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US preschoolers’ trust of and learning from media characters

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ABSTRACT
The current study examined the relations between children’s perceptions of character social realism, identification with characters, trust of characters as knowledgeable informants, and learning from media characters. Thirty-six 3½- to 6-year-old children watched a short clip of an animated educational television program about a preschool-aged boy who enjoys learning about science. Participants provided ratings of the character’s social realism, their identification with the character, and their trust in the character as a knowledgeable informant. Participants were asked to solve problems based on information in the video clip. Findings revealed character trust was the strongest indicator of learning from the character. Results are discussed in the context of the different factors that influence learning from curriculum-based media for young children.

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Introduction

Television viewing remains the most prominent form of media exposure for young children, despite the growing use of multiple forms of screen technology by children (Common Sense Media, 2013). Around 58% of children younger than 8 years still watch television daily, compared to 14% of children who use computers or 6% who play video games daily (Common Sense Media, 2013). Furthermore, televisions, DVD players, and VCRs are nearly universal in homes regardless of socioeconomic status or ethnicity (Gutnick, Robb, Takeuchi, & Kotler, 2010). Given how screens and the characters on them are nearly ubiquitous in American children’s lives (Vandewater et al., 2005), and with 76% of 2- to 4-year-olds watching educational television daily (Common Sense Media, 2013), educationally focused mass media provide an informal context for learning during early childhood. Research about learning from curriculum-based screen media during early childhood has focused on cognitive aspects of media, such as the importance of program comprehensibility, formal production features, interaction, and repetition for children’s attention to, and comprehