n* = 90) indicated they were answering the questions about their sons and 54% (*n* = 107) about their daughters. Children's average age was 38.28 months (range = 11.00 - 74.00 months, *SD* = 16.27) and parents' average age was 35.93 years old (range = 24.00 - 62.00 years, *SD* = 5.31).

Show Descriptions and Main Characters

Show descriptions for each of the top 22 shows from the survey were downloaded from official network websites. Coders (*n* = 12) unfamiliar with the shows individually coded each description (Appendix 2) on a scale of 1-5 (1 being lowest) for how much the show focused on science, math, reading/spelling, socio-emotional knowledge, and school readiness as well as how much they believed this show was educational overall. Half of the coders (Set A) read the full descriptions and half of the coders (Set B) read descriptions where any reference to the gender of

the characters (e.g., all of the character names and gender specific pronouns were replaced with a blank underline). Paired sample t-tests looking for whether the two groups coded differently (based on knowing gender or not) showed significant differences for only one television show: coders who coded Bubble Guppies with all words included (Set A) coded the show as focusing more on math ($t(10) = 2.236$, $p = .049$) and reading/spelling ($t(10) = 3.381$, $p = .007$) than those who coded the version without names of characters and gendered language (Set B). To note, the Bubble Guppies description (seen in Appendix 2) did not actually have any gender-specific pronouns so the only difference between Set A and B was that Set A knew the name of the show was Bubble Guppies. This was also the first description that each coder read. Therefore, for further analyses, all scores for shows' foci are reported as averages across both coding conditions.

For main characters, shows were classified as having a *male main character*, *female main character*, or *ensemble cast*. First, shows were coded based on the title character's gender (e.g., *Doc McStuffins* was classified as female main character and *Daniel Tiger's Neighborhood* was classified as male main character). Shows that did not have a title character in the name were coded as an ensemble cast if they had more than one female main character. The following shows were coded as having a male main character: *Daniel Tiger's Neighborhood*, *Mickey Mouse Clubhouse*, *Curious George*, *Super Why!*, *Jake & the Neverland Pirates*, *Thomas & Friends*, *Wild Kratts*, *The Cat in the Hat Knows a lot about that*, *Sid the Science Kid*, *Caillou*, and *Paw Patrol*. The following shows were coded as having a female main character: *Doc McStuffins*, *Sofia the First*, *Dora & Friends*, and *Peppa Pig*. The following shows were coded as having an ensemble cast: *Sesame Street*, *Dinosaur Train*, *Bubble Guppies*, *Team Umizoomi*, *Octonauts*, *Chuggington*, and *Little Einsteins*.

Content Analysis

The top 22 shows were taken from the results of the parent survey. Lists of episodes were compiled from the most recent completed season of each show. Then, one episode was randomly selected from the first, middle, and final third of each season. Most episodes were between 20-25 minutes long. For shows whose episodes were significantly shorter, more episodes were randomly chosen from the same season to ensure each collection of episodes was approximately the same amount of time. Special episodes (e.g., holiday specials) were excluded. See Appendix 3 for complete list of episodes used in coding.

Episodes were downloaded from YouTube and saved as separate files. Episodes not found on YouTube were purchased from iTunes. All videos were converted to .mp4 files for use in Datavyu, a free and open-source video coding software program (Datavyu Team, 2014). Below are the methods for each specific type of coding of the shows.

Male and female representation on screen. This code focused on how often males and females appeared on the screen as well as in which settings (indoors v. outdoors) they were portrayed. Two trained research assistants coded representation and setting for a screenshot every 10 seconds for the television episodes; end-of-show credits were not included in this coding. Gender representation was coded into one of six categories: only males, majority males (greater than 2:1 ratio males:females), equal (less than 2:1 ratio between genders), majority females (greater than 2:1 ratio females:males), only females, or none. Additionally, they also coded each screenshot for setting: indoors (including inside a vehicle with doors/windows shut), outdoors, or unclear. The two coders achieved reliability with 30% of the total data; for gender representation, kappa = .876 and for setting, kappa = .900. Any discrepancies were resolved with discussion and the remaining 70% of the data were then split equally between the two coders.

Words spoken and questions asked. For number of words spoken, samples were taken from the first 30 seconds, middle 30 seconds, and final 30 seconds of 3 episodes from each show, for a total of 9 segments (270 seconds) from each show. Two research assistants transcribed all words spoken within those time samples and coded each word as whether it was spoken by a male, female, or both. For reliability, each independently coded 30% of the total sample; Krippendorf's alpha for male words spoken = .9965, for female words spoken = .9810, and for words spoken by both = .9034. Any discrepancies were resolved with discussion and the remaining 70% of the data were split equally between the two coders.

For questions asked, samples included every episode in its entirety. Two coders independently watched full episodes and transcribed every question that was asked, and coded it for question type (wh- question, yes/no question, other), gender of asker (male, female, unknown), and gender of the character to whom the question was directed (male, female, both, unknown). For reliability, each coded 30% of the total sample; kappa for question type = .948, for gender of asker = .948, and for gender of character to whom question was directed = .865. Any discrepancies were resolved with discussion and the remaining 70% of the data were split equally between the two coders.

Gender stereotypes and counter-stereotypes. Stereotypes, counter-stereotypes, and neutral depictions were coded for both occupations and activities portrayed throughout the entirety of every episode in the sample. Four total coders completed this coding: two coded occupations and two coded activities. Each coder coded the entire sample to ensure separate reliabilities were calculated for each code in each show (across all the episodes of each show). Based on our coding scheme (found in Appendix 4), each instance of a male or female character being shown in a stereotyped, counter-stereotyped, or neutral occupation or activity was coded

during 30-second clips. For example, if Daniel Tiger (a male character) was depicted as a police officer (stereotyped occupation), he was only coded as this once for every 30-second clip in the episode. As stated before, kappas were calculated for each code in each show. For occupations, individual kappas ranged from 0.722-1.000, mean = 0.911. For activities, individual kappas ranged from 0.736-1.000, mean = 0.953. All kappas can be found in Appendix 5.

Results

Which shows are most popular for preschool-aged children?

For each of the shows listed, totals were computed for how many parents said the show was one of the top five that their child watched; shows listed under "Other" were also included in the count. Twenty-two shows emerged as leaders. Table 1 details the amount of votes for each show. Initial chi-square tests showed significant differences between child gender and shows that they watched. Overall, parents were more likely to indicate boys were watching Chuggington (χ^2 (1, N = 37) 6.578, p = .010) and Dinosaur Train (χ^2 (1, N = 57) = 4.366, p = .037) and girls were watching Doc McStuffins (χ^2 (1, N = 63) = 13.980, p < .001), Dora & Friends (χ^2 (1, N = 45) = 5.472, p = .019), Mickey Mouse Clubhouse (χ^2 (1, N = 76) = 7.785, p = .005), and Sofia the First (χ^2 (1, N = 52) = 7.188, p = .007).

Are there viewer differences based on the gender of the main character of the show?

The percentages of male and female viewers for each show were calculated. In order to investigate viewer differences with respect to the gender of the show's main character. Independent-samples t-tests indicated no significant difference for what girls were watching (p = .287). However, there was a significant difference for what boys were watching (t(12.417) = 6.440, p < .001); specifically, boys were significantly less likely to be watching shows with female main characters than shows with male main characters or ensemble casts.

Are there viewer gender differences based on the focus of the show? Based on the description coding, means were calculated for each show based for science focus, math focus, reading/spelling focus, socio-emotional knowledge focus, emphasis on school readiness, and overall educational focus. Ratios for each show were computed based on the number of boys and girls whose parents reported them watching; higher scores indicated more boys than girls watching the show. No significant correlations were found between the means for foci of the shows and ratios between boy and girl viewers.

How do popular children's television shows portray male and female characters?

Are there differences in how often males and females are shown on screen? Screenshots every 10 seconds of each episode were coded for whether they portrayed only males, majority males, roughly equal representation, majority females, or only female characters. For analyses, these five categories were condensed into three: all or majority males, equal representation, and all or majority females. Data for each individual show are presented in Table 2. The range for male representation across shows ranged from 16%-77%, with a mean of 51.83% (SD = 17.77). The range for female representation across shows ranged from 2%-57% with a mean of 15.96% (SD = 13.52). The range for equal representation across shows ranged from 2%-36% with a mean of 18.06% (SD = 10.67). Within shows the ratio between male representation and female representation was also calculated. Across the shows, ratios ranged from .29 to 38.20, with a mean of males being represented 8.66 times more often than females (SD = 10.15).

Paired-sample t-tests indicated that, across the 22 shows, males are portrayed on the screen significantly more often than females ($t(21) = 5.564$, $p < .001$) or equal representation

($t(21)= 5.904$, $p < .001$). There was no difference between female and equal representations ($p = .440$).

Are males and females depicted in different settings on screen? Of the original sample of screenshots ($n = 9649$), only those that depicted solely males or a male majority ($n = 5206$) and those that depicted solely females or a female majority ($n = 1532$) were analyzed for their settings. Seventy percent of male scenes were set outside; 60% of female scenes were set outside. The results of a ratio test found that female scenes were more likely to be set indoors than male scenes ($z = -7.62$, $p < .001$).

Are there differences in the number of words spoken by male and female characters? Thirty-second clips from the beginning, middle, and end of 3 episodes from each show were analyzed for words spoken by males, females, or both ($n = 270$ seconds for each show). Number of words spoken were converted into percentages to control for the number of words in each sample. Data for each individual show are presented in Table 3. Across all shows, males spoke an average of 68.24% of the words, with a range from 20%-98% ($SD = 22.51$). Females spoke an average of 28.13% of the words, with a range from 1%-73% ($SD = 22.35$). Words spoken by both a male and female character (e.g., a song sung by multiple characters) accounted for an average of 3.63% of the words, with a range from 0%-14% ($SD = 3.99$).

Paired-sample t-tests indicated that, across all shows, males spoke a higher percentage of words than females ($t(21) = 4.210$, $p < .001$) and both males and females together ($t(21) = 12.970$, $p < .001$). Females also spoke a higher percentage of words than both males and females together ($t(21) = 5.022$, $p < .001$).

Are there differences in the specific communicative behavior of asking questions? Each question in every episode of the sample was transcribed and coded as being a "wh-"

question or a “yes/no” question; “wh-“ questions (e.g., who, what, how, why) are theorized to be especially important for early STEM learning and are considered more cognitively demanding than “yes/no” questions (Cleveland, Reese, & Grolnick, 2007; Tenenbaum & Leaper, 2003). Then, each question was coded as whether it was asked by a male or female character and to whom it was directed (e.g., male or female character). Analyses were run with percentages for each show, to control for the different number of questions overall in shows.

Across all shows, 53.12% of the questions were “wh-“ questions (range = 30%-78%, *SD* = 12.81) and 46.82% were “yes/no” questions (range = 22%-70%, *SD* = 12.75). Males asked an average of 66.32% of the questions overall (range =23%-100%, *SD* =20.32) whereas females asked an average of 35.68% of the questions (range = 0%-77%, *SD* = 21.50). Overall, 41.92% of the questions were directed toward male characters (range = 4%-77%, *SD* = 20.85) whereas 19.72% of the questions were directed toward female characters (range = 0%-66%, *SD* = 15.78). The remainder of the questions were directed at the audience.

Next, analyses focused on how males and females specifically were asking and having specific types of questions directed towards them. An average of 64.96% of the “wh-“ questions were asked by males (range = 20%-100%, *SD* = 19.74) whereas only 34.80% of the “wh-“ questions were asked by females (range = 0%-80%, *SD* = 19.77). Similarly, males asked 66.71% of the “yes/no” questions (range = 20%-100%, *SD* = 22.91) whereas females asked 33.00% of the “yes/no” questions (range = 0%-80%, *SD* = 22.71). An average of 40.39% of “wh-“ questions were directed towards males (range = 11%-73%, *SD* = 20.12) whereas 18.54% were directed toward females (range = 0%-68%, *SD* = 17.93). Similarly, an average of 45.34% of the “yes/no” questions were directed towards males (range = 0%-100%, *SD* = 24.69) whereas

20.86% were directed towards females (range = 0%-64%, *SD* = 14.57). For details by show, see Table 4.

Paired-sample t-tests were run to compare questions across the entire sample. Overall, there were no differences in the percentage of "wh-" vs. "yes/no" questions ($p = .260$). However, males asked significantly more questions, in general, than females ($t(21) = 3.544$, $p = .002$); males also had more questions directed toward them than females ($t(21) = 3.572$, $p = .002$). In terms of type of question, male characters asked significantly more "wh-" ($t(21) = 3.582$, $p = .002$) and "yes/no" questions ($t(21) = 3.466$, $p = .002$) than female characters. Male characters also had more "wh-" ($t(21) = 3.333$, $p = .003$) and "yes/no" questions directed towards than ($t(21) = 3.528$, $p = .002$).

Correlation analyses were run to investigate how question-asking was related to overall speaking time. Males asking both types of questions was positively correlated with the percent that males spoke in shows (rs > .805, ps < .001) and negatively correlated with the percent females spoke in shows (rs < -.770, ps < .001). Similarly, females asking both types of questions was positively correlated with the percent females spoke (rs >.681, ps < .001) and negatively correlated with the percent males spoke in shows (rs < -.774, ps < .001). However, interesting differences emerged when examining the percent of questions directed towards male and female characters. Questions directed towards females were positively correlated with the percent that females spoke and negatively correlated with the percent that males spoke. However, questions directed towards males did not show significant correlations with either percent males spoke or females spoke. For correlation table, see Table 5.

How often are male and female characters portrayed in gender stereotypical or counter-stereotypical occupations and activities? Analyses are reported as percentages of 30-

second clips that contained a specific type of stereotype or counter-stereotype. Across all shows, males were depicted in stereotypical occupations in 28.70% of clips (range = 0%-83%, *SD* = 24.56) and counter-stereotypical occupations in 2.70% of clips (range = 0%-35%, *SD* = 7.83). Females were depicted in stereotypical occupations in 15.53% of clips (range = 0%-89%, *SD* = 24.09) and counter-stereotypical occupations in 11.60% of clips (range = 0%-90%, *SD* = 20.84). Males were depicted in stereotypical activities in 7.19% of clips (range = 0%-28%, *SD* = 7.03) and counter-stereotypical activities in 2.01% of the clips (range = 0%-10%, *SD* = 2.42). Females were depicted in stereotypical activities in 1.8% of the clips (range = 0%-5%, *SD*= 1.55) and counter-stereotypical activities in 2.51% of clips (range = 0%-9%, *SD* = 3.00). For details by show, see Table 6.

Paired-sample t-tests were conducted to see how stereotype and counter-stereotype depictions differed within and between male and female character portrayals. Across all shows, there were, overall, more stereotyped occupations shown than counter-stereotyped occupations ($t(21) = 4.262$, $p < .001$); there were also significantly more stereotyped activities depicted than counter-stereotyped activities ($t(21) = 3.187$, $p = .005$). Males were shown in more stereotyped occupations than counter-stereotyped occupations ($t(21) = 4.552$, $p < .001$); there was no significant difference between females being shown in stereotyped or counter-stereotyped occupations ($p = .481$). Similarly, males were shown in more stereotyped activities than counter-stereotyped activities ($t(21) = 3.583$, $p = .002$); again, there was no significant difference for females ($p = .273$). There were no significant differences between males and females depicted in stereotypical occupations ($p = .090$); there was a trend towards females being depicted in more counter-stereotypical occupations than males ($t(21)= -1.198$, $p = .069$). Males were depicted in stereotyped activities more often than females ($t(21) = 3.430$, $p = .003$) but there were no

differences between males and females being depicted in counter-stereotyped activities (p = .468).

Are there differences in the above portrayals as a function of the main character or topical focus of the shows? For the analyses based on the shows' main character, one-way ANOVAs were run with the factor being the main character gender (i.e., male, female, ensemble) and dependent variables were the percentages males and females were shown on screen, the percentages of words spoken, questions asked by and directed towards males and females, and stereotypical and counter-stereotypical depictions. For more details, see Table 7.

Are there differences in the percentage of screenshots that contained all (or majority) males, all (or majority) females, and equal representation based on the main character gender of the show? Indeed, there were significant differences between the groups for percentage of male representataion ($F(2, 19) = 9.625$, $p = .001$); post-hoc Bonferroni comparisons showed that this difference exists between shows with male and female main characters ($p = .001$, 95% CI: [.135, .538]) and between ensemble and female main character shows ($p = .038$, 95% CI: [-.444, -.010]). Therefore, shows with male main characters and ensemble casts depicted males more often than shows with female main characters. There were also significant differences for percentage of female representation ($F(2, 19) = 23.169$, $p = .000$); post-hoc Bonferroni comparisons show that this difference, again, exists between shows with female main characters and both male ($p < .001$, 95% CI: [-.416, -.181]) and ensemble shows ($p < .001$, 95% CI: [142, .394]). Therefore, shows with female main characters depicted females more often than shows with male main characters or ensemble casts. There were no significant difference for percentage of time equal representations of male and female characters were depicted on screen (ps > .336).

Are there differences in the percentage of words spoken by males, females, or both as a function of the gender of the main character in each show? Indeed, there was a significant difference for the percentage of words males speak ($F(2, 19) = 10.478$, $p = .001$); post-hoc Bonferroni comparisons show that this difference exists, again, between shows with a female main character and those with a male main character ($p = .001$, 95% CI: [.185, .686]) and an ensemble cast ($p = .011$, 95% CI: [-.606, -.069]). Therefore, shows with male main characters and ensemble casts have male characters speaking a higher percentage of the words. Similar to representation, there are also significant differences between the groups in terms of the percentage of words that female characters speak ($F(2, 19) = 10.515$, $p =.001$); post-hoc Bonferroni comparisons show that this difference, again, exists between shows with a female main character and both male main character ($p = .001$, 95% CI: [.183, .679]) and ensemble casts ($p = .007$, 95% CI: [.088, .620]). Therefore, shows with female main characters depicted females speaking more words than shows with male main characters or ensemble casts. There were no significant differences among the groups for percentage of words spoken by both male and female characters at the same time (ps > .878).

As far as the specific communicative behavior of asking and having questions directed towards them, there were also differences depending on the main character gender. One-way ANOVA analyses showed differences in the percent of questions males, $F(2, 19) = 12.195$, $p < .001$, and females, $F(2, 19) = 9.246$, $p = .002$, asked. Post-hoc Bonferroni comparisons showed males asked fewer questions in shows with female main characters than in shows with male main characters ($p < .001$, 95% CI: [.187, .620]) or ensemble casts ($p = .003$, 95% CI: [-.575, -.109]). Conversely, females asked more questions in shows with a female main character than in shows with male main characters ($p =.001$, 95% CI:[.157, .650]) or ensemble casts ($p = .037$, 95% CI:

[.014, .544]). However, the same pattern was not seen with questions directed towards males and females. There were no significant differences in the percentage of questions directed towards males as a function of the main character gender (p = .229), suggesting questions are directed towards males at higher rates regardless of the gender of the show's main charater. There were significant differences in the percentage of questions directed towards females ($F(2, 19) = 9.179$, p = .002); post-hoc Bonferroni comparisons showed females had more questions directed towards them in shows with a female main character compared to shows with a male main character (p = .001, 95% CI: [-.112, .475]) or ensemble cast (p = .011, 95% CI: [.050, .440]).

Are there differences in stereotype and counter-stereotype portrayals based on the gender of the main character? In terms of occupation portrayals, there was only a significant difference for the percentage of portrayals of females in stereotyped occupations ($F(2, 19) = 5.743$, p = .011). Post-hoc Bonferroni comparisons showed that this effect was driven by a significant difference between shows with female main characters and those wtih ensemble casts (p = .010, 95% CI: [.093, .751]). Of note, there was also a trend towards there being a difference between shows with male and female main characters (p = .055*, 95%* CI: [-.608, .005]). Therefore, in shows with female main characters, females are depicted in stereotypical occupations more often than in shows with ensemble casts, with a similar trend in shows with a male main character.

In terms of activity portrayals, there was also only one significant difference: females were depicted in counter-stereotypical activities differently across the three groups ($F(2, 19) = 10.181$, p =.001). Post-hoc Bonferroni comparisons showed that this difference existed between shows with a female main character and those with a male main character (p = .001, 95% CI: [.024, .0924]) as well as those with an ensemble cast (p = .037, 95% CI: [.002, .075]). Therefore, females were shown in more counter-stereotypical activities in shows where there was a female

main character compared to both shows with a male main character and shows with an ensemble cast.

For the analysis of differences by topical focus of the show, I ran correlations between the show description ratings and the measured variables. For all correlations, see Table 8. Significant correlations are reported here. Females depicted in counter-stereotypical activities was negatively correlated with both focus on school readiness (r = -.526, p = .012) and overall educational focus (r = -.498, p = .018). Female representation (screen shots with only or majority females) was negatively correlated with overall educational focus (r = -.436, p = .042).

Discussion

Children watch a variety of television shows, but certain ones are more popular than others, especially amongst boys. Cherney and London (2006) found that boys (ages 5- to 13-years old) were more likely to watch masculine shows and girls were more likely to watch feminine shows, but network executives have cited focus groups that say boys avoid feminine shows whereas girls will watch either feminine or masculine shows (Carter, 1991). My data seem to be more in line with network executives: overall, boys were less likely to watch shows with female main characters than shows with male main characters or ensemble casts but there were no differences for girls' viewing behavior. Looking at specific shows, girls were significantly more likely to watch three out of the four shows with female main characters. However, boys were only significantly more likely to watch two shows and both have ensemble casts although the topic of both shows has to do with trains (i.e., *Chuggington* and *Dinosaur Train*). The question of *why* boys avoid female-dominated shows remains unanswered. One possibility is that there are simply more male-dominated shows on television and thus, a wider selection. Another

possibility is that there is some aspect of the content of shows (e.g., representation of males, stereotypes) with female-dominated shows that boys avoid.

How are children's shows depicting male and female characters? First, male characters are shown on the screen significantly more often than female characters. This underrepresentation of female characters is similar to previous findings from other children's media, including storybooks (Gooden & Gooden, 2001), coloring books (Fitzpatrick & MacPherson, 2010), commercials (Larson, 2001), and movies (Smith et al., 2010). However, the present findings on representation on screen contribute to the literature in a number of ways. First, Smith and colleagues (2010) simply counted the number of male and female characters in top-grossing G-rated movies and found an average of 2.57 times more male than female characters; they failed to look at the actual amount of time male and female characters spent on screen. The current study shows that, within popular television shows aimed at young children, screen shots with all or mostly males outnumber those with all or mostly females at an average of 8.66 to 1. Therefore, just counting characters in children's media may underestimate the unbalanced nature of children's actual exposure to male and female characters in media. Second, whereas Gooden and Gooden (2001) analyzed popular children's storybooks and found males depicted in more illustrations than females, they did not analyze whether there were differences between books with male or female main characters. In the current study, shows with female main characters have significantly lower levels of males and higher levels of females, when compared to shows with either a male main character or an ensemble cast. These results suggest that simply adding in a few female characters (thus, creating an ensemble cast) does not necessarily solve the problem of more males represented on the screen. Future studies should investigate these differences in representation as a function of main character gender across

children's media (e.g., storybooks) and also examine whether these differences contribute to boys preferring to watch shows with a male main character or ensemble cast compared to shows with a female main character.

Males are shown on the screen more, but who speaks more? Previous analyses of children's television shows found that male characters, overall, talked more (Thompson & Zerbinos, 1995) and answered more questions than female characters (Aubrey & Harrison, 2004). Within the specific genre of super hero shows, Baker and Raney (2007) found that female superheroes asked more questions than their male counterparts. The current study found that, overall, males spoke more words, asked more questions, and had more questions directed towards them. As before, my work adds to the literature by examining differences across the main character of the show. Male characters spoke fewer words and female characters spoke more words in shows with a female main character, compared to shows with a male main character or an ensemble cast. Again, it appears that simply adding a few female characters to create an ensemble cast does not fix the problem of over-representation of males. The same pattern held true for questions asked by males and females, but not for questions directed towards them. Whereas there were no differences in the percentage of questions directed towards male characters across the different types of shows, there was the similar pattern of more questions directed at females in shows with female main characters, compared to shows with male main characters or ensemble casts. Given that asking questions is seen as a way to show engagement in class activities (Handelsman, Briggs, Sullivan, & Towler, 2005) and that children prefer to learn from those they trust more (Harris & Corriveau, 2011; Harris & Koenig, 2006; Koenig & Harris, 2005), future research should examine whether seeing questions asked by or

directed towards males and female television characters affects children's own question-asking behavior and/or trust in learning from television characters.

Whereas the visual representation and speaking time of male and female characters may implicitly send messages to children about gender roles, the depiction of gender stereotypes on the screen may send explicit messages to children about what males and females are "supposed" to do. For example, preschoolers who watched more superhero shows also engaged in more weapon play (Coyne, Linder, Rasmussen, Nelson, & Collier, 2014) and children report learning about occupations from television shows (Lemish, 2007). However, the previous work has been limited in terms of how often gender stereotypes and counter-stereotypes are depicted in children's television, and the effects those depictions have on children. The content analysis of this study was a first step towards identifying stereotypes and counter-stereotypes in children's television and how these depictions may differ depending on the main character of the show. It is especially important to examine stereotypes in preschooler's television, given that children's understanding of gender stereotypes emerges between the ages of 46- and 52-months-old (Martin & Little, 1990).

The current content analysis examined stereotypes and counter-stereotypes for both males and females across two domains: occupations and activities. Examples of male stereotypes were pilots, mechanics, plumbers, building things, hunting, playing sports, and washing a car. Examples of female stereotypes were baby-sitters, cheerleaders, secretaries, baking or cooking at home, caring for a child, and doing domestic chores. For a full list of occupations and activities, see the coding scheme in Appendix 4. Counter-stereotypes were coded if a male character was doing a female-stereotyped occupation or activity, and vice versa. Overall, there were more stereotyped occupations and activities depicted in the current sample of children's television than

counter-stereotyped examples. Over twenty-five years ago, Paterson and Lach (1990) found that, despite initiatives in the 1980s to encourage gender egalitarianism, children's storybooks still contained more gender stereotypes than counter-stereotypes. It appears that, within children's television as a whole, there are still more stereotypes than counter-stereotypes.

Beyond just overall rates of stereotypes, there is evidence that there are differences between the depictions of male and female characters in these roles. Across all shows, the present analyses found males depicted more frequently in stereotyped occupations and activities than in counter-stereotypical examples, whereas there was no difference for female characters. This effect is similar to analyses of children's storybooks where females are sometimes depicted in stereotypically male roles (counter-stereotypes) whereas males are very rarely depicted in stereotypically female roles (Gooden & Gooden, 2001; Hamilton et al., 2006). Children may also hold similar views about females being able to violate gender stereotypes (i.e., engage in counter-stereotypes) more easily than males. For example, Blakemore (2003) found that children aged three- to 11-years-old did not rate stereotype violations (for both boys and girls) of occupations or toys as egregious, but did rate boys' counter-stereotypical *appearance* and girls' counter-stereotypical *play styles* as devalued. Wilbourn and Kee (2010) found that, using implicit measurements, eight- and nine-year-old children were equally comfortable with males and females in stereotypical occupations but that they were far more comfortable with females in counter-stereotypical occupations than males; the authors concluded that, "children's gender role stereotypes were more restrictive for males than for females." Given the results of the content analysis (that males engage in more stereotypical than counter-stereotypical depictions but not females), future studies should investigate whether seeing these examples of stereotypes and

counter-stereotypes lead children to believe it is more acceptable for females to engage in counter-stereotypical occupations and activities than males.

How do stereotype depictions differ across shows as a function of the gender of their main character? The current study suggests that, in shows with a female main character, females are depicted in more stereotypical occupations and more counter-stereotypical activities, compared to shows with a male main character or an ensemble cast. Given that girls are the majority of the audience for shows with female main characters, it is important for future research to examine how girls, specifically, are affected by seeing female characters in stereotypical occupations and counter-stereotypical activities. For example, Durkin and Nugent (1998) found a developmental trend where five-year-old girls were less confident in their abilities to perform male stereotyped occupations than four-year-old girls. Girls' beliefs may be influenced by the stereotyped depictions they see on television.

Overall, this content analysis confirmed the over-representation of male characters in children's media (e.g., time on screen and communicative behaviors) that has been found in many other studies (Gooden & Gooden, 2001; Larson, 2001; Smith et al., 2010; Thompson & Zerbinos, 1995). Across all shows, male characters were more limited to stereotypical depictions whereas female characters were more "free" to participate in counter-stereotypical depictions as well as stereotypical ones, confirming previous analyses of children's storybook characters (Gooden & Gooden, 2001; Hamilton et al., 2006) and children's own beliefs (Blakemore, 2003; Wilbourn & Kee, 2010). In addition to confirming past findings, this study adds to the literature by analyzing differences in shows based on the gender of their main character. By demonstrating that many of the representation issues (e.g., males shown much more often, males speak more often) were only solved by having a female main character, and not by simply creating an

ensemble cast, this study could inform show creators who are looking to increase visibility of female characters. The number of current television shows with male main character or ensemble casts greatly outnumbers those with female main characters; this imbalance strongly suggests that both boys and girls are seeing and hearing far more male than female characters and that one way to achieve a more equal representation may be to develop more shows with female main characters.

CHAPTER 3: THE EFFECTS OF GENDER PORTRAYALS ON CHILDREN'S STEREOTYPED BELIEFS (STUDY 2)

Introduction

Despite recent efforts to engage girls in stereotypically male subjects such as science, technology, engineering, and math (STEM) fields, women still enroll in fewer college-level STEM courses than men, and are still underrepresented in the STEM fields (National Science Foundation, 2015). Research shows these differences may come from gender stereotypes that children internalize at an early age. For example, by the end of kindergarten, boys show greater willingness to learn new math concepts than girls (Byrnes & Wasik, 2009). This study seeks to evaluate the effects that gender stereotypes on television have on children's gender stereotypes as well as their motivation.

It is clear that children are paying attention to and able to learn from educational television (Fisch, 2004). But beyond number and pre-reading skills, are they also learning gender stereotypes? Indeed, correlational studies have found that boys and girls' weapon play was positively correlated with their viewing of superhero shows (Coyne et al., 2014) and their level of stereotypically-female play was positively correlated with their engagement with the Disney Princess franchise (Coyne, Linder, Rasmussen, Nelson, & Birkbeck, 2016). Children also report learning about occupations from television (Lemish, 2007, p. 105). However, there has not been much work investigating the links between gender stereotypes and counter-stereotypes (specifically occupations and activities) shown on television, children's own beliefs, and children's behavior; most research has focused on the effects of children's stereotyped beliefs on their behaviors and has neglected to add the media aspect. For example, children with stronger beliefs in gender stereotypes choose to play with more stereotypical toys (Carter & Levy, 1988),

which may lead boys to reject nurturing toys (e.g., dolls) and girls to reject toys that enforce spatial skills (e.g., blocks). Gender stereotypes also lead children to gravitate towards same-gender playgroups (Maccoby, 1990), which may lead to early differences in communication styles. Specifically, girls use more indirect attempts (e.g., "May I have the truck?") and boys use more direct attempts (e.g., "Give me the truck") and these differences lead to early gender differences in communication styles that later affect children in the classroom (Serbin, Sprafkin, Elman, & Doyle, 1982). Gender stereotypes can also affect the occupations to which children aspire. For example, by kindergarten, children have a firm grasp on gender stereotypes for occupations, rate culturally masculine jobs (e.g., doctor) as more prestigious than culturally feminine jobs (e.g., nurse), and are more confident in their abilities to do a gender-stereotyped job by early elementary school (Durkin & Nugent, 1998; Liben, Bigler, & Krogh, 2001).

Gender stereotypes can affect many aspects of young children's behavior, including persistence on a difficult task (McArthur & Eisen, 1976) and their motivation to pursue mathematics (Cvencek et al., 2011). Gender stereotypes have been shown to influence children's motivational approaches (DeBacker & Nelson, 2000), which affect their motivation to persist in a difficult task (Dweck, 1986). This effect is important because early motivational approaches (including persistence on a difficult task) have been shown to affect academic trajectories into late elementary school, and possibly beyond (Li-Grining et al., 2010).

How might we disrupt this effect of stereotypes leading to decreased motivation? A recent study suggests that showing six-year-old girls counter-stereotypical examples (e.g., a girl who is good at math) improved their performance on a math test relative to their performance after hearing stereotypical example (Galdi, Cadinu, & Tomasetto, 2014). This effect, termed "stereotype-lift" has also been found in a college-aged population (Franceschini, Galli, Chiesi, &

Primi, 2014). Of particular interest to the current study, previous work has demonstrated that showing children counter-stereotypes on television reduces their stereotype beliefs (Gunter & McAleer, 1997, p. 79). The experimental manipulation in the present study seeks to test this effect in preschool-aged children using television shows that have been specifically developed for them.

Research Questions

Q1: How does viewing only gender stereotypes, only counter-stereotypes, or a combination of the two affect children's:

a) own stereotyped beliefs about themselves and others?

b) understanding of gender essentialism?

c) motivation to persist in a difficult task?

Q2: Are the effects of viewing stereotypes and counter-stereotypes different between boys and girls?

Methods

Participants

Boys and girls (n = 124, 64 girls) were recruited from local preschools as well as from lists of parents who had previously expressed interest in participating in research (M_{age}= 57.4 months or 4 years 8 months, *range* = 36-82 months, SD_{age} = 10.7 months). There were no significant differences in age between boys and girls ($t(120) = -0.659$, $p = .511$). Parents reported the majority of children were multiracial (50.8%), followed by Caucasian (25.0%), Asian (15.3%), and Native Hawaiian/Pacific Islander (1.6%). As a whole, parents were highly educated with the majority having a graduate degree (50.0%), or a college degree (32.2%). Children came from primarily middle to high income households with 34.7% of families earning more than

$150,000 per year, 34.7% earning between $90-150,000 per year, 14.6% earning between $50-90,000 per year, and only 8.0% of families earning less than $50,000 per year; 84.7% of fathers and 58.9% of mothers worked full time outside of the home. Overall, 27.4% of parents reported equally splitting household chores, 56.5% reported mothers doing all or the majority of household chores, and 4.0% reported fathers doing all or the majority of household chores. Participants were excluded if they did not regularly speak in sentences because of concern that they could not adequately answer questions. They were also excluded if they watched television less than once per month because of concern that television was not a familiar learning context for them.

Parent Survey

Attached to the consent form, parents completed a brief survey on their child's television viewing habits, demographics, and gender egalitarianism (e.g., division of household chores) modeled at home (see Appendix 6 for full consent form and survey).

Child Tasks

After parents signed the consent form, children were brought to a quiet room at their school or home to complete the tasks with a trained researcher. Children were assented (see Appendix 7), and after they gave their assent, the research visit began. All researchers were female.

Child dress. Researchers wrote a short description of the child's clothes, including any pictures or words. These data were not analyzed for the present study.

Child pre-video interview. After explaining that she had a few questions for children and that there were no right or wrong answers, the researcher asked the child what their favorite

television show was and why. They also asked who the child's favorite character was on the show and why that was their favorite character.

Coding for pre-video interview. Two raters achieved inter-rater reliability coding for children's favorite television character. First, they coded for gender of favorite character (Kappa = 0.899). Then, they coded explanations for *why* a character was the child's favorite, according to whether the explanation contained mention of a personality trait (Kappa = 1.000), activity performed by character (Kappa = 0.800), character's appearance (Kappa = 0.904), or something the character had in their possession (Kappa = 0.774). All discrepancies were resolved with discussion, and the remaining coding was divided equally.

Television sample. Children were randomly assigned to view one of six videos. Two videos contained only examples of gender stereotypes (in random orders), two videos contained only examples of gender counter-stereotypes (in random orders), and two videos contained both examples of gender stereotypes and counter-stereotypes (in random orders). To create these stimuli videos, examples of stereotypes and counter-stereotypes were taken from the coding of television episodes in Study 1. Clips were then randomly chosen to include an equal number of male and female character depictions. Appendix 8 provides details on the clips included in each video. For the stereotype videos, 15 clips depicted females in stereotypical occupations or activities ($m_{\text{length of clip}}$=8.66 seconds, range = 3.5 – 14.9 seconds) and 15 clips depicted males in stereotypical occupations or activities ($m_{\text{length of clip}}$=8.71 seconds, range = 3.5 – 14.9 seconds) with an overall average clip length of 8.68 seconds. There were no differences in length between the clips depicting female and male characters ($t(28) = .039$, $p = .969$). For the counter-stereotype videos, 15 clips depicted females in counter-stereotypical occupations or activities ($m_{\text{length of clip}}$=8.62 seconds, range = 4.1 – 20.1 seconds) and 15 clips depicted males in counter-

stereotypical occupations or activities ($m_{\text{length of clip}}$=8.05 seconds, range = 3.0 – 19.5 seconds) with an overall average clip length of 8.34 seconds. Again, there were no differences in length between the clips depicting female and male characters ($t(28) = .372$, $p = .713$). For the control videos, 15 clips were randomly chosen from the stereotyped video (7 male) and 15 clips were randomly chosen from the counter-stereotyped video (7 male). The overall average clip length in the control video was 7.88 seconds, with no differences between length of counter-stereotyped and stereotyped clips ($t(14) = -.267$, $p = .794$) or between clips containing male and female characters ($t(13) = -.213$, $p = .835$).

After videos were created, they were blinded and assigned a number from one through six. These blinded numbers were used to assure equal numbers of boys and girls watched each type of video and that the researcher was unaware which video children were watching. Of the 60 boys who participated in the study, 20 watched the stereotyped video (m_{age} = 56.20 months), 20 watched the counter-stereotyped video (m_{age} = 53.84 months), and 20 watched the control video (m_{age} = 60.15 months). Of the 64 girls who participated in the study, 21 watched the stereotyped video (m_{age} = 56.40 months), 21 watched the counter-stereotyped video (m_{age} = 57.86 months), and 22 watched the control video (m_{age} = 59.77 months). There were no significant age differences between the groups for the boys ($F(2, 56) = 1.711$, $p = .190$) or for the girls ($F(2, 60) = .527$, $p = .593$). Looking at the sample as a whole, 40 children watched the stereotyped video (m_{age} = 56.30 months), 40 children watched the counter-stereotyped video (m_{age} = 55.95 months), and 42 children watched the control video (m_{age} = 59.95 months); there were no significant age differences between the groups ($F(2, 119) = 1.785$, $p = .172$). Previous research has shown that four- to five-year-olds do not often follow the entire storyline of a television episode and instead

see several individual scenes (Gunter & McAleer, 1997, p. 41). Therefore, showing children a series of individual scenes should not have been an unnecessary tax on their attention skills.

Forced-choice gender stereotype measure: Sticker choice task. After watching the video, children engaged in a sticker choice task similar to the one employed by Arthur and colleagues (2009) wherein children are offered a choice between an unattractive, small gender-typed sticker and an attractive, large cross-gender-typed sticker (examples in Appendix 9). Girls chose between a large, sparkly dinosaur sticker or a small butterfly sticker. Boys chose between a large, sparkly butterfly sticker or a small dinosaur sticker. The sticker task was meant to serve as an implicit measure of how much children are willing to engage in gender counter-stereotyped behavior. Children were then able to keep the sticker that they chose.

Coding for sticker choice task. The researcher recorded whether children picked the gender-stereotyped or counter-stereotyped sticker.

Open-ended gender stereotype measure: Gender Accessibility Measure (GAM). This is an open-ended measure where children's responses are recorded verbatim, developed by Miller, Lurye, Zosuls, and Ruble (2009). First, children were asked, "I bet you know a lot about girls. Tell me what you know about girls. Describe them." Next, they were asked, "I bet you know a lot about boys. Tell me about boys. Describe them." Responses were recorded verbatim and later coded.

Coding for GAM. First, two coders independently coded 20% of the sample for whether the question about girls contained any mention of female stereotypes (Kappa = .847) and whether the question about boys contained any mention of male stereotypes (Kappa = .922). Discrepancies were resolved with discussion and then one coder coded the remainder of the data. Then, two coders coded the explanations for how many mentions of activity, toy, or color that

girls or boys preferred (Krippendorf's alpha = .8507), of appearance (Krippendorf's alpha = .9515), of biological characteristics of boys or girls (Krippendorf's alpha = .8989), and personality traits (Krippendorf's alpha = .9211). After discrepancies were resolved with discussion, one coder coded the remainder of the data.

Forced-choice gender stereotype measure: Preschool Occupation Activity and Trait Measure (POAT). The Preschool Occupation Activity and Trait Measure (POAT; Liben & Bigler, 2002) measures preschoolers' attitudes towards others (POAT-AM) as well as gender-typing of themselves (POAT-PM) across three domains: occupations, activities, and traits. For this study, only two domains were used: occupations and activities, based on advice from the measure's creators. For the attitude measure (AM), children were asked to point at stick figures (a boy, a girl, or a boy and a girl) to indicate who should do a particular job (occupation) as well as who should do this particular thing (activity); researchers recorded the answer children give for each behavior. In the self-typing measure (PM) children were asked how much they would like to engage in that occupation or behavior with a Likert scale adapted for preschoolers by using sad to happy faces. Both the scales (stick figures and happy faces) are included in Appendix 10.

Coding the POAT. Each section of the POAT (POAT-AM occupations, POAT-AM activities, POAT-PM occupations, POAT-PM activities) was scored separately. Then scores were combined to calculate total scores for POAT-AM, POAT-PM, and the POAT overall. Each item was scored as a "1" if the answer was stereotypical for the child's gender, "0" if it was neutral (e.g., both boys and girls, or the neutral face), and "-1" if it was counter-stereotypical for the child's gender.

Gender essentialism/constancy task. Participants were led through the gender constancy task developed by Szkrybalo and Ruble (1999), which asks children ten questions about the constancy of their own and others' gender. Questions addressed the concepts of stability (e.g., "When you grow up, will you be a mother or a father?," "When this grown-up was little, was this grown-up really a boy or really a girl?"), activity (e.g., "If you played boy games, would you really be a boy or really be a girl?," "If this grown up did the work that women usually do, would this grown-up really be a man or really be a woman?"), clothing (e.g., "If you went in another room and put on these [gender atypical] clothes, would you then really be a boy or really be a girl?," "If Jack wore a dress, would Jack be a boy or a girl?"), and a combination of activity and trait (e.g., "If Jill was very strong and played football, would Jill be a girl or a boy?"). For five of the ten questions, children were also asked to explain their answer; these responses were recorded verbatim and later coded.

Coding the gender essentialism/constancy task. First, two coders coded 20% of the data for whether each answer was correct or incorrect based on the concept of gender constancy (Kappas for all questions = 1.000). Then, the explanations were coded based on the coding scheme developed by Szkrybalo and Ruble (1999) and included *gender norm explanations* (e.g., "If I did girl stuff, I would be a girl," "Boys play baseball"), *norm-flexibility* (e.g., "Girls at Auntie Kanani's house play football," "He's good at things like that"), *implied constancy explanation* (e.g., "If you play girl things, it may be fun but it doesn't mean you're a girl," "That's how he grew up"), and *operational-constancy explanations* (e.g., "I'm a girl and I cannot change," "He's a boy and he's not a girl"). These coding categories represented an increase in developmental sophistication in understanding of gender constancy; therefore, if a child's explanation contained more than one type of explanation, they were coded as the more

developmentally sophisticated category. Two coders coded 20% of the data (Kappa = .743), discrepancies were resolved with discussion, and then one coder coded the remainder of the data. Lastly, each explanation was also coded for the level of essentialism/constancy present. Explanations were coded as "0" if they contained no evidence of essentialist reasoning (e.g., "He's a boy," "I like girls"), as "1" if they showed emerging essentialist reasoning (e.g., "I grew up being a girl"), and as "2" if they demonstrated essentialist reasoning (e.g., "I'm a boy, so I can't be a girl," "It doesn't matter the clothes- it matters your body"). Two coders coded 20% of the data (Kappa = .817), discrepancies were resolved with discussion, and then one coder coded the remainder of the data. Detailed coding schemes can be found in Appendix 11.

Persistence in a difficult task. For this task, two sets of puzzles were used: one depicting a jungle scene, and one depicting an underwater scene. The order of puzzles was counter-balanced. Similar to the Smiley and Dweck (1994) puzzle task, children were first given a 35-piece puzzle to complete. Twenty-three of the pieces were glued down and 12 pieces were given to the child to complete the puzzle (See Appendix 12 for details). Children were told, "This puzzle is almost done so I want you to finish it as fast as you can." The researcher timed how long it took the child to complete the puzzle; if the puzzle was not completed after eight minutes (a time most children could achieve in pilot testing), this task was skipped and the researcher proceeded to the end of the protocol. After the child completed the first puzzle, they were given another 35-piece puzzle with 23 of the pieces glued down. However, this time, five of the loose pieces matched the puzzle whereas seven were similar in color and subject, but were from a different puzzle. Children were told, "Here's another puzzle. You have the same amount of time to do this one as you did for the last one." Children were given the same amount of time it took for the first puzzle; at the end of that time, they were told "Oh, time's up." After both of

these trials, children were offered the chance to do one of the puzzles again by the researcher saying, “We have time to do one more puzzle again. Which one would you like to do again?” If the child chose the second puzzle, they were told “Oh, you know what, I think I might have given you some of the wrong pieces before; here are the correct pieces.” Children were allowed to finish the puzzle of their choice and helped if necessary.

Coding the puzzle task. During the experimental protocol, the researcher recorded how long the child took to complete the first puzzle, which puzzle they chose to do again, and any self-talk during the puzzle completion. The self-talk was not analyzed for this study.

Results

Descriptive Results

Pre-video interview. When children were asked their favorite television show, 52 (41.9%) mentioned a show included in the content analysis of Study 1 (16 out of 22 shows were mentioned at least once), 66 (53.2%) mentioned a show not included in the content analysis of Study 1 or mentioned a movie, and 6 children (4.8%) did not provide a favorite show. When asked about their favorite character, 63 children (50.8%) named a male character, 44 children (35.5%) named a female character, and 7 children (5.6%) named either more than one character (different genders) or a character for whom we could not determine gender. Ten children (8.1%) did not provide a favorite character. Overall, children chose a male main character as their favorite more often than a female main character ($\chi^2(1, N = 107) = 8.961, p = .003$). Of the 53 boys who mentioned a favorite character, 32 (60.4%) mentioned a male character, 18 (33.9%) mentioned a female character, and 3 (5.6%) mentioned a character of unknown gender; there were no significant differences in boys choosing male or female favorite characters ($p = .097$). Of the 61 girls who mentioned a favorite character, 31 (50.8%) mentioned a male character, 26

(42.6%) mentioned a female character, and 4 (6.6%) mentioned a character of unknown gender; there were no significant differences in girls choosing a male or female main character (p = .542). There were also no differences in favorite character gender based on child gender (p = .589).

Seventeen children (13.7%) did not provide explanations when asked why a certain character was their favorite. Of the explanations provided, 22.6% mentioned the appearance of the character, 13.7% mentioned the character's personality trait, 32.3% mentioned an activity the character participated in, and 16.1% mentioned the character's possession. When comparing the explanations by character gender (male v. female), children were more likely to use appearance to describe female characters ($\chi^2(1, N = 102) = 10.703, p = .001$) and more likely to use personality traits when describing male characters ($\chi^2(1, N = 102) = 4.315, p = .038$). There were no differences in describing male versus female favorite characters using activities or possessions. There were also no differences based on children's own gender as far as how they described their favorite characters (all ps > .576).

Sticker choice. One child did not want to choose a sticker. Of the other children, 43 (34.7%) chose a counter-stereotypical sticker and 80 (64.5%) chose a stereotypical sticker. This overall distribution was very similar to the distributions for both boys and girls separately. For example, 35.0% of boys and 34.9% of girls chose a counter-stereotypical sticker; 65.0% of boys and 65.1% of girls chose a stereotypical sticker. There were no differences in the distributions between boys and girls ($\chi^2(1, N = 123) = .000, p = .993$).

Gender Accessibility Measure (GAM). When asked open-ended questions, 50.0% of children mentioned a female stereotype when asked about girls and 51.6% mentioned a male stereotype when asked about boys. There were significant differences between boys' and girls'

answers. Boys mentioned a female stereotype (66.7%) more often when asked about girls than girls (34.4%) did (χ^2 (1, N = 124) = 12.917, p = .000). Similarly, boys also mentioned a male stereotype (65.0%) more often when asked about boys than girls (39.1%) did (χ^2 (1, N = 124) = 8.342, p = .004).

When analyzing children's descriptions of girls in general, 38.7% mentioned at least one appearance-related comment (m = 1.98 mentions, range = 1-8), 4.1% mentioned one biological comment, 13.9% mentioned at least one activity that girls do (m = 1.71 mentions, range = 1-3), and 8.9% mentioned at least one personality trait (m = 1.55 mentions, range = 1-4). When analyzing children's descriptions of boys in general, 28.2% mentioned at least one appearance-related comment (m = 1.54, range = 1-5), 3.3% mentioned one biological comment, 23.8% mentioned at least one activity that boys do (m = 2.21 mentions, range = 1 -7), and 13.9% mentioned at least one personality trait (m = 1.41 mentions, range = 1-4). There were no differences between boys and girls for any of these codes (all ps >.580).

There were, however, differences, overall, in how children described boys and girls in the GAM. Girls were described using more appearance words (t(122) = 3.983, p < .001) and boys were described using more words describing their activities (t(121) = -3.093, p = .002). The main analyses will address whether these differences were affected by the stimuli video that children watched.

Preschool Occupation Activity and Traits (POAT). The POAT-PM asked children how much they, themselves, would like to do an occupation or an activity. The POAT-AM asked children who they thought should do a certain occupation or activity (men, women, or both). For each section, there were six questions that referred to stereotypically male occupations or activities and six questions that referred to stereotypically female occupations or activities. As

described in the Methods section, when children answered stereotypically, they were scored 1 point, when children answered counter-stereotypically, they were scored -1 point. Therefore, scores on each of four subtests (POAT-PM-Occupation, POAT-PM-Act, POAT-AM-Occupation, POAT-AM-Act) could range from -12 (children answer all questions counter-stereotypically) to 12 (children answer all questions stereotypically). Means for each group are summarized in Table 9.

When comparing boys' and girls' scores, boys showed more stereotyped answers compared to girls, overall, when asked questions about themselves (POAT-PM-Total; $F(1, 122) = 5.28$, $p = .023$) and specifically when asked about the activities they wanted to participate in (POAT-PM-Activity; $F(1, 122) = 14.99$, $p < .001$). Conversely, girls were more stereotyped than boys when asked about others' occupations (POAT-AM-Occupation; $F(1, 116) = 4.30$, $p = .040$).

Gender essentialism/constancy. When coding their answer (boy/girl, yes/no) without the explanation, participants could earn between 0 and 10 total points. In my sample, children earned between 2 and 10 points and the mean score was 6.41 ($SD = 2.29$). There were no differences between boys and girls ($p = .300$). When coding their explanations for five of the ten questions, participants could earn between 0 and 2 points per question, for a total between 0 and 10. Here, my sample represents the full possible range, and the mean score was .597 ($SD = 1.50$). Again, there were no differences between boys and girls ($p = .328$).

For the types of explanations, scores were calculated as a percentage of the total number of explanations that were able to be coded. For example, some children responded to "Why?" with "I don't know" or no answer; these responses were unable to be coded for type of explanation. These analyses are based on the percentage of each child's explanations that were able to be coded into one of the four categories. An average of 70.01% of children's responses

were based on gender norms (range = 0-100%, *SD* = 33.08%), 16.26% of children's responses were about norm flexibility (range = 0-100%, *SD* = 21.54%), 9.14% of responses were about implied constancy (range = 0-100%, *SD* = 23.47%), and only 4.58% of answers showed evidence of an operational understanding of constancy (range = 0-100%, *SD* = 14.30%). There were no gender differences for any of the explanation categories (all *p*s > .446).

Puzzle task. Overall, when asked which puzzle they wanted to do again, 44.3% of children chose to do the possible puzzle (with all the correct pieces) and 55.7% chose to do the impossible puzzle. Eighteen children took more than eight minutes to complete the first puzzle and therefore, did not complete the task. When looking at boys and girls separately, 47.9% of boys and 41.3% of girls chose the possible puzzle whereas 52.1% of boys and 58.6% of girls chose the impossible puzzle. There were no differences by gender (p =.500). It took children an average of 3 minutes and 42 seconds to complete the first puzzle (range= 42 seconds – 7 minutes and 55 seconds, *SD* = 1 minute and 41 seconds). There was a small trend towards girls completing the puzzle faster than boys (p = .085) with girls taking an average of 3 minutes and 27 seconds while boys took an average of 4 minutes and 1 second.

Main Analyses

Effects of video condition. One-way ANOVAs were run to compare the means for continuous variables across the video manipulations (stereotype, counter-stereotype, control). For categorical variables, chi-square analyses were run.

Baseline stereotype measure: Favorite character. The question about the favorite character came before participants watched the television clips and was designed to be both a measure of baseline gender stereotype belief as well as a check that random assignment to experimental groups worked. Chi-square tests between the experimental groups revealed no

differences for gender of the favorite character (p = .827), mentioning character's appearance (p = .822), mentioning character's personality trait (p = .766), or mentioning character's activity (p = .651). There was a significant difference for mentioning the character's possession (χ^2 (2, N = 107) = 6.085, p = .048) wherein children mentioned possession more often before the stereotyped video and less often before the control video. However, this variable was not used in further analyses.

Stereotype measure: POAT. When all children were included in the analyses, there was a significant difference between the video-watching groups (i.e., stereotyped, counter-stereotyped, control) in their stereotype scores for the total POAT score (F(2, 113) = 4.506, p = .013), as well as for the POAT-AM (F(2, 121) = 4.632, p = .012), which asked about what others should do; there was also a trend towards differences for the POAT-PM (F(2, 121) = 2.698, p = .055), which asked about what the child would like to do. Post-hoc Bonferroni tests indicated that children who watched the counter-stereotyped video had higher stereotyping scores on the total POAT score (p = .011, 95% CI: [-12.003, -1.173]) and the POAT-AM (p = .011, 95% CI: [.661, 6.796]) with a similar trend on the POAT-PM (p = .055, 95% CI: [-6.341, .048]), when compared to those who watched the stereotyped video. Looking at the occupation and activity sub-tests separately for each measure indicated similar effects for the POAT-AM-Occupation (F(2, 115) = 3.230, p =.043; Post-hoc Bonferroni analyses showed those who watched the counter-stereotyped video were more stereotyped than those who watched the stereotyped video, p = .037, 95% CI: [-3.636, -.082]), the POAT-AM-Activities (F(2, 116) = 5.310, p =.006; Post-hoc Bonferroni analyses showed those who watched the counter-stereotyped video were more stereotyped than those who watched the stereotyped video, p = .013, 95% CI: [-3.808, -.346]), and the POAT-PM-Occupation (F(2, 121) = 3.197, p = .044; Post-hoc Bonferroni analyses

showed those who watched the counter-stereotyped video were more stereotyped than those who watched the stereotyped video, $p = .038$). Means for these analyses are found in Table 14.

Given the different portrayals of male and female characters found in the television shows in Study 1, it was theoretically important to examine how the different types of television clips affected boys and girls differently. To examine whether the previously described effects of experimental group on POAT scoring were seen equally in both boys and girls, separate one-way ANOVAs were run with only boys and only girls. For the boys, there were no significant differences (all *p*s > .229). For the girls, effects looked similar to those effects seen for the sample as a whole. There were significant differences for the girls' total POAT scores ($F(2, 57) = 6.005$, $p = .004$), POAT-AM scores ($F(2, 57) = 5.199$, $p = .008$) and a strong trend towards differences in the girls' POAT-PM scores ($F(2, 61) = 3.083$, $p = .053$). Post-hoc Bonferroni tests indicated that girls who watched the counter-stereotyped videos had higher stereotype scores on their total POAT score ($p = .003$, 95% CI: [-19.763, -3.311]) as well as on both the POAT-AM ($p = .007$, 95% CI: [-10.8167, -1.410]) and the POAT-PM ($p =.048$, 95% CI: [-9.676, -.038]), compared to girls who watched the stereotyped videos. However, when looking at the POAT sub-tests for occupations and activities, only the subtests for the POAT-AM, which asked about what other should do, were significantly different for girls depending on the video they watched. One-way ANOVAs found differences for girls' stereotype scores on the POAT-AM-Occupation ($F(2, 58) = 5.775$, $p = .005$); post-hoc Bonferroni tests indicated, again, that girls who watched the counter-stereotyped video had higher stereotype scores ($p = .004$, 95% CI: [-5.905, -.932]) than girls who watched the stereotyped video. There were also differences for girls' stereotype scores on the POAT-AM-Activities ($F(2, 59) = 3.883$, $p = .026$); again, post-hoc Bonferroni tests indicated that girls who watched the counter-stereotyped video had higher stereotype scores ($p =$

.033, 95% CI: [-5.704, -.181]) than girls who watched the stereotype video. Means for girls' POAT scores across different experimental groups can be found in Table 14.

Stereotype measure: Sticker choice. Chi-square analyses were run to look for differences in sticker choice by experimental group. For the sample as a whole, there were no significant differences in the sticker chosen based on which video was shown (p = .173). This effect was also not significant for boys (p = .415) or girls (p =.265) as separate groups.

Stereotype measure: GAM. Chi-square analyses were run to look for difference in GAM answers by experimental group. For the sample as a whole, there were no significant differences based on experimental group in whether children used female (p = .976) or male stereotypes (p = .900) when they were asked open-ended questions about boys and girls. For boys as a separate group, there were also no differences for using female (p = .153) or male stereotypes (p = .215). Similarly, for girls there were no significant differences for using female (p =.295) or male stereotypes (p =.114).

Gender constancy/essentialism. One-way ANOVAs were run for the total essentialism score (based on whether the answer was correct), essentialism explanation score (based on the level of essentialism understanding in the explanations), and the percentages for types of explanations (gender norms, norm flexibility, implied constancy, operational constancy). The only variable that showed significant differences by experimental group was the essentialism explanation score ($F(2, 121) = 3.948$, p = .022). Post-hoc Bonferroni tests indicated that essentialism explanation scores were higher after watching the stereotyped video, compared to both the counter-stereotyped video (p =.052, 95% CI: [-.004, 1.565]) and the control video (p = .046, 95% CI: [-1.568, -.009]). However, these differences did not reach significance when boys (p = .159) and girls (p=.134) were examined separately. Means can be found in Table 14.

Motivation task: Puzzle choice. Chi-square analyses were run for puzzle choice (possible versus impossible) based on manipulation group. As described previously, choosing the impossible puzzle suggests greater motivation to persist in a difficult task. There were no significant differences for the group overall (p = .183) or for girls only (p = .988). There were significant differences for boys ($X^2(2, N = 48) = 6.449$, p =.040) wherein they were more likely to choose the possible puzzle after watching the counter-stereotyped video than after watching the control video.

Relations between variables. Because of interest in how the variables measured are related to each other, beyond the experimental manipulation, the following correlation and independent sample t-test analyses were run.

Stereotype measures. Both the GAM and the POAT had different sub-tests. First, correlations were run to examine whether the sub-tests were related to each other. For the GAM, children who mentioned a female stereotype during the "Tell me about girls" question were also more likely to mention a male stereotype during the "Tell me about boys" question (r = .710, p < .000). For the POAT, the overall scores on the POAT-PM and the POAT-AM were significantly correlated (r = .483, p < .000) with each other. This relation also existed when analyzing boys and girls separately. Additional correlations between the different sub-tests on the POAT are summarized in Tables 10-12.

Given that both the sticker choice task and the POAT asked children to take an explicit stance on stereotypes, analyses were run to check for relations between the two variables. Independent sample t-tests showed that children who chose the stereotyped sticker also had more stereotyped scores on the total POAT score ($t(114) = -2.687$, p = .008), POAT-PM ($t(121) = -2.160$, p = .033), POAT-AM ($t(114) = -2.275$, p = .025), POAT-PM-Activities subtest ($t(121) = -$

2.299, p = .023), and the POAT-AM-Activities subtest (t(117) = -2.158, p = .033). These relationships were also confirmed with Spearman correlation analyses. These results suggest that the sticker choice and the POAT were measuring a similar construct: children's answers when faced with a forced-choice on questions of stereotypes. However, this may be limited to girls only. When boys were run separately, there were no significant differences in POAT scores based on sticker choice. For girls, those who chose the stereotypical sticker had higher total POAT scores (t(58) = -2.773, p = .007), overall POAT-AM scores (t(60) = -2.518, p = .015), POAT-AM- Occupation scores (t(58) = -2.041, p = .046), POAT-AM-Activity scores (t(60) = -2.518, p = .015), POAT-PM-Activity scores (t(61) = -3.042, p = .003), and a trend towards higher overall POAT-PM scores (t(61) = -1.952, p = .056). There were no significant differences on the POAT-PM-Occupation subtest (p = .875).

The GAM, on the other hand, gave children the opportunity to *choose* whether to use a stereotype or not when describing boys and girls. To establish that the GAM was measuring a different construct, independent t-tests were run to examine whether mean POAT scores were different based on whether children used a gender stereotype when asked about boys and girls. The only significant difference was that children who used a female stereotype when asked about girls ($mean_{\text{POAT}}$ = 5.629) had more stereotyped beliefs on the POAT-PM-Activities subtest (t(113.4) = -2.118, p = .036) when compared to children who did not use a female stereotype ($mean_{\text{POAT}}$ = 4.145). There were no significant differences when examining data from boys and girls separately.

Gender constancy/essentialism. The two main essentialism measures included coding whether children's forced answer (boy/girl, yes/no) suggested an understanding of gender constancy and whether their open-ended explanation demonstrated understanding gender

essentialism. These two measures were not correlated with each other (p = .542). Because the explanation measure is a more stringent test of children's understanding of the concept and previous research suggests explanation is more useful to relate to stereotyped beliefs (Ruble et al., 2007), that variable will be used in the following analyses.

Given the theoretical argument for stereotyping and essentialism being related, I ran correlations between the POAT scores and essentialism explanations. Surprisingly, when all children were run together, none of the POAT scores correlated significantly with essentialism explanations (all ps > .097). To check for differences by gender, I ran separate correlations for boys and girls. For boys, there were no significant correlations. For girls, essentialism explanations were significantly positively correlated with their total POAT score (r = .271, p = .036) as well as their overall POAT-PM score (r = .264, p = .035) and POAT-PM-activities (r = .287, p = .021). These correlations suggest that girls with higher levels of gender essentialism/constancy also report higher stereotype scores for what they would like to do themselves, especially when asked about their activities.

Given the initial analyses that showed POAT and GAM measuring different constructs of gender stereotypes, I also ran Spearman correlations to check for relations between GAM and essentialism explanations. For the entire sample, there were significant correlations between using a female stereotype in the "Tell me about girls" question and children's essentialism explanations (r= .267, p =.003) but not for using male stereoytpes in the "Tell me about boys" question (p = .154). When analyses were run separately for boys and girls, there were no significant correlations between GAM and essentialism explanations for boys, but girls who had higher levels of essentialist reasoning in their explanations were also more likely to use female stereotypes in their answer to the "Tell me about girls" question (r= .342, p = .006). These

correlations were also confirmed by independent sample t-tests looking for differences in the mean essentialism explanation scores between those who used stereotypes in the GAM and those who did not.

Child age & other demographics. Past research demonstrates that gender stereotyping and understanding gender essentialism/constancy are significant developmental achievements in a child's understanding of gender. Therefore, I first looked at how child age (as a continuous variable) was correlated with the other measures. For boys and girls together, child age was only correlated with POAT scores: the overall total ($r = .444$, $p < .001$), POAT-PM total ($r = .382$, $p < .001$), POAT-AM total ($r = .438$, $p < .001$), POAT-PM-Occupations ($r = .247$, $p = .006$), POAT-PM-Activities ($r = .365$, $p < .001$), POAT-AM-Occupations ($r = .369$, $p < .001$), and POAT-AM-Activities ($r = .395$, $p < .001$). The same significant correlations were, for the most part, seen with boys separately (with the exception of POAT-AM-Occupations which was not significantly correlated, $p = .121$) and with girls separately (with the exception of POAT-PM-Occupations which was not significantly correlated, $p = .225$). It is interesting to note that boys' age correlated with all POAT measures except when asked about *others'* occupational interests whereas girls' age correlated with all POAT measures except when asked about *their own* occupational interests.

There were no significant correlations amongst any of the measured variables and other demographic factors including: parent education level, family income level, whether the father and/or mother worked full time, or how household chores were split between mother and father.

Does age play a factor in the effects seen? Because child age was strongly correlated with POAT scores, I wanted to check that the effects on POAT by the video manipulation were not, in fact, just due to age. First I ran an ANCOVA with total POAT score as the dependent

variable, video manipulation as the fixed factor, and age as a covariate. The model was significant ($F(2, 110) = 12.686$, $p < .001$, $\eta\rho^2 = .257$) as were both the covariate of age ($F(1, 110) = 27.732$, $p < .000$, $\eta\rho^2 = .201$) and the factor of video manipulation ($F(2, 110) = 5.293$, $p = .006$, $\eta\rho^2 = .088$). I also created a variable that split children by age into younger and older groups according to the overall mean age. I ran a 2 (age) x 3 (video) ANOVA; the overall model was significant ($F(5, 108) = 6.699$, $p < .001$, $\eta\rho^2 = .237$). The video manipulation was also significant ($F(2, 108) = 5.098$, $p = .008$, $\eta\rho^2 = .086$) as was the age ($F(1, 108) = 19.232$, $p < .001$, $\eta\rho^2 = .151$). However, the interaction was not significant ($p = .161$). Therefore, both age and experimental manipulation affected the stereotype score.

When the above ANCOVA was run for boys and girls separately, different patterns emerged. For boys, the overall model was significant ($F(5, 49) = 3.087$, $p = .017$, $\eta\rho^2 = .240$) as was the covariate of age ($F(1, 49) = 12.119$, $p = .001$) but not the fixed factor of video manipulation ($p = .714$) or the interaction between the two ($p = .364$). However, for girls, the overall model was significant ($F(5, 53) = 4.846$, $p = .001$, $\eta\rho^2 = .314$), as were both the fixed factor of video manipulation ($F(2, 53) = 5.226$, $p = .008$) and the covariate of age ($F(1, 53) = 7.154$, $p = .010$). Therefore, it appears that, whereas both boys and girls' stereotyping scores were affected by their age, the girls were much more affected by the video manipulation than boys.

Discussion

The main purpose of this study was to investigate how viewing gender stereotypes and counter-stereotypes on television affect children's own stereotyped beliefs. Participants in this study were children ages 3.5- to 6-years-old; this age range was chosen because previous research shows this is the developmental period when children learn and begin to use gender

stereotypes. To maximize ecological validity, actual clips from children's television shows were used. Additionally, experimenters were blind to which video children were watching to minimize potential bias effects from researchers. By including measures of both explicit (forced-choice) and more implicit (open-ended) gender stereotypes, I explored different paths through which television viewing could affect children's beliefs.

In the following sections, I discuss several interesting results. First, I use previous literature to provide possible explanations for the expected and unexpected effects of viewing the different videos. Then, I examine the developmental trends that emerged between stereotyping and essentialism as well as the different ways children described males and females. Lastly, I describe differences between explicit (forced-choice) and implicit (open-ended) stereotype measures and offer suggestions for future research in this topic area.

Effects of videos on children's gender stereotypes

Much of the research showing links between children's viewing of stereotypes and their own stereotyped beliefs has been correlational in nature (e.g., Aubrey & Harrison, 2004; Halim, Ruble, & Tamis-LeMonda, 2013). In experimental studies (with children slightly older than the current sample), there has actually been more consistent evidence that viewing gender counter-stereotypes decreases children's stereotyped beliefs, instead of stereotyped portrayals increasing stereotyped beliefs. For example, Pike and Jennings (2005) showed first- and second-grade children commercials where children were either playing with a stereotypical or counter-stereotypical toy. After watching commercials where a child plays with a counter-stereotypical toy (e.g., girls play with airplanes), children were more likely to say that toy was for "both boys and girls" than children who had watched the stereotypical video (e.g., boys play with airplanes). These results suggest that children viewing counter-stereotypes are more likely to adopt a gender

egalitarian view on toy play. Similarly, Pickering and Repacholi (2001) found that, after kindergarteners watched someone play a counter-stereotypical instrument (e.g., a man playing a flute), they were more likely to modify their own instrument preference; there was no change in preference after seeing a stereotyped instrument portrayal. Davidson, Yasuna, and Tower (1979) showed five- to six-year-old girls television episodes of shows that had been rated either as stereotyped, counter-stereotyped, or neutral. Girls who watched the counter-stereotyped material showed lower levels of gender role stereotypes than those who had watched the stereotyped or neutral materials. However, there are two main drawbacks to the Davidson et al. (1979) study. First, they did not complete a content analysis of the shows and therefore, are unable to draw conclusions about the number of stereotypes versus counter-stereotypes seen across the conditions. Second, unlike the stereotype measure in the current study (POAT) and in the Pike and Jennings (2005) study, Davidson and colleagues (1979) used a measure that forced children to choose either a boy or a girl as doing an activity; there was no option for "both boys and girls." Therefore, girls may have been artificially forced to choose one or the other, skewing the results.

Together, the studies above suggest that viewing counter-stereotypes may be more influential in changing children's beliefs than viewing stereotypes. Indeed, the current results also showed this effect, with the counter-stereotype group showing significantly different levels of stereotyped beliefs (on the POAT) when compared to both the stereotyped and control groups. However, unlike the previous studies, the present results suggest counter-stereotype viewing as *increasing* stereotype scores, relative to viewing stereotypes or a control video. This increase was seen especially strongly in children's stereotyping scores of other people. Additionally, when boys' data were looked at separately, there were no significant effects of the video

manipulation. In the current study, the girls seemed to be especially sensitive to changes in stereotype beliefs as a result of watching the counter-stereotype video. Pickering and Repacholi (2001) found similar results wherein girls were more likely to alter their stereotyped beliefs about instruments after seeing counter-stereotypical videos. However, Pike and Jennings (2005) found that, in their study, boys were the most sensitive to changing their beliefs after watching different types of commercials. Therefore, future studies should investigate counter-stereotypes across different domains to determine whether boys and girls are differentially sensitive to different portrayal domains (e.g., instruments, commercials, television).

The question remains: why did explicit (forced-choice) beliefs in the POAT become more stereotyped after viewing a series of counter-stereotypes? This finding is puzzling given previous work showing a decrease in children's stereotyped beliefs after being exposed to counter-stereotypes (Goclowska & Crisp, 2013; Pike & Jennings, 2005; Steyer, 2014). However, there is also some evidence that children possess "stereotype-conforming cognitive tendencies" which cause them to compensate by becoming more stereotyped when faced with counter-stereotypes (Trautner, Ruble, Cyprus, Kiersten, Behrent, & Hartmann, 2005). For example, Hughes and Seta (2003) found that, when fifth-grade children read descriptions of men performing counter-stereotypical behavior, they were more likely to predict another man would perform stereotypical behavior. Similarly, in a qualitative study, Frawley (2008) found that first-graders often reported memory distortions when asked to recall counter-stereotypical aspects of books; that is, they would alter the counter-stereotypical aspect of the story to bring it in line with their knowledge of gender stereotypes. However, the majority of these studies showing effects in either direction have directly measured children's stereotyped beliefs *about a specifically manipulated gender stereotype* (e.g., instruments, specific toys, actions in a book) instead of children's overall

stereotyped beliefs across several examples, as the POAT did in the current study. Future research should investigate how viewing counter-stereotypical examples can affect children's overall stereotyped beliefs, both in one-time instances as well as over time.

A challenge of the current study was that participants were in the peak of gender stereotype rigidity (Halim, Ruble, Tamis-LeMonda, Zosuls, Lurye, & Greulich, 2014; Ruble et al., 2007; Trautner et al., 2005): the average age of children in the current study was 57 months (4 years, 8 months). Because of this gender rigidity, children may have been especially sensitive to seeing information that contradicted their rigid gender stereotypes. In a study with similarly aged children (mean age = 58 months), Martin (1989) found that children were incredibly rigid in their beliefs, even when presented with counter-stereotypical information: when asked about another child's interest in toys, participants predicted the other child would like the gender-typed toy, even if they had heard a description that the child liked to play with the gender counter-typed toy. This effect was not seen in older participants, who also took the child's reported interests into account (Martin, 1989). High gender rigidity could explain why my sample did not replicate previous studies done with older children that showed a decrease in stereotype beliefs after viewing counter-stereotyped content.

Research in other domains of child development (e.g., executive function, teleological thinking) have also shown that, at this age, children are still developing the skill of holding two competing ideas in their head (Jones, Rothbart, & Posner, 2003; Keleman, 1999); arguably, this skill is important for children to suppress their rigid gender stereotypes and express counter-stereotypical beliefs. It is possible that the children in my study expressed higher stereotype beliefs after viewing the counter-stereotyped video because the task of holding two different concepts (e.g., their own gender schema and the counter-stereotypical examples) was simply

beyond their developmental skill. In a study examining children's memory for counter-stereotypical *racial* knowledge, Bigler and Liben (1993) found that children with better ability to classify stimuli along many dimensions indeed had better memory for counter-stereotyped material. Future research should investigate children's abilities to hold more than one idea in their mind as a predictor of how viewing gender stereotypes or counter-stereotypes affect children's own beliefs.

In addition to children's forced-choice gender stereotyped beliefs, gender essentialism/constancy was also different amongst the different experimental groups; specifically, children's explanations contained higher levels of understanding gender could not change after watching the stereotyped video. However, the connection between gender essentialism understanding and stereotyped beliefs and behaviors has shown mixed results in previous literature. Whereas Kohlberg (1966) initially proposed a connection between gender constancy understanding and stereotype knowledge, some research with children has not found a connection (Arthur et al., 2009; Bussey & Bandura, 1992). Of particular relevance to the current study, Meyer and Gelman (2016) found that children's gender essentialism was related to their own gender-typed preferences (POAT-PM) but not their prescriptive stereotypes (POAT-AM). Relatedly, my results showed significant correlations only in girls' scores; particularly, higher levels of gender essentialism were correlated with higher levels of children's own gender-typed preferences and only the activity subscale of their prescriptive stereotypes. Together, these results suggest that children's understanding of gender essentialism has a greater effect on how children use gender stereotypes to think about themselves. However, the video manipulation affected children's prescriptive gender stereotypes about others. When models were run in the current study, gender essentialism did not act as a mediator between video manipulation and

stereotyping scores, but instead contributed to stereotyping along with the video manipulation, for girls only. Future research should continue to investigate the connection between gender essentialism understanding and stereotype use, especially after a manipulation to affect stereotype beliefs.

Developmental Trends

When initial correlations were run in the current study, age was only correlated with the forced-choice stereotype measure (POAT). This effect fits with other literature, which shows children's stereotype knowledge increases with age (Blakemore, 2003; Levy & Carter, 1989; Martin & Little, 1990; Martin, Wood, & Little, 1990). Indeed, age was a significant predictor of POAT score in the current study, but it did not interact with video manipulation (either as a continuous or dichotomous variable); that is, the effect of the video portrayals was not significantly different depending on children's age. In fact, for boys, age was the only significant predictor of POAT score whereas for girls, age and video manipulation both significantly predicted POAT score. Given other literature that suggests boys and girls may learn about gender stereotypes through different processes (O'Brien et al., 2000), future studies should investigate how boys and girls are differentially affected by stereotype and counter-stereotype portrayals on television.

Descriptions of Males and Females

Asking children their favorite character (and why) before they watched the video was meant to act as a pre-test of stereotypes without explicitly mentioning (and thus, priming) the categories of male and female; it did not end up being a significant covariate in any models run. Nonetheless, it is interesting to look at how children answered the questions in relation to previous work. In the current study, both boys and girls more frequently chose a male main

character as their favorite, but the proportions of male to female favorite characters was closer to even than in previous studies. For example, in this study, 60.4% of boys and 50.8% of girls chose a male character as their favorite while 33.9% of boys and 42.6% of girls chose a female character as their favorite. In comparison, Hoffner (1996) found that, among seven- to 12-year-olds, 91.1% of boys chose male favorite characters and 52.6% of girls chose female favorite characters. Therefore, it appears that boys in my study were more likely to mention female favorite characters than in previous studies; this effect did not appear to be driven by the frequency of boys watching shows with female main characters. Future research should investigate reasons why boys may list female favorite characters at a higher rate than twenty years ago.

When asked *why* a television character was their favorite, children were more likely to use appearance descriptions (e.g., "cause she has pink," "her dress is so pretty," "she's so pretty with purple and her cutie nails") when explaining a female character, compared to a male character. Conversely, they were more likely to use personality traits (e.g., "he's cool," "sometimes he's a scaredy cat," "he's silly") when explaining their favorite choice being a male character, compared to those who chose a female main character. Similarly, when children were asked about boys and girls in open-ended questions during the GAM, they used more appearance descriptions to talk about girls (e.g., "girls wear earring, beautiful eyes, wear necklaces," "they wear bows, they're pretty," "they like dresses") and more activity descriptions (e.g., "play iPad, play in the dirt," "they like to fight, like to watch shows, like to play video games," "they love to play fighting") to talk about boys; this finding mirrors the original GAM paper (Miller et al., 2009). Additionally, other studies have found similar effects for females being described more

often with appearance words than males (Hoffner, 1996), although Miller and colleagues (2009) say that this is a relatively under-researched effect.

Explicit v. Implicit Gender Stereotype Measures

The current study included several measures of children's stereotype beliefs. Two measures (sticker task and POAT) forced children to make a choice between stereotyped and counter-stereotyped beliefs whereas one measure (GAM) gave children an open-ended choice to use a gender stereotype or not. The data support these distinctions: children who chose the stereotyped sticker were also higher in their POAT stereotype scores, whereas children's use of a stereotype in their GAM description had no correlation to their forced-choice stereotyping scores (with the exception of the POAT-PM-Activities scale). However, only the POAT showed significant differences between the experimental groups. As discussed previously, most of the literature looking at presenting children with stereotyped or counter-stereotyped examples and measuring their beliefs has looked at their *explicit* beliefs (Davidson et al., 1979).

However, social psychologists have found *implicit* beliefs to be better predictors of prejudiced *behavior* (as a result of stereotyped beliefs) compared to *explicit* beliefs (Greenwald, Poehlman, Uhlmann, & Banaji, 2009). Developmental psychologists have just recently begun to use IAT measures to show implicit beliefs such as children between the ages of six- and ten-years-old hold implicit gender stereotypes about math abilities (Cvencek et al., 2011; Steffens, Jelenec, & Noack, 2010) and that children between the ages of five- and seven-years-old hold gender stereotypes about dolls being associated with girls and trucks being associated with boys (Meyer & Gelman, 2016). Interestingly, Meyer and Gelman (2016) found that children's implicit attitudes were not correlated with their explicit gender stereotypes, similar to my findings. A next step in this research would be to investigate the link between children's implicit stereotypes with

their stereotyped behavior. Additionally, if there is, in fact, a link, are children's implicit gender stereotypes malleable based on social factors, such as media exposure?

CHAPTER 4: GENERAL DISCUSSION

Together, these two studies add to the literature on young children's learning of gender stereotypes from television shows designed specifically for this age group. Children's educational television has been lauded as an effective intervention to support positive development in several domains including school readiness, problem solving, literacy, mathematics, and science (Fisch, 2004). However, many studies have reported that children's media contains a high number of genders stereotypes as well as an under-representation of female characters (Gooden & Gooden, 2001; Larson, 2001; Smith et al., 2010; Thompson & Zerbinos, 1995). These studies suggest (but have not tested whether) children's viewing of stereotypes affects their own beliefs about gender stereotypes. While there have been correlational studies linking television viewing and stereotypical behaviors such as superhero viewing and weapon play (Coyne et al., 2014) and engagement in the Disney Princess franchise and stereotypically-female play (Coyne et al., 2016), only a few studies have employed an experimental manipulation to demonstrate how children's stereotype beliefs are affected by viewing different levels of stereotypes on television (Davidson et al., 1979; Pike & Jennings, 2005). Importantly, past studies have almost always included either a content analysis of children's television or an experimental manipulation, but rarely both. The current study sought to fill this gap in the literature by first completing a content analysis of popular children's television shows and then using the content analysis to drive the stimuli design for the experimental manipulation.

The main finding from the content analysis was that the underrepresentation of female characters found in previous literature is still present in popular children's educational television today. Specifically, male characters appear on the screen more often, speak more words, ask

more questions, and have more questions directed towards them compared to female characters. Overall, shows depict more stereotyped occupations and activities than counter-stereotyped examples; interestingly, male characters follow this general pattern (more stereotypes than counter-stereotypes) whereas female characters do not (no significant differences between stereotyped and counter-stereotyped portrayals). Importantly, this study added to the literature by looking at differences in these variables as a function of the main character gender of the show. Specifically, shows with a female main character showed higher levels of female representation on the screen as well as speaking time compared to shows with male main characters and ensemble casts. These results suggest that one way to increase female representation on children's television is to create more shows with female main characters.

Given that the design of the experimental manipulation was more novel than the content analysis, it is not surprising that the main findings were also less clear when compared to previous work. In this study, children who watched the series of counter-stereotyped clips had *more* explicitly stereotyped beliefs, especially on their views of what others should do, compared to children who watch the series of stereotyped clips or a control version of both stereotyped and counter-stereotyped clips. This effect was seen especially in female participants. Children who watched the series of stereotyped television clips showed greater understanding of gender essentialism/constancy (i.e., the understanding that gender cannot change) than those who had watched the counter-stereotype clips or the control video, suggesting that viewing stereotypes on television may not directly act on children's gender beliefs but may instead influence them indirectly through understanding of other concepts such as constancy.

In the following sections, the findings from the content analysis and the experimental study are linked to draw broader conclusions about children's learning of gender stereotypes

from television. First, I expand upon the previous discussion of reasons why children's stereotype scores went up after watching the counter-stereotyped videos; specifically, how the novelty of watching a series of counter-stereotypes may have led to the surprising finding. Next, the ways in which the current findings contribute to the three main theoretical approaches these studies were based on are discussed: Gender Schema Theory, Social-Cognitive Theory, and Developmental Intergroup Theory. I conclude by offering some suggestions for the design of future television shows for young children.

Why did gender stereotypes increase after watching the counter-stereotyped video?

Whereas previous studies have shown a decrease in children's gender stereotypes after viewing counter-stereotype examples (Davidson et al., 1979; Pike & Jennings, 2005), the present study found the opposite effect, especially within the female participants. Two possible explanations were discussed in the Study 2 discussion. One possibility for this surprising finding is that children were over-compensating for viewing counter-stereotypes by expressing more stereotyped beliefs (Frawley, 2008; Hughes & Seta, 2003), possibly driven by the fact that they were in a developmental period of peak rigidity for gender stereotypes (Martin, 1989; Trautner et al., 2005). Another possibility is that children at this age are unskilled at holding two (or more) competing ideas in their mind, across different domains of learning (e.g., Bigler & Liben, 1993; Jones et al., 2003; Keleman, 1999) and that they were simply too young to quickly integrate counter-stereotyped examples into their overall schemas of what males and females are supposed to do, according to gender stereotypes.

A third possibility is that watching a series of counter-stereotyped clips was an extremely novel experience for children and represented a world they were unfamiliar with. This is a plausible explanation given the results of the content analysis, which show gender counter-

stereotypes are relatively rare in children's television programming. One line of research in developmental psychology has investigated how children interpret and use counter-factual thinking (Beck, Carroll, Brundson, & Gryg, 2011). For example, preschool-aged children have difficulty reporting on the world as it *could be* instead of as it is (Riggs, Peterson, Robinson, & Mitchell, 1998). If children are accustomed to seeing television shows with mostly gender stereotypes, and have constructed ideas in their heads that this is the way the world is, it may be difficult for them to accept a "counterfactual world" of gender counter-stereotypes. Of particular relevance to the current study are previous findings showing children will "fight back" when told details that do not fit their knowledge of the world by reporting the truth about the world (Hawkins, Pea, Glick, & Scribner, 1984). Interestingly, Dias and Harris (1990) found that children are more likely to accept the counter-factual world when storytellers use "make-believe intonation," stories are set in remote settings (e.g., another planet), and when accompanied by visual imagery. One limitation of the current study is that participants were not asked about the videos after viewing them. Future studies could address this limitation by asking children what they remember from the videos to see if they are distorting their memories to remember more stereotypical depictions (as in Bigler & Liben, 1993 and Hawkins et al., 1984) or if they are picking up on certain aspects of the shows (e.g., remote settings) that may make them more likely to "accept the counterfactual world" of gender counter-stereotypes (as in Dias & Harris, 1990). Future studies should also investigate whether repeatedly viewing gender counter-stereotypes (thereby, possibly leading children to integrate the examples into their overall schema of the world) cause children to express less stereotyped beliefs because they no longer view a series of counter-stereotypes as a "counter-factual world."

Contributions to current theories

The results of the current study offer many contributions to theoretical perspectives on children's development and use of gender stereotypes. For example, by conducting an updated content analysis of children's television, this study contributes to knowledge about what children are seeing in media. By investigating the effects of children's viewing on their stereotyped beliefs, this study contributes to our understanding of how children acquire gender stereotypes and how different aspects of gender development interact with each other. In the sections below, I discuss how this series of studies contributes to three different (but related) theories of gender stereotype development: gender schema theory, social-cognitive theory, and developmental intergroup theory.

Gender Schema Theory. Pioneered by Martin and colleagues, Gender Schema Theory focuses on how children construct their cognitive understanding of gender. The current results demonstrating the difficulty of children accepting counter-stereotypical depictions of gender roles lend support for the idea of a period of high gender stereotype rigidity, when children are highly sensitive to violations of gender stereotypes (Martin, 1989; Ruble et al., 2007; Trautner et al., 2005). Gender Schema Theory sees this period of rigidity as a developmental step between learning about stereotype content and understanding that individuals can be more flexible in their adherence to these roles (Martin & Little, 1990).

Additionally, this study calls into question Gender Schema Theory's link between overall gender stereotype knowledge and understanding of gender constancy/essentialism (Martin et al., 1990). In both the current study and a study by Meyer and Gelman (2016), children's understanding of gender essentialism was directly related to their own gender-typed preferences but not their prescriptive gender stereotypes for others. Therefore, future work in Gender Schema

Theory should address how the cognitive structures differ for children learning stereotypes for themselves versus for others; these results may illuminate how gender stereotypes for the self may lead to the understanding that gender cannot change.

Social-Cognitive Theory. In addition to acknowledging children's developing cognitive understanding of gender, Social-Cognitive Theory also looks at how social factors (e.g., media) contribute to children's understanding of gender stereotypes, especially focusing on how children learn by observing examples in their everyday social worlds. Past work on children learning from media have mainly relied on content analyses of children's media showing under-representation of female characters and depictions of gender stereotypes (Baker & Raney, 2007; Gooden & Gooden, 2001; Hamilton et al., 2006; Leaper et al., 2002; Smith et al., 2010; Thompson & Zerbinos, 1997; Weitzman et al., 1972) and use Social-Cognitive Theory (Bussey & Bandura, 1999) to speculate that these representations will contribute to children's understanding of gender stereotypes. The current study adds to a smaller body of literature (Davidson et al., 1979; Pike & Jennings, 2005) that measures children's reactions to gender depictions in television. Whereas traditional Social-Cognitive Theory emphasizes observational learning, the current study, in particular, suggests that children are not passive consumers of television depictions, but instead actively engage with the material and decide how to integrate what they see on television with their own cognitive beliefs about gender stereotypes. More recent writing on Social-Cognitive Theory has begun to acknowledge children's ability to distinguish between different contexts of social learning and to choose the one that is most applicable to them in that moment (Bandura & Bussey, 2004).

Developmental Intergroup Theory (DIT). Given its focus on a highly salient social category (i.e., gender) in a highly salient context (i.e., television), the current study contributes to

Developmental Intergroup Theory, which suggests children form opinions about social groups based on perceptual salience. However, because much of the DIT literature is based on children learning *novel* social categories (Bigler & Liben, 2007), the current study is somewhat limited in its contributions, given that it was examining an already-established social category. Past studies on children's learning of gender stereotypes have found that, in classrooms where gender saliency is higher (e.g., teacher uses gender to group children, greets children as "boys and girls"), children showed higher prescriptive gender stereotyping while their own gender-typed preferences for occupations and activities remained unchanged (Hilliard & Liben, 2010). Given that the counter-stereotype video in the current study had a greater effect on children's prescriptive gender stereotyping, one possible explanation could be that the counter-stereotype video made gender more salient for children. Future research could investigate whether children pay more attention to counter-stereotypes (e.g., because they are more perceptually salient). Indeed, Cherney and Dempsey (2010) found that children categorized ambiguous toys (e.g., school bus, farm) as masculine or feminine based on colors (e.g., a toy with pink or purple was categorized as feminine). Together with the current study, DIT suggests that, when evaluating stereotypical and counter-stereotypical depictions, children may simply be focusing on the most perceptually salient aspect instead of actively evaluating whether the depiction fits within their cognitive schema of gender.

Suggestions for future children's television

Gender stereotyped beliefs can be associated with decreased persistence on difficult tasks (McArthur & Eisen, 1976), girls' decreased motivation to pursue mathematics and science (Cvencek et al., 2011; Dweck, 1986), and children's early play styles (Carter & Levy, 1988; Maccoby, 1990). Study 1 demonstrated that children's television shows still contain more

examples of gender stereotypes than counter-stereotypes, especially for male characters. Study 2 demonstrated that depictions on television can affect children's gender-stereotyped beliefs and understanding of gender essentialism/constancy. Importantly, the effects of counter-stereotypes reducing stereotyped beliefs (Davidson et al., 1979; Pike & Jennings, 2005) were not observed in the current study; it is possible that seeing several counter-stereotypes in a row was too novel for children and that they may need more sustained and subtle presentation of counter-stereotypes in order for their gender stereotyped beliefs to decrease. Below, I offer some suggestions for the design of future children's television in order to reduce the amount of gender stereotypes depicted.

Design more television shows with a female main character. An important finding of the Study 1 content analysis was that female representation and speaking time lagged behind male representation and speaking time in the overall sample, as well as in shows that had a male main character and in shows with an ensemble cast. These findings suggest that simply adding a few female characters (i.e., making an ensemble cast) does not solve the problem of under-representation of female characters. Importantly, only four of the twenty-two most popular shows (18.2%) had female main characters. Relatedly, in Study 2, both boys and girls were more likely to list a male character as their favorite television character compared to a female character; this effect has also been observed in slightly older children (ages 7- to 12-years-old; Hoffner, 1996).

Why is it important to have more equal representation of male and female characters in children's shows? Children as young as three-years-old are capable of noticing when others are being treated unfairly (LoBue, Nishida, Chiong, DeLoache, & Haidt, 2009) and preschoolers implicitly prefer those who are advantaged (e.g., have more resources) even after a time delay

(Li, Spitzer, & Olson, 2014). In interviews with children ages four- to nine-years-old, Thompson and Zerbinos (1997) found that the majority of children (78%) reported that there were more male characters in cartoons. Together, these results suggest that children are able to notice that female characters are under-represented on television and that being exposed to these representation differences over a long period of time may contribute to children's construction of gender stereotypes, especially where female characters are valued less (Signorielli, 1989; 1990). But, would increasing female representation improve this effect? When Ochman (1996) exposed third graders to non-stereotyped same-sex role models, both boys and girls' self-esteem improved. Similarly, Dasgupta and Asgari (2004) found that in a social environment with more female leaders (i.e., a women's college), there were less automatic gender stereotypes and that environments with more men (i.e., co-ed college classes where males are the majority) induce automatic gender stereotypes. In a qualitative study, Westland (1993) found that reading "upside-down fairytales" (e.g., warrior princesses) did not diminish ten-year-old girls' interest in princesses, but was associated with decreased levels of wanting to be a princess and increased levels of desiring their own independence. Therefore, it is likely that increasing female character representation on children's television shows may contribute to young children seeing the two genders as more equal, which may have beneficial effects for self-esteem and future gender stereotyped beliefs.

Create characters who consistently have gender counter-stereotypical roles (especially boys!). As discussed previously, one possible reason that children increased their stereotyped beliefs after seeing the counter-stereotyped video may have been that it was an incredibly novel experience for them and they were reluctant to adopt those views into their existing gender schema. Indeed, the content analysis found fewer examples of counter-

stereotypes (compared to stereotypes) in children's television shows, especially among male characters. There is evidence that children also hold different beliefs about males and females engaging in counter-stereotypical behavior. For example, Wilbourn and Kee (2010) found both boys and girls were more comfortable with females engaging in counter-stereotypical occupations than males. Blakemore (2003) found that children ages three- to 11-years –old were more concerned with stereotype violations when boys had feminine appearances and when girls had masculine play styles. Together, these studies suggest that children may benefit (i.e., be more open to counter-stereotypes) from television characters who consistently engage in counter-stereotypical gender roles. In particular, television show creators should design male characters who have counter-stereotypical appearances and occupations and female characters who use male play styles. Given the results of Study 2 show children seem to have a "backlash" of more stereotyped beliefs after seeing a series of only gender counter-stereotypes, it is important for children's television creators to incorporate counter-stereotypical examples more regularly into their programming to reduce the novelty of seeing counter-stereotyped examples on television.

Final Thoughts

The present studies offer several important theoretical and practical contributions to the study of how children learn gender stereotypes, specifically from television shows. The content analysis updated an extensive literature on gender representation in children's media and demonstrated that, overall, children's television shows still contain under-representation of female characters and a greater number of stereotypical gender role depictions, compared to counter-stereotypical depictions. This study made an important contribution to the literature by examining shows based on the gender of their main character and found that adding a few

females to the cast (i.e., creating an ensemble cast) does not significantly improve the female representation; to do that, shows must have a female main character. The experimental study found that girls appeared to be more affected by viewing counter-stereotypes on television; specifically, they became more stereotyped in their explicit beliefs about gender stereotypes.

These findings have both theoretical and practical implications. Theoretically, the results contribute to Gender Schema Theory by offering additional evidence for a period of peak gender stereotype rigidity between ages four- and five-years-old but question the link between gender stereotype belief and understanding of gender constancy/essentialism. The results also call into question Social-Cognitive Theory's suggestion that children absorb what they see on television and incorporate it into their cognitive understanding of gender; if this were the case, children in the experimental portion would have shown a decrease in their gender stereotyped beliefs. Instead, it appears that children actively engage with media and choose how to react to the depictions they see on television. The results add to the Developmental Intergroup Theory by providing another example of how children may focus on the most perceptually salient aspect of a character (e.g., their gender) instead of taking into account the entire context of the situation (e.g., a counter-stereotypical activity or occupation they are participating in). Together, these two studies suggest two main practical implications for the design of children's television programming: creating more shows with female main characters (to increase representation of females) and creating more characters who regularly appear in counter-stereotypical ways and engage in counter-stereotypical occupations and activities (to reduce the novelty of seeing counter-stereotypes on television). With these changes, children would be exposed to a more egalitarian world on television, which could inspire them to expect and create a more egalitarian real world.

APPENDICES

Appendix 1: Parent Survey

For this survey,please think about your child who is between the ages of 1 and 5 years old.
If you have more than one child in this age range,please focus on the child who is 3-4 years old.

Question 1: Children watch TV for many different reasons. Please rank the following reasons as to why your child watches TV from 1 (being the top reason they watch TV) to 4. To rank, please drag the answers to the order you believe reflects your rankings.

1 To learn something
2 To give caregivers a break
3 To relax and/or for enjoyment
4 Because other people in the household are watching TV

Question 2: Please check the 5 shows your child watches most often:
Angelina Ballerina Dinosaur Train Martha Speaks The Cat in the Hat Knows a lot about that
Arthur Doc McStuffins Mickey Mouse Clubhouse The Electric Company
BackyardigansDora & Friends Mike the Knight Thomas & Friends
Between the Lions Franklin & Friends Ni-hao Kai-lan Timmy Time
Bob the Builder Go Diego Go! Octonauts Toot & Puddle Bubble Guppies
Guess How Much I Love You Peep & the Big Wide World Wibbly Pig
Busy World of Richard Scarry Harold & the Purple Crayon Phineas & Ferb
Wild Kratts Busytown Mysteries Harry the Bunny Sesame Street Wonder Pets!
Caillou Henry Hugglemonster Sheriff Callie's Wild West WordGirl
Charlie & Lola Imagination Movers Sid the Science Kid WordWorld
Chuggington Jack's Big Music Show Sofia the First Yo Gabba Gabba
Clifford the Big Red Dog Jake & the Neverland Pirates Special Agent Oso
Curious George Julius Jr. Stella & Sam Cyberchase Kipper Super WHY!
Daniel Tiger's Neighborhood Little Einsteins Team Umizoomi
Other, please write:_____

Question 3: Which show does your child watch the MOST? Please write below; all questions on this page will be referring to this show.
HOW does your child watch this show? (Select all the apply)

Live television
Recorded television (e.g., DVR, OnDemand)
Internet television (e.g., YouTube, Netflix)
DVD

In general, HOW OFTEN does your child watch this show? (Choose one)
Less than Once a Month Once a Month 2-3 Times a Month Once a Week
2-3 Times a Week Daily
What is the MAIN REASON your child watches this show? (Choose one)

My child genuinely enjoys this show
I enjoy this show
I believe my child learns something from this show

My child's sibling(s) enjoy this show
Other, please describe:

In general, HOW OFTEN do YOU (or another caregiver) watch this show WITH your child? (Choose one)

Less than Once a Month Once a Month 2-3 Times a Month Once a Week
2-3 Times a Week Daily

Do you ever talk to your child about this show while you are both watching it?

Yes No

HOW do you and your child talk about this show? (Check all that apply)

My child asks me questions about the show
I ask my child questions about the show
My child comments on things happening on the show
I comment on things happening on the show
My child relates characters/themes on the show to his/her own life
I relate characters/themes on the show to my child's life

Please write any examples you can think of your child asking questions about this show:
Please write any examples you can think of you asking your child questions about this show:
Please write any examples you can think of your child making comments about things happening on this show:
Please write any examples you can think of yourself making comments about things happening on this show to your child:
Please write any examples you can think of your child relating things happening on this show to his/her own life:
Please write any examples you can think of when you related things happening on this show to your child's life:

Question 4: Which show do YOU WATCH MOST OFTEN WITH YOUR CHILD? Please write below; all questions on this page will be about this show:

Is this the same show you answered questions about on the previous page?

Yes (sent participants to next section)
No (sent participants to same questions answered in Question3)

Demographics:

Now we would like to ask you some questions about YOU and YOUR CHILD.
What is YOUR gender? Male Female Other
What is YOUR CHILD'S gender? Male Female Other
What is YOUR age?
What is your child's birthdate?
What is YOUR highest level of education completed? (Choose one)

Some high school
High school
Some college or 2-year degree
4-year college degree
Some graduate school
Graduate degree

What is your annual household income? (Choose one)

Less than $25,000/yr $25,001-$50,000/yr $50,001-$75,000/yr
$75,001-$100,000/yr $100,001-$125,000/yr $125,001-$150,000/yr
More than $150,000/yr

Appendix 2: Show Descriptions for Coding

Show 1: Bubble Guppies
Jump into a watery world of learning and music with Bubble Guppies! This hilarious, variety-style kids show teaches preschoolers science, math, and reading while it explores themes such as dinosaurs, recycling, rock 'n roll, colors, and cowboys.

Show 2: Caillou
Caillou, a four-year-old little-kid hero, epitomizes the wonder with which children experience the ordinary - from understanding one's family to venturing around the corner for the first time. The series blends animation and live-action segments as Caillou makes sense of the world and helps young viewers do the same.
For children 3 to 6 years old.
Series Goals:

- Help children discover and learn new things.
- Help children develop social interaction skills like giving, caring and sharing.
- Help children learn about family and friends.

Helping Kids Prepare for School:

In each episode, Caillou and his friends confront an age-appropriate concept relating to social literacy and child development. Caillou focuses on the social and emotional growth of young children, and encourages them to ask questions and explore the world around them.
He delights in the small wonders of the world around him, embellishing everything he sees with his rich imagination. Surrounded by his parents, his little sister, Rosie, his grandparents and friends his age, Caillou discovers the world and just can't wait to grow up! Everything around him is an excuse to embark on exciting adventures, learn new things and have fun. Whether he's at school, at home or in a park, Caillou finds opportunities for learning and growing everywhere!

Each episode of the series is a slice of Caillou's life. Thanks to his vivid imagination, ordinary, everyday events quickly become exciting adventures where Caillou can play "make-believe". But Caillou can tell the difference between real life and pretending. When he is done playing make-believe, Caillou happily returns to the familiar daily routine of a 4-year-old. Indeed, each episode begins and ends firmly anchored in the real world.

Designed for preschoolers, the Caillou television series is composed of 30 minute episodes divided into three 7 minute adventures. In each adventure, Caillou discovers the big, wide world, experiences new things, shares his imaginary adventures with us and sometimes, even sings for his little viewers! Since the beginning of the Caillou television series, each episode has featured everyday experiences and events that resonate with all children. Caillou is as realistic as possible so that young viewers can identify with him - and vice-versa! After all, Caillou is based on what real kids say and do. Now, Caillou's focus is on role-playing and "make-believe." Children develop and mature through play. In fact, by imagining they are someone else, they can often accomplish extraordinary things they would never have thought possible. Their self-confidence improves and they enjoy and take pride in growing up.

Like other children, Caillou spruces up reality with a healthy dose of imagination. Each episode begins with an everyday event from Caillou's life that, through his mind's eye, quickly turns into a fantastic and larger-than-life adventure. Though Caillou has not experienced much in real life, in his imagination, things are very different! He can do the impossible and be the hero of a breathtakingly dangerous adventure... safe and sound in his own home, park or playschool.

Why he can just sit back and imagine he is the strongest, bravest boy in the world, saving planet Earth every day!

Young viewers, who are used to playing make-believe, will be thrilled to see Caillou playing just as they do, and becoming more and more like them. Captivated by his lively imaginary adventures, they will be inspired to use their imaginations even more to make up adventures of their own. At this age, role playing is as appealing as it is essential. By using their imagination, children can visualize doing things they have never done: they are empowered beyond their years and dare to try and discover new things. They can be invisible, invincible, big or small, cleverer, funnier, faster and stronger. Role-playing teaches children to cope with strong emotions like anger, sadness and jealousy and thereby accomplish feats they would never have thought possible.

Observing Caillou and following his example, children (and their parents) learn that using their imagination is an important, useful and valuable thing to do. Young viewers feel encouraged to imitate our little hero as they watch him go through various stages of development. At first Caillou relies on realistic props such as a doll house to invent a story and bring his imaginary ideas to life. But little by little, he is able to use more abstract, symbolic objects that bear no physical resemblance to the things he is imagining, but are realistic to him. After a while, a large cardboard box comes to represent a house just as well as the doll house did. Caillou shares his engaging, imaginative creations with his preschool viewing audience in every episode.

Why bother validating a game that children play instinctively? Because today, society does not value games of make believe as much as it used to. Children are encouraged to learn to play the violin, take dance or karate lessons, use the computer or watch educational television programs, in short, to develop their intellect. Parents often prefer activities that teach children, for instance, to recognize numbers and letters. By comparison, purely imaginative play may seem less "useful" for the child. Yet, developing a fertile imagination is fundamental to bringing up the next generation of inventors, artists and a host of other talented visionaries who will shape the world we live in. Moreover, role-playing has a number of beneficial effects on children: it makes them more sociable and cooperative, enriches their vocabulary, fosters more advanced cognitive development and improves their ability to distinguish between appearances and reality. While fun activities are generally good for children, developing their imagination remains key to their development. Here again, Caillou leads through example!

Show 3: The Cat in the Hat Knows A Lot About That

The Cat in the Hat Knows a Lot About That!™ is designed to spark a love of learning and an interest in science in preschool-aged children.

Based on Random House's best-selling Beginner Book collection "The Cat in the Hat's Learning Library™," the TV series and online resources are designed to cultivate positive views about science and scientists among the next generation—the children who will become tomorrow's citizens and innovators—and help families and teachers build communities of science explorers.

In each program, the Cat in the Hat and his friends Sally and Nick go on a science adventure such as shrinking to bee-size to explore a hive and discover how honey is made; flying with birds to discover how and why they migrate; diving inside flowers to find out more about the animals that depend on them to live; or taking a snowcat to the Arctic to explore freezing and melting. Guided by the Cat, the children figure things out by engaging in science inquiry. They

ask questions, make observations, make predictions, plan investigations, collect data, make discoveries, and generate and discuss ideas about how the world works.

Each half-hour television episode consists of two 11-minute animated adventures, along with corresponding short animated clips. Each adventure revolves around a specific science concept such as bird migration or animal camouflage. The animated clips feature songs and rhymes, interesting science facts, humorous science explorations by Thing One and Thing Two, and interviews of animals by Sally and Nick.

The Cat in the Hat Knows a Lot About That!™ is voiced by award-winning actor Martin Short and produced by Portfolio Entertainment Inc. and Collingwood O'Hare Productions, in association with Dr. Seuss Enterprises, Random House Children's Entertainment, Treehouse, and PBS KIDS.

Children are naturally curious about the world and how it works, and science learning for young children begins with wondering and asking questions. At the beginning of each *The Cat in the Hat Knows a Lot About That!™* adventure, Sally or Nick poses a question about the natural world. Although the Cat knows a lot of things, he doesn't know everything and he's also curious to learn more. It's this insatiable curiosity that sparks the friends' adventures in the Cat's one-of-a-kind contraption, the Thinga-ma-jigger.

Learning Goals:

The learning goals of *The Cat in the Hat Knows a Lot About That!™* programs and resources are designed to support young children's science learning by:

- Building on and supporting children's curiosity about the natural world
- Introducing children to core science concepts
- Engaging children in the process of science inquiry
- Providing opportunities for children to learn, use, and practice inquiry skills
- Modeling what it means to think and act like a scientist
- Inviting children to engage in science practices including discourse and collaboration
- Providing a foundation on which later science learning will build

The PBS Parents, PBS Teachers, and PBS KIDS websites provide young children with opportunities to explore the science ideas introduced in *The Cat in the Hat Knows a Lot About That!™* in the contexts of their own homes, neighborhoods, and schools. Children are also encouraged to visit their local libraries, science museums, aquariums, parks, and zoos to continue their science explorations. Direct exploration and observation, supported by knowledgeable and interested adults, are central components of children's science inquiry.

Show 4: Chuggington

Chuggington is an action-packed and contemporary animated train series for preschoolers that follows the exciting adventures of three young trainees: Wilson, Brewster, and Koko. In each energetic, vibrant episode, the trainees ride the rails through the world of Chuggington, exploring the many locations (such as the Safari Park, Ice Cream Factory & Rocky Ridge Mine) and taking on exciting challenges that test their courage, speed, and determination. With the help, support and guidance of the more experience Chuggers, they learn positive values, including respect and loyalty and new skills such as teamwork and patience, empowering them to be the best trainees they can be. Chuggington supports children's social, emotional and personal development by: demonstrating problem solving skills and responsible behavior including persistence, making choice and learning from mistakes. Promoting core values such as honesty, loyalty, compassion, integrity, independence, self belief and patience. Helping to boost their self-esteem- encouraging

them to try harder and have a go at learning new skills. Reinforcing values being taught to them by their parents.

Show 5: Curious George

CURIOUS GEORGE is a 2-time Daytime Emmy® award-winning animated series based on the popular books by Margret and H.A. Rey. It airs daily on PBS KIDS. (Check local listings or the TV Schedule for dates and times.) Aimed at preschool viewers (ages three to five), the goal of the series is to inspire children to explore science, engineering, and math in the world around them. And what better guide is there for this kind of exploration than the world's most curious monkey?

George lives to find new things to discover, touch, spill, and chew. Everything is new to George and worth investigating. Of course, in George's hands — all four of them — investigation often leads to unintended consequences! Throughout George's adventures, he encounters and models basic concepts in each of the three content areas. (To learn more, read about the educational philosophy that drives the series.)

While remaining true to the look and feel of the beloved books, the daily series expands George's world to include a host of colorful new characters and locales. Each episode features two animated stories followed by short live-action segments in which real kids investigate the ideas that George introduces in the stories. The first season was narrated by Emmy® award-winning actor William H. Macy.

The CURIOUS GEORGE series also aims to show parents and caregivers how to foster the development of science and math literacy in children. In addition to programming, the series is supported by a substantial educational outreach campaign that develops relevant materials and distributes them to librarians, teachers, community centers, and families. These materials offer activities designed to support and extend the learning objectives of the series. Most of these resources are available right here on the CURIOUS GEORGE Web site in the Activities & More section.

Show 6: Daniel Tiger's Neighborhood

Daniel Tiger's Neighborhood is a new animated program for preschoolers ages 2 to 4 which builds on the pioneering PBS series, Mister Rogers' Neighborhood. This new series, for a new generation of children, tells its engaging stories about the life of a preschooler using musical strategies grounded in Fred Rogers' landmark social-emotional curriculum. Through imagination, creativity and music, Daniel and his friends learn the key social skills necessary for school and for life.

The star of the series is 4-year-old Daniel Tiger, son of the original program's beloved puppet Daniel Striped Tiger, who invites young viewers into his world, giving them a kid's eye view of his life. Daniel talks directly to viewers, warmly drawing them in and making them feel like one of his neighbors. As they closely follow and share Daniel's everyday adventures, preschoolers and their families learn fun and practical strategies and skills necessary for growing and learning.

Each episode of Daniel Tiger's Neighborhood consists of two engaging stories that center on a common early learning theme such as dealing with disappointment. One of the key ingredients that sets the new series apart is its groundbreaking use of catchy, musical strategies that reinforce each theme and that preschoolers and parents will both sing – and use – together in their daily lives.

The series' stories were written based on extensive input from a wide range of early learning specialists, formative research with children and the benefit of more than 40 years of the work of Fred Rogers. It all adds up to a powerful tool for parents: an entertaining and thoughtful guide for today's families that integrates music, interactivity and a research-based curriculum.

Show 7: Dinosaur Train

Dinosaur Train embraces and celebrates the fascination that preschoolers have with both dinosaurs and trains, while encouraging basic scientific thinking skills as the audience learns about life science, natural history and paleontology. Each of the 40 half-hour episodes features Buddy, an adorable preschool age Tyrannosaurus Rex, and includes two 11-minute animated stories along with brief live action segments hosted by renowned paleontologist Dr. Scott Sampson. Young viewers can join Buddy and his adoptive Pteranodon family on a whimsical voyage through prehistoric jungles, swamps, volcanoes and oceans, as they unearth basic concepts in life science, natural history and paleontology. The learning and fun are continued on the web site, where users can play games with their favorite characters, print activity pages and watch clips from the show.

Dinosaur Train begins when Buddy is adopted by Mr. and Mrs. Pteranodon and brought to their nest to hatch at the same time as his new siblings, Tiny, Shiny and Don. Buddy and his new family have an insatiable desire to learn all about the different types of dinosaurs, so they board the wondrous Dinosaur Train, which allows them to travel and explore the world inhabited by these amazing creatures.

Departing from Pteranodon Station, the Dinosaur Train is a colorful locomotive, customized to accommodate all kinds of dinosaurs. Windows are perfect for the long-necked herbivores, and there's plenty of head room in the Observation Car for the Giganotosaurus, giving all the species onboard a chance to check out the prehistoric world as they ride on the train. The Dinosaur Train has the ability to visit the Triassic, Jurassic and Cretaceous worlds, while the Train's Conductor, a knowledgeable Troodon, provides passengers with cool facts about dinosaurs along the way.

Harnessing children's enthusiasm for and curiosity about dinosaurs, Dinosaur Train sparks 3 to 6 year-old children's interest in life science and natural history. The show encourages children to compare the characteristics of ancient animals with those that are alive today. As they explore a variety of interesting animals past and present, children develop the inquiry skills and core knowledge needed to help them think, talk and act like scientists.
To fulfill this mission, Dinosaur Train will:

- Spark children's interest in science, especially life Science, Natural Science and Paleontology.
- Develop children's inquiry skills to help children think like scientists, by engaging in the following behaviors: asking questions, making observations, making predictions, making connections, forming hypotheses / developing possible explanations, investigating and exploring the natural world, drawing conclusions, and sharing findings with others.
- Provide core science knowledge to enable children to explore the worlds of life science, natural science and paleontology.

Inspire children to visit local science and natural history museums, go on "fossil hunts," and conduct their own explorations and investigations about the natural world.

Show 8: Doc McStuffins

Doc McStuffins is an American animated television series produced by Brown Bag Films. It premiered on March 23, 2012 on Disney Channel and Disney Junior. The series is about a seven-year-old girl who can "fix" toys, with a little help from her stuffed animal friends.
The series debuted the same day as Disney Junior: The Channel, which is Disney-ABCs first preschool-oriented network in the United States. On June 5, 2012, Disney Junior renewed the series for a second season, which began airing in mid-2013. On January 8, 2014, Disney Junior renewed for a third season, which began airing in late-2014.

The series chronicles a seven-year-old girl named Dottie McStuffins who, one day, wants to become a doctor like her mother. As a kid, she "pretends" to be a doctor by fixing up toys and dolls (because of this, everyone calls her 'Doc'). When she puts on her stethoscope, something magical happens: toys, dolls and stuffed animals come to life and she can communicate with them. With a little help from her stuffed animal friends, Stuffy, Hallie, Lambie and Chilly, Doc helps toys "feel better" by giving them check-ups. Each 11-minute episode includes original songs, the "Time for Your Check-Up" song, the "I Feel Better" song and the "Hey, What's Going On" song. During ending credits in Season 1, Doc gives advice to viewers about staying healthy. Seasons 1, 2 and 3 have the original intro. Doc McStuffins was created and executive produced by Humanitas Prize and Emmy Award-winner Chris Nee.

Show 9: Dora & Friends

Armed with a magical bracelet, a trusted Map App, and strength that comes from smart and loving friends Alana, Emma, Naiya, Kate, and Pablo, Dora invites preschoolers to solve problems, speak Spanish, give back to the community--and help save the day!

Show 10: Jake and the Neverland Pirates

Jake and the Never Land Pirates is an Annie Award-winning musical interactive animated Disney Junior how based on the successful Disney franchise, Peter Pan that was in turn based on the famous book and play by British author J.M Barrie. It is the first Disney Junior original show following the switch from Playhouse Disney.
The series focuses on a band of young pirates consisting of Jake, Izzy, Cubby, their parrot Skully and Bucky, their living pirate ship, who continuously spend their days competing against Captain Hook and Mr. Smee for treasure. They are often accompanied by several characters, including their mermaid friend Marina.

The show revolves around a group of three children who are pirates in Never Land, looking for treasure. Their main obstacles are Captain Hook, Mr. Smee, Tick-Tock-Smee, Tick-Tock the Crocodile, Peter Pan and Tinker Bell from Disney's Peter Pan franchise. Captain Hook usually sees Jake and his crew doing something fun and steals it from them, and Jake and his crew have to get it back. After they succeed, Jake and his crew count their gold doubloons (which they receive after solving puzzles, or "pirate problems") and put them in their treasure chest known as the "Team Treasure Chest." Jake inspires little children that when you need to find something, you should look for it and not give up for the evil and not well people to earn it. The first season of the series followed more "playful" conflicts such as, Jake and the crew getting their basketball back from Captain Hook, or Jake and the crew taking back their stolen skateboard. The second season gave a larger scale to the adventure in the show, now having the characters find a lost city of gold, and an ancient pirate pyramid.

Each program contains two eleven minute animated episodes, followed by a live-action song by the Never Land Pirate Band. The singing characters "Bones" and "Sharky" appear in both animated and live action forms.

Show 11: Little Einsteins

Four friends go on missions with their ever changing rocket ship. Every mission includes a classic song and a painting.

Show 12: Mickey Mouse Clubhous

Mickey Mouse, Minnie Mouse, Donald Duck, Daisy Duck, Goofy and Pluto star in the series, which focuses on interacting with the viewer to stimulate problem solving. Pete, Clarabelle Cow, Ludwig Von Drake, Chip 'n' Dale, Willie the Giant, Butch, Figaro, Humphrey the Bear, Salty the Seal, Mortimer Mouse have made guest appearances.

Disney says that each episode has the characters help children "solve a specific age-appropriate problem utilizing basic skills, such as identifying shapes and counting through ten." The series uses "Disney Junior's 'whole child' curriculum of cognitive, social and creative learning opportunities." Once the problem of the episode has been explained, Mickey invites viewers to join him at the Mousekadoer, a giant Mickey-head-shaped computer whose main function is to distribute the day's Mousekatools, a collection (usually 3,4, or possibly 5) of objects needed to solve the day's problem, to Mickey. Once the tools have been shown to Mickey on the Mousekadoer screen, they are quickly downloaded to Toodles, a small, Mickey-head-shaped flying extension of the Mousekadoer. By calling, "Oh Toodles!" Mickey summons him to pop up from where he is hiding and fly up to the screen so the viewer can pick which tool Mickey needs for the current situation. One of the tools is a "Mystery Mouskatool", which is a surprise tool represented by a question mark.

Show 13: Octonauts

The Octonauts are a team of quirky and courageous undersea adventurers who are always ready to dive into action! Their mission: to explore new underwater worlds, rescue amazing sea creatures and protect the ocean.

The Octonauts follows a team of adventure heroes who dive into action whenever there is trouble under the sea. In a fleet of aquatic vehicles they rescue amazing sea creatures, explore incredible new underwater worlds and often save the day before returning safely to their home base, the Octopod.

Show 14: Paw Patrol

PAW Patrol stars a pack of pups--Chase, Marshall, Rocky, Zuma, Rubble, and Skye--all led by a boy named Ryder. The PAW Patrol goes on high-stakes rescue missions to protect the Adventure Bay community while teaching kids how to solve problems through teamwork.

Show 15: Peppa Pig

Peppa Pig is an energetic piggy who lives with Mummy, Daddy, and little brother George. She loves to jump in mud puddles and make loud snorting noises. Episodes feature fun, everyday activities that support kids' social & emotional development.

Show 16: Sesame Street

Since 1969, children and adults alike have flocked to the place where multiethnic, multigenerational, and even multispecies residents coexist in harmony. The people on this very special street learn life's lessons together, provide viewers with strong role models, and teach children that everyone brings a special ability to the community. Here, children learn to use their imaginations, build social skills, and respect people's differences.

The phenomenon that changed the face of children's television came about after co-founder Joan Ganz Cooney observed that children in underserved communities were at a disadvantage when it came to school preparedness. She assembled a team of educational advisors, researchers, and television producers to create a show that would directly impact children's lives.

Sesame Street put television to work as an educational tool, and independent research has repeatedly and conclusively proven that the approach succeeds in improving cognitive skills, teaching respect and social skills, and promoting school readiness skills. Children who watch the show as two-year-olds gain an advantage in math, vocabulary, and other school readiness skills by the time they are five.

Sesame Workshop's international co-productions are carefully crafted to meet local children's specific educational needs. Child development experts from each country work with local directors, producers, and writers to translate the show's magic in a way that resonates with children in a given country or region.

The action takes place in a variety of familiar, child-friendly settings, including a plaza in Mexico and a marketplace in South Africa. Additionally, each co-production includes characters – such as Samson, a big brown bear in Germany; Halum, a tiger in Bangladesh; and Tantan, an orangutan in Indonesia – that have been designed by local teams to have particular cultural relevance.

How does *Sesame Street* help prepare children for school?

Since its debut in 1969, *Sesame Street* has been grounded on a comprehensive whole-child curriculum that supports preschoolers' cognitive, social, emotional, and physical development. The curriculum is created by in-house child psychologists, educators, and educational advisors, incorporating the latest research in child development and innovative approaches in early childhood education. While the series is designed to address all areas of children's learning and development, the primary curricular focus changes every one or two seasons in order to meet preschoolers' current critical needs.

Sesame Street helps children:

- Develop early language and literacy skills such as letter knowledge, vocabulary, and reading and writing fundamentals.
- Think things through and reason effectively through observation, asking questions, problem solving, and understanding other people's perspectives.
- Gain a deeper understanding of early mathematical concepts and language such as numbers, counting, addition, subtraction, geometric shapes, and patterns.
- Label and express their feelings.
- Cope constructively with their feelings and empathize with others.
- Form positive relationships as they play, cooperate, and resolve conflicts.
- Develop an appreciation and love for nature, and learn simple ways of showing care and stewardship for the environment.
- Create and appreciate various forms of art such as visual art, music, and dance.

- Incorporate healthy habits in their everyday lives by eating healthy foods, staying physically active, and practicing good hygiene.
- Appreciate cultural diversity and children with various abilities.

Show 17: Sid the Science Kid

Sid the Science Kid is an award-winning educational animated television series that uses comedy and music to promote exploration, discovery and science readiness among preschoolers. This landmark production of 66 half-hour episodes, produced by The Jim Henson Company for PBS KIDS®, debuted on September 1, 2008, and has since been honored with five EMMY nominations and multiple prestigious awards (most recently the CINE Golden Eagle Award). Sid the Science Kid features a practical in-school science curriculum and celebrates children's natural curiosity about science in everyday life. The energetic and inquisitive Sid starts each episode with a new question ("Why are my shoes shrinking?" "Why do bananas get mushy?") and embarks on a fun-filled day of finding answers with the help of family and friends. Each episode of "Sid the Science Kid" focuses on a single scientific concept that is presented using Preschool Pathways to Science (PrePS©), a practical science readiness curriculum used in preschool classrooms that was created by cognitive researchers and preschool educators, incorporating lessons learned from developmental research as well as classroom experience.
Sid the Science Kid is a television series and interactive website for children 3-6 and the adults who care for them. To support science learning, Sid takes advantage of kids' instinctive quest to figure out the world as well as their growing sense of humor. The desire to understand underlies all scientific exploration, and preschoolers' questions often involve the same big ideas that scientists investigate. Kids who ask, "Why are the leaves falling off the trees? Why are my shoes too small? Where'd my snowman go?" – are wondering about transformation and change. "What's hair for? Why are my teeth different shapes? How do birds fly, and why can't I?" are questions about form and function. Research tells us that young children already know something about these big ideas. Sid is ready to help them learn more.
The main goals of Sid the Science Kid are:

- To encourage children to think, talk and work the way scientists do by building on preschoolers' natural curiosity about the world.
- To show that science is all around us – we all interact with and are capable of learning about scientific concepts.
- To contribute to school readiness by fostering children's intellectual skills, motivation to learn, and confidence in themselves as learners.
- To support children's learning by partnering with parents and teachers to create a "climate of curiosity" for children.

Each day, Sid, his friends, and our viewers practice doing what scientists do:

- Observing objects, events, and people
- Asking questions
- Finding words to describe observations and to communicate ideas
- Exploring and investigating to try to answer questions
- Using science tools to observe and measure
- Recording observations using simple drawings and basic charts
- Using what they have observed, measured, and recorded to predict what might happen next and to ask more questions

Although we use humor to teach, the entire Sid team is very serious about children's learning. We've carefully designed the series and website so that children have repeated opportunities to think about a specific scientific idea. Within an episode, we explore Sid's latest science question from daybreak to day's end, illustrating the concept in as many ways as possible. In addition, each week's episodes are connected by a big science concept. For example, we explore transformation and change by investigating questions about growth (Why are my shoes shrinking?), decay (Why's my banana all yucky?!), the effects of freezing and melting (Where'd my popsicle go?), and the effects of heat (How DO you make the perfect pancake?). Friday shows review what's been learned during the week, giving viewers another chance to consolidate understanding.

The conceptual content of Sid is based in national science learning standards, cognitive learning theory, and on the preschool science curriculum, Preschool Pathways to Science ©. By connecting experiences conceptually and exploring topics over an extended period, Sid increases learners' opportunities for discovering important ideas. For example, children find out that some changes are reversible and others are not, or that living things grow and decay. Understanding is a critical goal in itself, but the benefits extend even further, since children who experience the joy and satisfaction of discovery will want to savor it again. Early exposure to science can inspire positive lifelong attitudes towards it, empowering children to see themselves as capable learners, and motivating them to learn and do more.

To appeal to young children, the science content in Sid is both meaningful and relevant to their everyday lives. To achieve this relatability, the characters pose questions and investigate objects and events that can be directly observed and explored. Based on age-appropriate developmental concepts, this approach embraces the idea that kids can "do" their own science, not just read about and discuss what others have observed.

Show 18: Sofia the First

Disney has featured many princesses in its TV shows and movies through the years -- but never a little princess. Until now. This animated series features Sofia, an ordinary girl who becomes a princess overnight when hermom marries the king. The adventurous young Sofia, first introduced in the 2012 TV movie ``Princess Sofia," must learn how to adjust to royal life. Offering her words of wisdom are classic princess -- including Cinderella, Snow White and Belle-- who make special appearances as they help advise the youngster during her transition to royalty. Throughout her journey, Sofia learns that it isn't having a title that imparts royal demeanor; it's that having the characteristics of honesty, loyalty, compassion and grace make one worthy of the role.

Show 19: Super Why!

Welcome to **SUPER WHY**, a breakthrough preschool series designed to help kids ages 3 to 6 with the critical skills that they need to learn to read (and love to read!) as recommended by the National Reading Panel (alphabet skills, word families, spelling, comprehension and vocabulary). **SUPER WHY** is the first original program from **Out of the Blue Enterprises**, an innovator in interactive children's entertainment led by Angela C. Santomero, an Emmy-nominated co-creator of *Blue's Clues*, and Samantha Freeman Alpert, a veteran in children's entertainment. **SUPER WHY** makes reading an empowering adventure by using interactive literacy games that need YOU to play. In **SUPER WHY** reading is power!

We begin each 24-minute reading adventure in Storybrook Village, a magical 3-D world hidden behind the bookshelves in a children's library. The Storybrook Village is the home of your child's favorite fairytale characters. Immediately, you'll meet the four best friends who anchor each episode: Red, from Little Red Riding Hood; Pig from The Three Little Pigs, Princess from The Princess and The Pea, and Whyatt, the curious younger brother of Jack from Jack and The Beanstalk who discovers he has the power to fly inside books to find answers to his questions. Each of these characters is re-imagined as an everyday kid, not unlike your child's own friends: Red rides roller blades; Pig drives a trike; Princess loves tea parties and dress-up; and Whyatt is the group's natural leader.

In every episode, one of the friends encounters a problem with another Storybrook Village character (For instance, Jill from the Jack and Jill rhyme is not being nice). As in real life, the problems require preschool social skills to resolve. And that's when **SUPER WHY** gets super-powered! Whyatt calls his fairy tale friends to their secret clubhouse, named "The Book Club," where they transform themselves from mere mortals into literacy-powered super heroes: Alpha Pig with "Alphabet Power," Wonder Red with "Word Power," Princess Presto with "Spelling Power," Super Why with the "Power to Read," and your child-Super You, with the "Power to Help." Using their super powers, these Super Readers literally fly inside books. The adventure begins as the Super Readers find out how famous fictional characters handled similar situations (Why is the big bad wolf so big and bad?). This adventure inside a book helps the Super Readers figure out the answers to their own problems. Be prepared to hear: Super Why and the Super Readers.to the rescue!

"Inside" each book the Super Readers lead the viewer on an engaging reading adventure. They talk to fictional characters from the story, play reading games and activities to overcome obstacles, search for Super Letters, and practice such key skills as letter identification, word decoding, spelling, vocabulary and comprehension. Super Why, who has the Power to Read can even change a story ending.and save the day! (For example: He can change the big bad wolf to a small good wolf!) What's unique about this approach is that while kids are learning and practicing the ABC's of reading, they're also thinking about what they're reading, applying reasoning skills to see the story in a real-life context and experiencing books in a powerful new way.

As soon as the Super Readers solve the fictional problem and gather all the Super Letters they need, they fly back in their Why Flyers to the Book Club. There, they decode the Super Story Answer, or theme, on the Super Duper Computer and reveal how to realistically resolve their own problem. (The big bad wolf is acting bad because he was so sad. He has no friends.) The episode ends with the characters modeling the behavior so kids can actually see the problem being fixed. Finally, with a song you'll find yourself singing, a dance you'll quickly pick up, and a hip, hip, hooray! The Super Readers—and Super You—save the day!

Show 20: Team Umizoomi

It's Team Umizoomi to the rescue! Join Milli, Geo, Bot, and UmiCar to solve everyday problems in Umi City. Preschoolers will need to use their "Might Math Powers" like shapes, counting, sorting, measuring, and patterns to help the team.

Show 21: Thomas & Friends

Thomas & Friends™ has sparked the imagination of young children for generations. The enduring and classic animated series is based on the much-loved books by Reverend W. Awdry, who created Thomas the Tank Engine™ to entertain his young son, Christopher, when he was in bed with the measles. The series features Thomas, a true blue engine friend who proudly wears the "#1" on his side, and a cast of track stars, including James, Percy, Emily, Henry and Gordon, as well as Sir Topham Hatt, Controller of the Railway, who keeps everything running smoothly. Thomas' world is a place with a strong community spirit, typified by a universal willingness to embrace good manners and hard work, and a desire to be "really useful."

Each episode features two animated stories, a live-action segment and a music video designed to delight children while helping to foster their social and emotional development. As young viewers join Thomas and his engine friends on exciting adventures on the Island of Sodor and beyond, they experience timeless life lessons of discovery, cooperation, and friendship. For more about the Thomas & Friends educational framework, see Learning Goals.
Thomas & Friends™ supports children aged 2 to 5 as they develop important social-emotional skills and the capacity to act constructively on their environment. By modeling characters engaging in positive social interactions and resolving meaningful dilemmas, *Thomas & Friends*™ helps to build an early foundation for preschoolers' success. Born from a decades-long literary tradition, *Thomas & Friends*™ continues to offer positive lessons and storytelling with a purpose. The series supports viewers as they become increasingly independent, navigating the world around them with greater control and confidence.

Child development experts and researchers continually cite the importance of fostering three skill sets among young children: (1) engaging in constructive social and emotional interactions; (2) self-efficacy, including mastery over oneself and one's environment; and, (3) the ability to problem solve and manage failures and frustrations. *Thomas & Friends*™ models these key struggles and competencies, weaving them strategically into the characters' personalities and the series' narratives.

The steam railway provides a distinctive and powerful backdrop for showcasing such stories. From a developmental perspective, young children's need for safety and comfort is coupled with a desire for exploration and experimentation. *Thomas & Friends*™ represents a model of this journey, offering a variety of adventures and exciting destinations, but within the context of a predictable world that has rules, responsibilities, and reliable mediators (i.e., the conductors) who guide the engines and help them master new skills. The world of Sodor is a compelling metaphor for preschoolers, as the series promotes exploration within the safety of familiar boundaries and adult supervision.

Against this backdrop, the characters interact with one another much like children do on a playground. Viewers will identify with the trains and their everyday ups and downs, as they work through jealousies, rivalries, squabbles, jokes and schemes that do not always have the outcomes they intended. Motivated by always wanting to be "Really Useful Engines," the trains are sometimes faced with the need to control their impulses or modify their approach to a situation in order to succeed.

As is the case for their real world preschool counterparts, the series' characters sometimes need to fail as part of the way they learn. But within the context of this safe environment, apologies can be made, solutions found, and positive outcomes accomplished. The Island of Sodor offers an array of personalities, ages, backgrounds, and temperaments with which children can identify or experience for the first time. In this way, *Thomas & Friends*™ also highlights an appreciation of differences and an understanding that communities thrive when

its members contribute their unique strengths and skills. The series draws upon a diverse cast to populate a range of entertaining and engaging adventures that resonate emotionally with children, while imparting valuable life lessons. Characters' personalities are strategically designed to be broad, defined by key features that help to make their behaviors and, therefore, educational purposes clear.

Finally, the series' content is further reinforced through appealing music videos that spark preschool attention and complement the messages embedded in each episode. With themes like "Determination," "Learning Together," "Kindness with Friends," "Helping Each Other," and "Giving and Sharing," these music videos offer children additional, memorable entry points through which they can explore the important themes presented in the narratives.

Educational Goals:

The series offers three primary goal areas to foster increased competence and positive self-regard as children learn to navigate relationships, contribute to their communities and master the world around them.

Social and Emotional Interactions: Presented with an increasing number of socialization opportunities, preschoolers are beginning to learn how to offer friendship, express themselves, control their emotions, resolve conflicts, and engage with others in conversation and play. *Thomas & Friends*™ helps children to develop this new and often challenging skill set. Goals in this area include:

1. Being a good friend: Treating others with kindness and a caring attitude
2. Making new friends: Strategies for connecting with others
3. Perspective taking: Understanding that others may have an interpretation, preference, experience or feeling that is different from one's own
4. Listening carefully
5. Helping others
6. Sharing
7. Respecting and appreciating differences (e.g., in appearance, abilities, perspective)
8. Apologizing and forgiving others
9. Appreciating one's community
10. Being fair

Self-Efficacy: Preschoolers are beginning to experiment with mastery over themselves, their actions and their environments. *Thomas & Friends*™ will help children understand that their choices and behaviors do, in fact, make a difference to themselves and others. The series promotes belief in one's own competencies, the ability to take initiative, and the capacity to effect significant change. Goals in this area include:

11. Making meaningful contributions: Believing in one's ability to impact individual situations, as well as one's broader community (i.e., being a "Really Useful Engine")
12. Demonstrating responsibility (e.g., engines have specific responsibilities, like Percy, who delivers the mail)
13. Understanding that there are consequences to one's actions
14. Following directions, instructions, rules
15. Prioritizing goals

Problem Solving: As preschoolers learn to problem solve, they will naturally encounter obstacles, make mistakes, and experience disappointing results. Being able to persevere, manage

frustration, think creatively and work with others are valuable skills modeled by *Thomas & Friends*™. Goals in this area include:

16. Coping with failure: Managing frustration and disappointments
17. Persistence: Not giving up; understanding the value of remaining engaged with a problem
18. Flexible thinking: Seeing a problem in a new way; generating multiple, creative solutions
19. Applying one's best effort
20. Asking for, accepting and appreciating help
21. Teamwork: Cooperating, collaborating with others to achieve a shared goal
22. Appreciation of differences: Recognizing and utilizing individuals' strengths and skills

Show 22: Wild Kratts

Wild Kratts is a web-only, animated show that follows the adventures of real-life brothers, Chris and Martin Kratt, as they encounter incredible wild animals during visits to animal habitats around the globe. The show combines science education with fun and adventure. Each adventure explores an age-appropriate science concept central to an animal's life and showcases a never-before-seen wildlife moment. It's all wrapped up in engaging stories of adventure, mystery, rescue, and the Kratt brothers' brand of laugh-out-loud-comedy that kids love.

Join the adventures of Chris and Martin Kratt as they encounter incredible wild animals, combining science education with fun and adventure, while traveling to animal habitats around the globe. Each adventure explores an age-appropriate science concept central to an animal's life and showcases a never-before-seen wildlife moment. It's all wrapped up in engaging stories of adventure, mystery, rescue, and the Kratt brothers' brand of laugh-out-loud-comedy that kids love.

The real-life Chris and Martin introduce each Wild Kratts episode with a live action segment that imagines what it would be like to experience a never- before-seen wildlife moment, and asks, "What if…?" The Kratt brothers transition into animation and the adventure begins, bringing early-elementary school children into the secret lives of extraordinary creatures, many of which have never been animated before – including proboscis monkeys, draco lizards and caracals!

Aided by the brilliant hi-tech inventor and scientist Aviva Corcovado and her team, the adventuring brothers can activate their Creature Power Suits to fly with peregrine falcons, tag along remora-style with a great white shark, or dive to the bottom of the sea with whales and colossal squid!

From meeting a young elephant who uses the physics of suction to bring water into her trunk, to poison arrow frogs who use chemistry as their defense, to peregrine falcons who harness the force of gravity to fly so fast, the brothers and viewers learn that animals can take you anywhere in science!

The learning goals of Wild Kratts are to:

1. Teach six to eight-year-old viewers natural history and age-appropriate science by building on their natural interest in animals.
2. Develop and strengthen basic skills of observation and investigation that children will use increasingly as they continue their study of science.
3. Build excitement in science that will remain with them throughout their lives.

Animals can take you anywhere in science. This series now takes the natural appeal of animals and harnesses it towards the goal of teaching science concepts to children ages 6- 8.

Educationally, Wild Kratts is timely, focusing on science just as educational indicators show an alarming trend of low performance and interest in science in today's children in international comparisons (NSF Indicators 2004). The smart, fun, confident, enthusiastic characters of Wild Kratts provide role models that are culturally diverse to ensure that a wide range of viewers can identify with, and thus learn with, the characters in the show.

In Wild Kratts, science content is always seamlessly integrated with the stories. As they learn about the world and science through animals, the characters actively apply their new knowledge to achieving their goals and completing the mission – whether it be exploring the never-before-seen deep sea in search of new creatures or finding out why worms come out from their underground home when it rains! New understandings or questions are closely tied to plot points that send the characters in new directions in their adventures of mystery, discovery, and rescue. Science content is focused to support curriculum standards as laid out by the National Science Education Standards (NSES) from the National Academy of Sciences and with the Benchmarks for Science Literacy from American Association for the Advancement of Science (AAAS). Of primary importance for this age group is to provide an inquiry- based educational approach: encouraging viewers to ask questions, complete investigations/observations, answer questions, and present results. This process is modeled by the characters and is central to each and every story. The fact that our successful heroes use an inquiry-based approach to life and learning, and our perpetually unsuccessful villain does not, sends a clear message to children about the inherent value of this critical thinking skill.

Appendix 3: Episodes used in content analysis

Show Name	Episode Name	Episode Length
Bubble Guppies	Swimtastic Checkup	23:07
	Good morning Mr. Grumpfish	25:34
	Puppy Love	21:40
Caillou	Big Time Caillou	25:50
	Caillou Explores	25:51
	Team Player Caillou	25:51
Cat in the Hat knows a lot about that	Take a walk/Cotton Patch	28:28
	Skin I'm in/Wishy-Washy	28:28
	Tough Enough/How Cool is Coral	26:30
Chuggington	High Rise Rescue/Old Silver Mine Line	19:41
	Record Breaker Koko/Iron Chuggers	19:40
	Stop Koko Stop/Brewster Makes Tracks	17:23
Curious George	We otter be friends/Sir George and the Dragon	23:40
	Where's the firedog?/Toot toot tootsie goodbye	23:40
	George and Allie's Lawn Service/ Scavenger Hunt	23:37
Daniel Tiger's Neighborhood	Daniel is jealous/Jealousy at the treehouse	24:10
	Duckling goes home/Daniel feels left out	26:58
	New Friends/Same & Different	27:00
Dinosaur Train	Apatosaurus Adventure/Nature Art	24:07
	Arnie rides the flatcar/Old Reliable	26:32
	Stargazing on the night train/Get into Nature	23:04
Doc McStuffins	Doc's busy day/Wrong side of the law	22:36
	Leilani's luau/Karate Kangaroos	22:36
	School of Medicine/Super amazing ultra hoppers	23:52
Dora & Friends	Doggie Day	23:11
	Magic Land	23:13
	Mystery of the Magic Horses	20:01
Jake & the Neverland Pirates	Shiver Jack/Treasure Tunnel Trouble	24:05
	Singing Stones/Mermaid Queen's Voice	23:54
	Neverland Coconut Cook Off/Lost & Found Treasure	24:05
Little Einsteins	Little Red Rockethood	24:04
	Show & Tell	24:05
	Annie & Little Toy Plane	23:51
Mickey Mouse Clubhouse	Mickey's Mousekeball	24:56
	Minnie Rella	25:54
	Quest for the Crystal Mickey	29:31
Octonauts	The Octonauts & the Cone Snail	10:00
	The Octonauts & the Immortal Jellyfish	10:05
	The Octonauts and the Yeti Crab	9:56
	The Octonauts and the Siphonophone	10:00
	The Octonauts and the Carracudas	10:32
	The Octonauts and the Sea Skaters	9:56

Paw Patrol	Pups save the diving bell/Pups save the beavers	23:24
	Pups save a ghost/Pups save a show	23:24
	Pups save a talent show/Pups save the corn roast	23:22
Peppa Pig	Pedro the Cowboy	5:01
	Peppa and George's Garden	5:14
	The Flying Vet	5:00
	Kylie Kangaroo	5:02
	Mr. Potato's Christmas Show	5:01
	Madam Gazelle's Leaving Party	5:01
	Desert Island	5:02
	George's Balloon	5:00
	Peppa's Circus	5:00
	The Fish Pond	5:02
	Snowy Mountain	5:00
Sesame Street	Me Amigita Rosita	55:57
	Firefly Show	55:57
	Every plant that ever was	55:57
Sid the Science Kid	The Itchy Tag	26:58
	Sid's Health Day	28:46
	The Bug Club	26:19
Sofia the First	The Princess Test	20:38
	Tri-Kingdom Picnic	20:09
	Make way for Miss Nettle	21:17
Super Why!	Goldilocks & the Three Bears	25:24
	The Ghost who was afraid of Halloween	25:25
	Cinderella- The Prince's side of the story	26:39
Team Umizoomi	Presto's Magic House	23:12
	Doormouse in Space	22:12
	Lost and Found Toys	23:12
Thomas & Friends	Follow that Flour	10:11
	Percy and the Funfair	10:11
	The Green Controller	10:10
	Toby's Afternoon Off	10:12
	Toby's New Shed	10:11
	Edward Strikes out	10:11
	Big Strong Henry	10:11
	Sticky Toffee Thomas	10:12
	Thomas and the Treasure	10:11
Wild Kratts	Happy Turkey Day	26:12
	Rainforest Stew	26:31
	Skunked	26:31

Appendix 4: Gender stereotype coding scheme

Occupations
- Code if character is portrayed as being this OR if child is pretending to be this

Male Stereotyped	**Female Stereotyped**	**Neutral**
Doctor/Dentist/Veterinarian	Baby-sitter	Artist
Pilot	Dancer	Baker
Scientist/Engineer	Cheerleader	Comedian
Fire fighter	Nurse/dental assistant	Cook in restaurant
Mechanic/Construction worker	Florist	Writer
Mail carrier	Preschool/Elem School Teacher	
Politician/President/Mayor/King	House cleaner	
Pilot (while flying a plane/vehicle)	Hair stylist	
Banker	Secretary	
Bus driver	Supermarket clerk/cashier	
Garbage collector	Librarian	
Lawyer	Social Worker	
Ship captain	Queen	
Plumber	Stay-at-home parent	
School Principal		
Soldier		
Truck driver/Train driver/conductor		
Professor		
Farmer		
Business person (office worker)		

Activities

- Code if character is depicted doing this OR if they explicitly say they are going to do it (e.g., "Now I'm going to go grocery shopping")
- FOR LARGE GROUPS: If there are >5 people pictured, only code for 1 instance of stereotype
- If <5 people pictured, count each character who is doing stereotype

Male Stereotyped	**Female Stereotyped**	**Neutral**
Build things (forts, airplanes, use tools)	Bake/cook @ home (or helping to do this)	Act in a play
Fix things (bikes, car)	Grocery shop/errands	Go bowling
Go fishing	Make jewelry/ arts & crafts	Go horseback riding
Hunt	Domestic Chores (vacuum, wash dishes, wash clothes, etc)	Go to the beach
Play sports (basketball, baseball, soccer)	Set the table for dinner	Listen to music
Play video games	Sewing	Play cards, checkers, board game
Shoot a bow & arrow/use weapons	Play with a doll/dollhouse	Play hide and seek, tag
Use a microscope	Use makeup	Paint pictures
Use maps	Baby-sit/care for a baby	Read books
Wash a car	Play with tea set	Sing in a choir, play instruments
Do yardwork	Write poems	
Watch sports on TV	Be rescued by someone else	
Rescue someone		

Appendix 5: Kappas per show for gender stereotypes

Kappas for individual codes for *occupation* depictions

Show	Kappa for MS-M	Kappa for MS-F	Kappa for FS-F	Kappa for FS-M	Kappa for NS-M	Kappa for NS-F
Bubble Guppies	0.928	1.000	0.789	0.856	n/a	n/a
Caillou	1.000	0.854	0.960	n/a	n/a	n/a
Cat in the Hat	0.963	n/a	n/a	n/a	n/a	n/a
Chuggington	0.863	0.814	n/a	n/a	n/a	n/a
Curious George	0.980	1.000	0.868	n/a	0.967	0.796
Daniel Tiger	0.903	0.748	0.962	0.969	0.797	n/a
Dinosaur Train	0.921	1.000	n/a	n/a	n/a	n/a
Doc McStuffins	0.963	0.934	0.811	1.000	n/a	n/a
Dora & Friends	n/a	n/a	n/a	n/a	n/a	n/a
Jake & the Neverland Pirates	0.919	n/a	0.949	n/a	n/a	n/a
Little Einsteins	0.932	n/a	n/a	n/a	0.909	n/a
Mickey Mouse Clubhouse	0.866	0.925	0.967	n/a	n/a	n/a
Octonauts	0.746	0.964	n/a	n/a	n/a	n/a
Paw Patrol	0.847	0.877	1.000	n/a	n/a	n/a
Peppa Pig	0.795	.0722	0.762	n/a	n/a	n/a
Sesame Street	0.913	1.000	n/a	n/a	1.000	0.940
Sid the Science Kid	1.000	1.000	0.801	0.797	n/a	n/a
Sofia the First	0.793	n/a	0.760	n/a	n/a	n/a
Super Why!	0.928	0.920	0.933	n/a	1.000	1.000
Team Umizoomi	n/a	n/a	n/a	0.876	n/a	n/a
Thomas	0.974	n/a	n/a	n/a	n/a	n/a
Wild Kratts	1.000	1.000	n/a	n/a	1.000	n/a

Kappas for individual codes for *activity* depictions

Show	Kappa for MS-M	Kappa for MS-F	Kappa for FS-F	Kappa for FS-M	Kappa for NS-M	Kappa for NS-F
Bubble Guppies	1.000	1.000	1.000	1.000	0.960	0.931
Caillou	0.969	1.000	0.920	1.000	0.888	0.947
Cat in the Hat	1.000	1.000	1.000	1.000	0.790	0.875
Chuggington	0.964	1.000	n/a	n/a	1.000	1.000
Curious George	1.000	1.000	1.000	1.000	0.943	0.868
Daniel Tiger	0.910	1.000	1.000	0.868	0.782	0.982
Dinosaur Train	0.854	1.000	1.000	1.000	1.000	1.000
Doc McStuffins	1.000	1.000	0.885	1.000	0.736	0.786
Dora & Friends	n/a	1.000	n/a	n/a	0.913	0.901
Jake & the Neverland Pirates	0.982	1.000	1.000	1.000	0.966	0.978
Little Einsteins	n/a	n/a	n/a	n/a	0.953	0.960
Mickey Mouse Clubhouse	0.859	1.000	1.000	n/a	0.946	0.885
Octonauts	0.907	1.000	1.000	0.899	1.000	n/a
Paw Patrol	0.752	0.796	n/a	0.759	0.980	0.948
Peppa Pig	0.872	0.936	0.908	0.959	0.916	0.819
Sesame Street	1.000	1.000	1.000	1.000	0.988	1.000
Sid the Science Kid	1.000	n/a	1.000	n/a	0.920	0.901
Sofia the First	1.000	1.000	0.937	n/a	1.000	0.962
Super Why!	1.000	n/a	0.854	1.000	.0957	0.827
Team Umizoomi	0885	1.000	n/a	1.000	0.977	1.000
Thomas	0.913	n/a	n/a	1.000	n/a	n/a
Wild Kratts	1.000	1.000	n/a	1.000	n/a	n/a

Key: MS-M= male shown in male-stereotyped depiction, MS-F= female shown in male-stereotyped depiction, FS-F= female shown in female-stereotyped depiction, FS-M= male shown in female-stereotyped depiction, NS-M= male shown in neutral stereotype, NS-F= female shown in neutral stereotype
Note: "n/a" indicates there were no examples of that code in the episodes coded

Appendix 6: Consent & Parent Survey (Study 2)

University of Hawai'i
Parent/Guardian Consent for Child to Participate in Research Project:
Preschoolers' Interactions with Media

My name is Ashley Biddle. I am a doctoral student in Developmental Psychology at University of Hawai`i at Mānoa (UH). I am also a freelance researcher for Sesame Workshop, the non-profit research division of Sesame Street. As a requirement for both of these roles, I do research on preschoolers' interactions with media (e.g., television, apps) that is specifically designed for their age group. The purpose of this research is to learn how children are interacting with media and offer ways we might be able to improve this media. I am asking your permission for you and your child to participate in this project. I also will ask your child if s/he agrees to participate in this project.

What activities will your child do in the study and how long will the activities last? If you and your child participate in this project, I will ask that you complete the attached survey and I will visit your child's classroom or afterschool program two times. Each time, your child will either watch a Sesame Street video (or other educational TV show aimed at preschoolers), play a new web or tablet educational game, or listen to a storybook. Children may participate as a group or individually but each child will work directly with a *Sesame Street* or University of Hawai`i researcher and be asked questions about what they remember from the media, and what they liked or did not like about the game, story, or show. They may also be asked about the characters, including their gender and what activities they may want to participate in (e.g., play with a doll, build with blocks). I will plan the timing of these sessions with your child's preschool teachers, to be as minimally disruptive to the day as possible. I will be with each group of children for a maximum of 45 minutes and will plan to videotape these sessions. These videotapes will only be used as a record of our observations of the children and will never be used for broadcast purposes. In addition, with your permission (granted at the end of this form), we may keep the data for use in future research studies. If you do not agree to this, please indicate at the end of the form. The children's names will not be reported to anyone and their individual responses will be kept confidential. This is not a test of your child. Rather, I am interested in learning how children interact with and learn from media as well as how to make media contest the best it can be to help children become smarter, stronger, and kinder.

Benefits and Risks: There may be no direct benefits to you or your child for participating in my project beyond enjoyment while watching a television episode, playing a game, or listening to a story. However, the results of this project may help me provide feedback to children's media production teams to create more enjoyable and educational content. I believe there is little or no risk to you or your child in participating in this project. There is a possibility you child may become bored or stressed by answering questions. If that happens, we can skip questions, take breaks, or stop the project. Your child may also withdraw from the project altogether.

Confidentiality and Privacy: I will keep all the information from this project on a password-protected computer. When I store data, I will store it with code numbers and will never use names. Only my University of Hawaii advisor and I will have access to the data. Other agencies

that have legal permission have the right to review research records. The University of Hawaii Human Studies Program has the right to review research records for this study. When I report the results of my research project in my typed paper or at research conferences, I will not use you or your child's name or any other personal information that would identify you or your child and data will be reported as a group; no participant will be singled out.

Voluntary Participation: Participation in this research project is voluntary. You or your child can choose freely to participate or not to participate. You can choose freely whether or not your child may participate in this project. At any point during this project, you can withdraw your permission, and your child can stop participating without any loss of benefits.

Questions: If you have any questions about this project, you can contact me, Ashley Biddle ,by phone (703)244-4526 or email (ammorris@hawaii.edu). If you would like a copy of my final report, please contact me. You can also call my advisor at the University of Hawaii, Dr. Kristin Pauker, at 808-956-8107 or by email at kpauker@hawaii.edu. If you have questions about your rights, or your child's rights, contact the University of Hawaii, Human Studies Program, by phone at (808) 956-5007 or by email at uhirb@hawaii.edu.

Signature(s) for Consent:
I agree to participate in this research project and also give permission for my child to participate in the research project entitled, *Preschooler's interactions with media*. I understand that, in order to participate in this project, my child must also agree to participate. I understand that my child or I can change our minds about participating in this project. I understand that I can change my mind about participating, at any time, by notifying the researchers to end participation in this project.
Name of Parent/Guardian (Print) _____
Parent/Guardian's Signature _____
Date _____
Name of Child (Print) _____
Birthdate of Child _____ Sex of Child _____
Race/Ethnicity of Child _____
Please initial next to one:
_____ I give permission for my child to be video-recorded for this project.
_____ I do not give permission for my child to be video-recorded, but they may be audio-recorded.
_____ I do not give permission for my child to be video- or audio-recorded.
Please initial next to one:
____ I give permission for my child's data to be used in future research. I understand that their data will be stored in a safe place and any identifying information will be removed.
____ I do not give permission for my child's data to be used in future research. Please destroy the data as soon as the study is over.

Preschoolers' Interaction with Media

Thank you for agreeing to have your child participate in our study! We are interested in how children interact with media. Before we talk to your child, it is helpful for us to know their familiarity with various television shows. Below, please circle how often your child watches each of the following shows. Please include the frequency with which they watch each show across all mediums (e.g., television, Netflix, network websites).

YOUR CHILD'S FAVORITE SHOW: _____

How often does your child watch **Bubble Guppies?** (circle one)
Never Once a month 2-3 times/month Once a week 2-3 days/week Almost every day

How often does your child watch **Caillou?** (circle one)
Never Once a month 2-3 times/month Once a week 2-3 days/week Almost every day

How often does your child watch **Chuggington?** (circle one)
Never Once a month 2-3 times/month Once a week 2-3 days/week Almost every day

How often does your child watch **Curious George?** (circle one)
Never Once a month 2-3 times/month Once a week 2-3 days/week Almost every day

How often does your child watch **Daniel Tiger's Neighborhood?** (circle one)
Never Once a month 2-3 times/month Once a week 2-3 days/week Almost every day

How often does your child watch **Dinosaur Train?** (circle one)
Never Once a month 2-3 times/month Once a week 2-3 days/week Almost every day

How often does your child watch **Doc McStuffins?** (circle one)
Never Once a month 2-3 times/month Once a week 2-3 days/week Almost every day

How often does your child watch **Dora & Friends?** (circle one)
Never Once a month 2-3 times/month Once a week 2-3 days/week Almost every day

How often does your child watch **Jake & the Neverland Pirates?** (circle one)
Never Once a month 2-3 times/month Once a week 2-3 days/week Almost every day

How often does your child watch **Little Einsteins?** (circle one)
Never Once a month 2-3 times/month Once a week 2-3 days/week Almost every day

How often does your child watch **Mickey Mouse Clubhouse?** (circle one)
Never Once a month 2-3 times/month Once a week 2-3 days/week Almost every day

How often does your child watch **Octonauts?** (circle one)
Never Once a month 2-3 times/month Once a week 2-3 days/week Almost every day

How often does your child watch **Paw Patrol?** (circle one)
Never Once a month 2-3 times/month Once a week 2-3 days/week Almost every day

How often does your child watch **Peppa Pig?** (circle one)
Never Once a month 2-3 times/month Once a week 2-3 days/week Almost every day

How often does your child watch **Sesame Street?** (circle one)
Never Once a month 2-3 times/month Once a week 2-3 days/week Almost every day

How often does your child watch **Sid the Science Kid?** (circle one)
Never Once a month 2-3 times/month Once a week 2-3 days/week Almost every day

How often does your child watch **Sofia the First?** (circle one)
Never Once a month 2-3 times/month Once a week 2-3 days/week Almost every day

How often does your child watch **Super WHY?** (circle one)
Never Once a month 2-3 times/month Once a week 2-3 days/week Almost every day

How often does your child watch **Team Umizoomi?** (circle one)
Never Once a month 2-3 times/month Once a week 2-3 days/week Almost every day

How often does your child watch **The Cat in the Hat knows a lot about that?** (circle one)

Never Once a month 2-3 times/month Once a week 2-3 days/week Almost every day
How often does your child watch **Thomas & Friends?** (circle one)
Never Once a month 2-3 times/month Once a week 2-3 days/week Almost every day
How often does your child watch **Wild Kratts?** (circle one)
Never Once a month 2-3 times/month Once a week 2-3 days/week Almost every day

Please complete the following information about your family.
Child's Gender: male female Your Gender: male female
Child's birthdate _____ Your age _____
Child's race/ethnicity _____ Your race/ethnicity _____
Child's # of brothers _____ # of sisters _____
Child's mother's occupation _____
Child's father's occupation _____
What is the highest level of education completed by you, the parent?
____ High school
____ Some college or 2-year college degree
____ 4-year college degree
____ Some graduate school
____ Graduate degree
What is the annual household income of your household?
___ Less than $10,000/yr
___ $10,001-30,000/yr
___ $30,001-50,000/yr
___ $50,001-70,000/yr
___ $70,001-90,000/yr
___ $90,001-110,000/yr
___ $110,001-130,000/yr
___ $130,001-150,000/yr
___ More than $150,000/yr
Now, please think about how much time the adults in your house spend doing housework (e.g., cooking, cleaning). What would you say the closest approximation is?
___ Mother does 100% of housework
___ Father does 100% of housework
___ Mother and father each do 50% of housework
___ Mother does 70% of housework, father does 30%
___ Mother does 30% of housework, father does 70%
___ Other, please describe: _____
Please check all that apply:
____ Father works full-time (>20 hrs/wk) outside of the home
____ Mother works full-time (>20 hrs/wk) outside of the home
____ Father works part-time (<20 hrs/wk) outside of the home
____ Mother works part-time (<20 hrs/wk) outside of the home
____ Father stays home with children the majority of the time during the week
____ Mother stays home with children the majority of the time during the week

Appendix 7: Child Assent

Hi [child's name]! My name is [your name] and I brought some games for us to play today. I'm going to ask you some questions, show you some videos, and do some puzzles. If you need to take a break, we can do that – just let me know. Do you want to play my games?

Appendix 8: Television clips used in stimuli videos

Stereotype Video Creation.

Show	**Description of Clip**	**Male or Female Character**	**Clip Length (sec)**	**Randomly chosen for use in Control Video**
Curious George	George, the Man with the Yellow Hat, and another man are on a boat	Male	7.1	No
Paw Patrol	Rubble uses a bulldozer	Male	5.7	Yes
Paw Patrol	Rubble uses a bulldozer	Male	9.9	No
Mickey Mouse Clubhouse	Mickey flies a plane	Male	8.0	Yes
Chuggington	Human male engineer fixes computer	Male	11.7	Yes
Dinosaur Train	Donny & male friend build robots and talk about playing soccer	Male	10.6	No
Sid the Science Kid	Gerald is pretending to be a dentist	Male	14.5	No
Curious George	Male farmer with ox and yolk	Male	9.9	No
Sesame Street	Elmo is a ship captain	Male	8.8	Yes
Peppa Pig	Grandfathers talk about going on a fishing trip on a boat	Male	6.1	Yes
Jake & the Neverland Pirates	Flynn is captain of the ship	Male	5.6	No
Caillou	Dad is fixing the car	Male	3.5	Yes
Caillou	Caillou and male friend play baseball while dad fixes lawnmower	Male	14.9	No
Team Umizoomi	Geo plays with a firetruck	Male	7.5	Yes
Paw Patrol	Chase does police work	Male	6.8	No
Mickey Mouse Clubhouse	There is a song about Minnie needing a “dress to impress” and animals help her put a dress together	Female	7.2	Yes
Sid the Science Kid	Mom takes care of baby	Female	11.6	No
Sesame Street	Human girl plays princess/dress-up	Female	14.9	No
Mickey Mouse Clubhouse	Minnie and Daisy compliment each other on how pretty they look	Female	9.7	Yes
Curious	A woman is ironing	Female	5.9	Yes

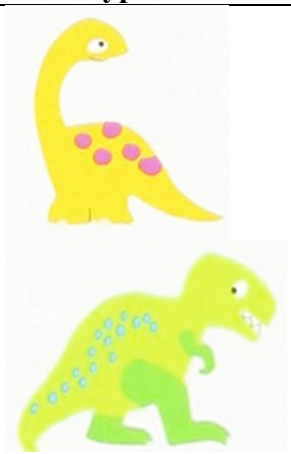
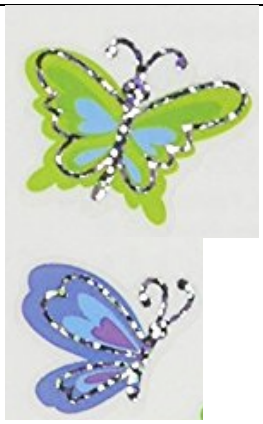
George				
Octonauts	Mama Seaskater takes care of baby seaskaters	Female	5.8	No
Sid the Science Kid	Mom takes care of baby	Female	6.2	No
Princess Sofia	Amber and Sofia do ballet	Female	8.3	No
Caillou	Mom washes dishes	Female	10.6	Yes
Mickey Mouse Clubhouse	Minnie and fairy godmother clean, sweep, and wash	Female	11.6	Yes
Jake & the Neverland Pirates	A witch asks Izzy to taste something while they're cooking	Female	3.5	No
Sofia the First	Sofia sings about being a princess with dresses and shoes	Female	13.0	Yes
Cat in the Hat Knows A Lot about That	Mom vacuums	Female	7.3	Yes
Little Einsteins	Girl dances ballet	Female	4.5	Yes
Dinosaur Train	Mom cleans nest	Female	9.8	No

Counter-stereotype Video Creation.

Show	**Description of Clip**	**Male or Female Character**	**Clip Length (sec)**	**Randomly chosen for use in Control Video**
Daniel Tiger's Neighborhood	Human female is an airplane pilot	Female	6.2	Yes
Wild Kratts	Woman programs a computer	Female	6.3	Yes
Team Umizoomi	Girl plays with dinosaur	Female	6.1	Yes
Wild Kratts	Woman explains chemical reactions	Female	12.7	Yes
Chuggington	Female construction worker	Female	7.8	No
Paw Patrol	Female farmer helps Chase lift something heavy	Female	10.4	Yes
Sofia the First	Girls play basketball	Female	7.3	No
Peppa Pig	Female veterinarian flies a plane	Female	13.3	No
Bubble Guppies	Female mayor runs a marathon with girl guppies	Female	5.5	Yes
Wild Kratts	Woman does chemistry	Female	5.3	Yes
Doc McStuffins	Doc fixes male kangaroo using tools	Female	5.5	No
Octonauts	Female uses computer to check on mechanical functioning of submarine	Female	10.0	No
Peppa Pig	Show all of Ms. Rabbit's jobs (including helicopter and recycling)	Female	20.1	No
Wild Kratts	Woman does chemistry	Female	8.7	No
Team Umizoomi	Mili catches baseball	Female	4.1	Yes
Jake & the Neverland Pirates	Bones & Captain Hook take care of baby	Male	12.9	No
Sid the Science Kid	Dad is doing laundry	Male	11.1	No
Caillou	Dad does laundry and tells Caillou to clean up	Male	7.7	Yes
Jake & the Neverland Pirates	Smee takes care of Captain Hook by bringing him warm soup	Male	8.3	Yes
Doc McStuffins	Dad cleans up after toddler	Male	5.5	No
Jake & the Neverland Pirates	Captain Hook and Smee dress as female mermaids	Male	4.5	Yes
Daniel Tiger's Neighborhood	Daniel makes salad for dinner	Male	6.5	No
Sesame Street	Dad bakes with his daughter	Male	3.0	Yes
Doc McStuffins	Dad pops in while cooking dinner to tell son his ride to soccer is here	Male	8.8	No

Daniel Tiger's Neighborhood	Dad comforts Daniel	Male	10.0	Yes
Jake & the Neverland Pirates	Male pirates are cooking	Male	5.7	Yes
Sofia the First	Male teacher dances ballet	Male	7.7	No
Peppa Pig	Rabbit puts makeup on boy character	Male	4.8	No
Caillou	Dad is at park with baby and stroller	Male	19.5	Yes
Daniel Tiger's Neighborhood	Daniel and his dad are grocery shopping	Male	4.8	No

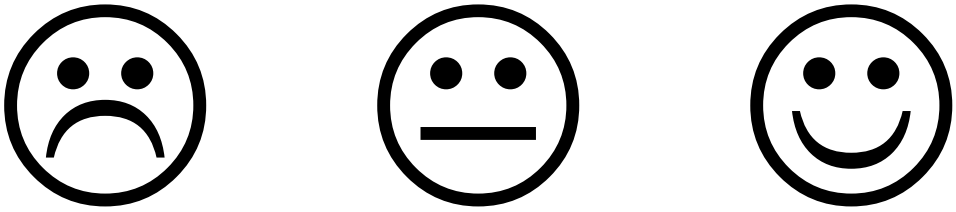
Appendix 9: Sticker choice examples

	Stereotyped	Counter-stereotyped
Boys		
Girls		

Appendix 10: Scales for POAT-PM and POAT-AM

POAT-AM: Who should do this job/activity?

POAT-PM: How much would you like to do this job/activity?



Appendix 11: Coding Schemes for Gender constancy/essentialism measure

Essentialism/Gender Constancy

0: No evidence of essentialist reasoning

- does not mention constancy words (e.g., "still," "doesn't change," etc)
- does not mention gender staying constant in past or future
- May mention they are a boy/girl b/c they "like" that

Examples:
"He's a boy" or "I'm a girl"
"I like girls"
"b/c when I'm grown up, I don't like to be a boy"

1: Emerging essentialist reasoning

- may mention constancy words but doesn't explicitly indicate that gender will not change in the future
- may indicate the child "used to be a …" but doesn't apply to future possible changes

Examples:
"I grew up being a girl"
"Her's already a girl"

2: Essentialist reasoning achieved

- uses constancy words and shows clear understanding that gender doesn't change

Examples:
"I'm a boy so I can't be a girl"
"Even if he cooks dinner, he'll still stay the same"
"It doesn't matter the clothes- it matters of your body"
"Girl still, b/c how could I turn into a boy?"

Explanation Coding

Important: The first 4 categories progress from lower to higher levels of development. If an explanation includes more than one of these categories, code the explanation at the highest level. For example, if an explanation has both gender norm and implied constancy, code as implied constancy.

Gender Norm Explanations: **direct or indirect reference to gender-stereotypic norms of appearance and conduct, either explicitly identifying norms or describing the stimulus features that confirm or refuted norm violations. Mentions "girl stuff" or "boy stuff"**

Examples:
"If I did girl stuff, I would be a girl"
"I don't like girl stuff"
"b/c he's a boy and his name is Jack and that's a boy name"
"boys play baseball"

Norm-flexibility: **a more integrated belief that norm violations did not affect sex identity because the norms themselves were flexible (e.g., "girls can play football too")**
Examples:
"He's good at things like that" [Jack cooking]
"I don't really like… well sometimes I like to play with boy toys"
"Girls at Auntie Kanani's house play football"
"Girls can play that too"

Implied-constancy explanations: **suggested sex identity could not change under the given circumstances; however, they did not discount the possibility that identity changes could take place in other situations (e.g., "Just because he's gentle doesn't mean he's a girl")**
Examples:
"If you play girl things, it may fun but it doesn't mean you're a girl"
"I dressed up as a girl"
"She did boy sports but she's a girl"
"That's how he grew up" [Jack would be a boy with a dress on]

Operational-constancy explanations: **convey very clearly that sex-identity transformation could not occur under any circumstances, with the exception of a sex-change operation**
Examples:
"I'm a girl and I cannot change"
"If you do something girls do, you're still a boy"
"He's a boy and he's not a girl"

Other**: does not fit into any of the above categories, but gives more information than the no response category below. May not make sense based on the context**
Examples:
"b/c I'm a girl"
"I love girls- they're so pretty"
"'cause I can see a boy"
"He likes being a boy"
"some boys wear crocs" [there were no Crocs pictured on what child was looking at]
"Is Jack a character?"

No response: **no explanation or "I don't know"**

Appendix 12: Puzzles as presented to children with 12 pieces missing

Appendix 13: Output from SPSS for linear regression of counter-stereotype video and essentialism explanation predicting girls' POAT score

Model Summary[a]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.343[b]	.118	.102	10.66575	.118	7.738	1	58	.007
2	.448[c]	.201	.173	10.23926	.083	5.932	1	57	.018

a. Gender= girl

b. Predictors: (Constant), CS video

c. Predictors: (Constant), CS video, Essentialism Explanation total

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	880.208	1	880.208	7.738	.007[c]
	Residual	6597.975	58	113.758		
	Total	7478.183	59			
2	Regression	1502.159	2	751.080	7.164	.002[d]
	Residual	5976.024	57	104.843		
	Total	7478.183	59			

a. Gender = girl

b. Dependent Variable: POAT score

c. Predictors: (Constant), CS video

d. Predictors: (Constant), CS video, Essentialism Explanation total

Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	12.675	1.686		7.516	.000
	CS video	8.125	2.921	.343	2.782	.007
2	(Constant)	11.676	1.670		6.991	.000
	CS video	8.458	2.807	.357	3.013	.004
	Essentialism Explanation total	2.221	.912	.289	2.436	.018

a. Gender = girl

b. Dependent Variable: POAT score

TABLES

Table 1: Votes for each show

Show name	Network	Number of overall votes
Daniel Tiger	PBS Kids	105
Mickey Mouse Clubhouse	Disney Jr.	76
Sesame Street	PBS Kids	66
Curious George	PBS Kids	65
Super Why!	PBS Kids	57
Doc McStuffins	Disney Jr.	51
Jake & the Neverland Pirates	Disney Jr.	49
Dinosaur Train	PBS Kids	42
Wild Kratts	PBS Kids	40
Thomas & Friends	PBS Kids	39
Sofia the First	Disney Jr.	39
Octonauts	Disney Jr./BBC	27
Bubble Guppies	Nick Jr.	26
Dora & Friends	Nick Jr.	25
Team Umizoomi	Nick Jr.	25
The Cat in the Hat knows a lot about that	PBS Kids	25
Sid the Science Kid	PBS Kids	21
Caillou	PBS Kids	21
Chuggington	Disney Jr./BBC	19
Little Einsteins	Disney Jr.	17
Peppa Pig	Nick Jr./BBC	13
Paw Patrol	Nick Jr.	13

Table 2: Percentage of representation per show

Show Name	Percentage of Male/Majority Male Representation	Percentage of Female/Majority Female Representation	Percentage of Equal Representation
Curious George	76.8%	2.6%	9.4%
Octonauts	73.8%	4.0%	8.4%
Jake & the Neverland Pirates	73.7%	4.6%	9.6%
Paw Patrol	71.8%	4.9%	7.0%
Cat in the Hat	69.0%	3.6%	15.8%
Wild Kratts	68.8%	6.7%	4.4%
Thomas & Friends	67.4%	1.8%	1.9%
Caillou	63.3%	10.4%	14.7%
Mickey Mouse Clubhouse	60.6%	19.4%	7.1%
Team Umizoomi	56.4%	5.8%	5.6%
Sesame Street	54.2%	13.4%	25.4%
Chuggington	50.7%	12.2%	13.3%
Daniel Tiger's Neighborhood	50.0%	16.7%	25.3%
Little Einsteins	43.7%	19.0%	26.3%
Super Why!	42.2%	16.2%	28.8%
Dinosaur Train	38.5%	13.4%	35.6%
Doc McStuffins	37.3%	34.9%	23.6%
Bubble Guppies	36.3%	20.6%	31.6%
Dora & Friends	35.9%	31.7%	21.3%
Sid the Science Kid	32.2%	18.9%	31.4%
Peppa Pig	22.5%	32.6%	35.0%
Sofia the First	10.9%	61.1%	21.9%

Table 3: Percentage of words spoken by show

Show Name	Percentage of words spoken by male characters	Percentage of words spoken by female characters	Percentage of words spoken by both male and female characters
Thomas & Friends	98.07%	1.93%	0%
Curious George	97.40%	2.31%	0.29%
Jake & the Neverland Pirates	92.03%	5.40%	2.57%
Wild Kratts	91.31%	8.69%	0%
Mickey Mouse Clubhouse	89.79%	0.71%	9.50%
Dinosaur Train	84.68%	13.96%	1.35%
Chuggington	81.62%	11.57%	6.81%
Paw Patrol	80.88%	16.92%	2.20%
Super Why!	80.34%	18.54%	1.12%
Octonauts	79.41%	20.37%	0.23%
Daniel Tiger's Neighborhood	71.30%	22.41%	6.29%
Sesame Street	70.28%	26.96%	2.76%
Team Umizoomi	69.29%	17.02%	13.69%
Sid the Science Kid	69.21%	30.41%	0.38%
Cat in the Hat Knows A Lot about That	62.69%	28.20%	9.12%
Peppa Pig	56.02%	39.42%	4.56%
Little Einsteins	54.65%	44.41%	0.94%
Bubble Guppies	46.46%	44.38%	9.15%
Caillou	38.96%	61.04%	0%
Sofia the First	33.87%	64.30%	1.83%
Doc McStuffins	32.68%	67.12%	0.19%
Dora & Friends	20.29%	72.88%	6.83%

Table 4: Questions asked and directed towards males and females

	Wh- Questions				Yes/No Questions			
Show	**Asked by male**	**Asked by female**	**Directed toward males**	**Directed toward females**	**Asked by male**	**Asked by female**	**Directed toward males**	**Directed toward females**
Thomas & Friends	100%	0%	46.15%	0%	100%	0%	100%	0%
Octonauts	87.93%	12.07%	65.52%	13.79%	93.48%	6.52%	52.17%	21.74%
Jake & the Neverland Pirates	86.49%	13.51%	59.46%	0%	92.68%	7.32%	46.34%	12.20%
Paw Patrol	82.93%	17.07%	73.17%	2.44%	93.10%	6.90%	82.76%	6.90%
Daniel Tiger	81.08%	18.92%	40.54%	21.62%	74.42%	25.58%	34.88%	25.58%
Curious George	76.31%	23.68%	55.26%	0%	87.88%	12.12%	69.70%	9.09%
Wild Kratts	75.51%	24.49%	57.14%	10.20%	90.32%	9.68%	59.68%	12.90%
Sesame Street	71.30%	28.70%	44.84%	31.39%	67.67%	30.08%	41.35%	28.57%
Chuggington	71.05%	26.32%	63.16%	21.05%	77.14%	22.86%	74.29%	20.00%
Team Umizoomi	71.05%	28.95%	10.53%	2.63%	71.43%	28.57%	19.05%	4.76%
Cat in the Hat	69.23%	30.77%	63.08%	7.69%	68.97%	31.03%	42.53%	11.49%
Super Why!	69.23%	30.77%	14.29%	4.40%	77.14%	22.86%	20.00%	8.57%
Mickey Mouse Clubhouse	65.63%	34.38%	28.13%	10.94%	68.18%	31.82%	18.18%	38.64%
Dinosaur Train	62.32%	36.23%	28.99%	21.74%	63.33%	35.56%	45.56%	20.00%
Bubble Guppies	60.53%	38.16%	36.84%	22.37%	32.35%	64.71%	47.06%	20.59%
Little Einsteins	58.82%	41.18%	11.76%	5.89%	63.64%	36.36%	0%	12.12%
Sid the Science Kid	55.10%	44.90%	26.53%	44.90%	37.50%	62.50%	43.75%	18.75%
Caillou	53.33%	46.67%	63.33%	16.67%	60.97%	39.02%	68.29%	19.51%
Doc McStuffins	52.08%	47.92%	39.58%	52.08%	57.36%	42.65%	55.88%	44.12%
Sofia the First	30.59%	69.41%	15.29%	68.24%	20.31%	79.69%	23.44%	64.06%
Peppa Pig	28.57%	71.43%	31.75%	25.40%	43.94%	56.06%	43.94%	31.82%
Dora & Friends	20.00%	80.00%	13.33%	24.44%	25.86%	74.14%	8.62%	27.59%

Table 5: Correlations between percent speaking and questions

	Percent of words spoken by males overall	**Percent of words spoken by females overall**
Percent of Questions asked by males overall	.828***	-.805***
Percent of Questions asked by females overall	-.718***	.681***
Percent of Wh- Questions asked by males	.805***	-.790***
Percent of Wh- Questions asked by females	-.808***	.794***
Percent of Yes/No Questions asked by males	.809***	-.774***
Percent of Yes/No Questions asked by females	-.812***	.799***
Percent of Questions directed towards males overall	.390	-.333
Percent of Questions directed towards females overall	-.622**	.644**
Percent of Wh- Questions directed towards males	.379	-.340
Percent of Wh- Questions directed towards females	-.620**	.650**
Percent of Yes/No Questions directed towards males	.407	-.343
Percent of Yes/No Questions directed towards females	-.559**	.563**

*$p < .05$ **$p<.01$ ***$p<.001$

Table 6: Stereotype and Counter-stereotype content by show

	Occupations				Activities			
Show	**M-S**	**M-CS**	**F-S**	**F-CS**	**M-S**	**M-CS**	**F-S**	**F-CS**
Octonauts	83.47%	0%	0%	33.88%	9.50%	3.72%	2.48%	7.44%
Paw Patrol	75.53%	0%	1.42%	41.49%	20.57%	3.90%	0%	1.42%
Jake & Neverland Pirates	54.45%	0%	7.19%	0%	16.78%	6.16%	1.37%	1.37%
Sofia the First	51.98%	0%	89.29%	0%	11.11%	0%	3.57%	8.73%
Mickey Mouse Clubhouse	49.39%	0%	22.70%	12.88%	6.44%	0%	1.84%	0.61%
Chuggington	47.83%	0%	0%	10.43%	27.83%	0%	0%	6.96%
Dinosaur Train	47.00%	0%	0%	2.00%	1.33%	1.33%	2.67%	1.33%
Daniel Tiger	37.26%	11.15%	21.02%	8.28%	5.73%	3.18%	1.91%	1.27%
Cat in the Hat Knows a lot about That	35.33%	0%	0%	0%	4.19%	2.40%	2.40%	1.2%
Little Einsteins	28.08%	0%	0%	0%	0%	0%	0%	0%
Curious George	26.04%	0%	5.56%	4.17%	6.94%	0.69%	2.78%	0.69%
Super Why!	20.83%	0%	32.37%	9.62%	2.56%	1.28%	1.28%	0%
Bubble Guppies	19.93%	34.97%	12.94%	18.18%	0.70%	1.40%	1.40%	2.10%
Doc McStuffins	15.36%	2.14%	68.93%	90.36%	1.43%	1.43%	3.21%	6.07%
Sesame Street	11.61%	0%	0%	2.38%	4.46%	1.49%	1.79%	1.19%
Peppa Pig	9.77%	0%	17.97%	15.63%	8.20%	9.77%	3.91%	9.38%
Thomas & Friends	9.52%	0%	0%	0%	5.82%	1.06%	0%	0%
Sid the Science Kid	4.24%	1.52%	42.42%	1.21%	2.42%	0%	4.24%	0%
Caillou	1.92%	0%	19.87%	2.24%	12.18%	4.49%	4.81%	0.64%
Wild Kratts	1.86%	0%	0%	2.48%	3.11%	1.24%	0%	1.24%
Dora & Friends	0%	0%	0%	0%	0%	0%	0%	2.22%
Team Umizoomi	0%	9.71%	0%	0%	6.83%	0.72%	0%	1.44%

Key: M-S= males in stereotyped occupations/activities; M-CS: males in counter-stereotyped occupations/activities; F-S= females in stereotyped occupations/activities; F-CS= females in counter-stereotyped occupations/activities

Table 7: Differences based on gender of show's main character

Variable	Mean shows with male main character	Mean shows with female main character	Mean shows with ensemble cast
Percentage of males depicted on screen	61.43%	27.79%*	50.49%
Percentage of females depicted on screen	9.58%	39.38%*	12.61%
Percentage of equal representation on screen	14.10%	24.13%	20.83%
Percentage of words spoken by males	79.27%	35.72%*	69.48%
Percentage of words spoken by females	17.87%	60.93%*	25.53%
Percentage of words spoken by both males & females at same time	2.86%	3.35%	4.99%
Percentage of questions asked by males	75.61%	35.27%*	69.47%
Percentage of questions asked by females	24.39%	64.73%*	36.82%
Percentage of questions directed towards males	49.02%	29.15%	38.05%
Percentage of questions directed towards females	12.84%	42.19%*	17.69%
Percentage of males shown in stereotypical occupations	28.76%	19.28%	33.99%
Percentage of males shown in counter-stereotypical occupations	1.15%	0.54%	6.38%
Percentage of females shown in stereotypical occupations	13.87%	44.05%(*)	1.85%*
Percentage of females shows in counter-stereotypical occupations	7.49%	26.50%	9.55%

Percentage of males shown in stereotypical activities	7.89%	5.19%	7.24%
Percentage of males shown in counter-stereotypical activities	2.22%	2.80%	1.24%
Percentage of females shown in stereotypical activities	1.88%	2.67%	1.19%
Percentage of females shown in counter-stereotypical activities	0.77%	6.60%*	2.92%

*significant differences between this group and other two groups
(*) trend towards differences

Table 8: Correlations between topical focus and measured variables

	Science Focus	Math Focus	Reading & Spelling Focus	Socio-emotional Focus	School Readiness Focus	Overall Educational Focus
Percentage of words spoken by males	.259	.237	.090	.113	.358	.329
Percentage of words spoken by females	-.238	-.302	-.085	-.082	-.369	-.342
Percentage of words spoken by both males & females	-.125	.351	-.031	-.181	.046	.059
Males portrayed in stereotypical occupations	-.100	0.286	-.279	-.088	-.352	-.376
Males portrayed in counter-stereotypical occupations	.084	.217	.181	-.207	.160	.118
Females portrayed in stereotypical occupations	-.175	-.248	-.055	.050	-.175	-.234
Females portrayed in counter-stereotypical occupations	-.084	-.237	-.185	-.136	-.309	-.336
Males portrayed in stereotypical activities	-.365	-.215	-.305	.398	-.151	-.231
Males portrayed in counter-stereotypical activities	-.221	-.271	-.221	.192	-.230	-.249
Females portrayed in stereotypical activities	.233	.003	.044	.116	.133	.124

Females portrayed in counter-stereotypical activities	-.241	-.373	-.395	.039	-.526*	-.498*
Percentage of male majority screen shots	.174	.255	-.073	.038	.192	.237
Percentage of females majority screen shots	-.321	-.326	-.111	-.025	-.398	-.436*
Percentage of equal representation in screen shots	.134	-.099	.389	-.030	.115	.066
Percent wh-questions overall	-.050	.403	.375	.018	.320	.231
Percent yes/no questions overall	.053	-.402	-.378	-.025	-.324	-.234
Percent questions asked by males	.128	.124	.018	.159	.240	.233
Percent questions asked by females	-.187	-.193	-.055	.005	-.211	-.223
Percent questions directed towards males	.234	-.070	-.138	.352	.216	.241
Percent questions directed towards females	-.044	-.169	-.075	.073	-.186	-.200

*p < .05

Table 9: Descriptive Statistics for POAT

Scale	Group of participants	Possible range	Actual range	Mean (SD)
POAT-PM Total	Boys & Girls	-24 to 24	-11 to 22	7.53 (6.05)
POAT-PM Total	Boys only	-24 to 24	-1 to 20	8.80 (5.23)
POAT-PM Total	Girls only	-24 to 24	-11 to 22	6.34 (6.55)
POAT-PM-Occupation	Boys & Girls	-12 to 12	-5 to 11	2.65 (3.20)
POAT-PM-Occupation	Boys only	-12 to 12	-4 to 11	2.57 (5.23)
POAT-PM-Occupation	Girls only	-12 to 12	-5 to 10	2.72 (6.55)
POAT-PM-Activity	Boys & Girls	-12 to 12	-8 to 12	4.89 (3.96)
POAT-PM-Activity	Boys only	-12 to 12	0 to 12	6.23 (3.19)
POAT-PM-Activity	Girls only	-12 to 12	-8 to 12	3.63 (4.20)
POAT-AM Total	Boys & Girls	-24 to 24	-7 to 21	8.74 (5.63)
POAT-AM Total	Boys only	-24 to 24	-3 to 21	8.39 (4.76)
POAT-AM Total	Girls only	-24 to 24	-7 to 20	9.07 (6.36)
POAT-AM-Occupation	Boys & Girls	-12 to 12	-5 to 10	3.72 (3.24)
POAT-AM-Occupation	Boys only	-12 to 12	-3 to 9	3.09 (2.99)
POAT-AM-Occupation	Girls only	-12 to 12	-5 to 10	4.31 (3.39)
POAT-AM-Activity	Boys & Girls	-12 to 12	-2 to 12	4.91 (3.26)
POAT-AM-Activity	Boys only	-12 to 12	-1 to 12	5.25 (2.61)
POAT-AM-Activity	Girls only	-12 to 12	-2 to 11	4.60 (3.75)

Table 10: Correlations between POAT scores for boys and girls together

	POAT-PM Total	**POAT-AM Total**	**POAT-PM-Occupations**	**POAT-PM-Activities**	**POAT-AM-Occupations**
POAT-AM Total	.483***				
POAT-PM-Occupations	.775***	.382***			
POAT-PM-Activities	.876***	.411***	.393***		
POAT-AM-Occupations	.348***	.857***	.358***	.223*	
POAT-PM-Activities	.466***	.853***	.279**	.479***	.479***

*$p < .05$ ** $p < .01$ *** $p < .001$

Table 11: Correlations between POAT scores for boys

	POAT-PM Total	**POAT-AM Total**	**POAT-PM-Occupations**	**POAT-PM-Activities**	**POAT-AM-Occupations**
POAT-AM Total	.425**				
POAT-PM-Occupations	.819***	.485***			
POAT-PM-Activities	.854***	.253	.424**		
POAT-AM-Occupations	.320*	.861***	.408**	.114	
POAT-PM-Activities	.358**	.760***	.323*	.348**	.355**

*$p < .05$ ** $p < .01$ *** $p < .001$

Table 12: Correlations between POAT scores for girls

	POAT-PM Total	**POAT-AM Total**	**POAT-PM-Occupations**	**POAT-PM-Activities**	**POAT-AM-Occupations**
POAT-AM Total	.555**				
POAT-PM-Occupations	.795***	.333**			
POAT-PM-Activities	.878***	.556***	.432***		
POAT-AM-Occupations	.480***	.864***	.355**	.434***	
POAT-PM-Activities	.474***	.909***	.239 (*n.s.*)	.510***	.585***

*$p < .05$ ** $p < .01$ *** $p < .001$

Table 13: Mean scores for POAT based on which sticker chosen

Measure	Mean for children who chose stereotyped sticker	Mean for children who chose counter-stereotyped sticker
POAT-PM total	8.3750*	5.9302*
POAT-AM total	9.6216*	7.1905*
POAT-PM-Occupation	2.9125	2.1628
POAT-PM-Activities	5.4625*	3.7674*
POAT-AM-Occupation	4.1081	3.0698
POAT-AM-Activities	5.3766*	4.0476*

*indicates a significant difference

Table 14: Mean scores for Outcome Measures by experimental group

Measure	Mean score (SD) for children who watched stereotype video	Mean score (SD) for children who watched counter-stereotype video	Mean score (SD) for children who watched control video
POAT: Boys and Girls Together			
POAT total	12.694 (9.913)	19.282 (10.052)	17.098 (8.977)
POAT-PM total	5.781 (5.850)	8.927 (5.781)	7.881 (6.224)
POAT-AM total	6.528 (5.838)	10.257 (5.403)	9.244 (5.166)
POAT-PM-Occupation	1.781 (2.971)	3.537 (3.195)	2.619 (3.261)
POAT-PM-Activities	4.000 (3.762)	5.390 (3.680)	5.262 (4.328)
POAT-AM- Occupation	2.757 (3.278)	4.615 (3.329)	3.738 (2.964)
POAT-AM-Activities	3.564 (3.110)	5.641 (3.166)	5.488 (3.163)
POAT: Girls Only			
POAT total	9.263 (10.487)	20.800 (11.237)	15.762 (9.481)
POAT-PM total	3.858 (5.351)	8.714 (6.642)	6.455 (6.899)
POAT-AM total	5.737 (6.959)	11.850 (5.631)	9.429 (5.221)
POAT-PM-Occupation	1.524 (2.839)	3.762 (3.520)	2.864 (3.536)
POAT-PM-Activities	2.333 (3.411)	4.952 (4.213)	3.591 (4.646)
POAT-AM- Occupation	2.632 (3.531)	6.050 (2.819)	4.182 (3.080)
POAT-AM-Activities	2.857 (3.692)	5.800 (3.764)	5.191 (3.296)
Essentialism: Boys and Girls Together			
Explanation Total	1.122 (2.100)	.342 (.990)	.333 (1.028)

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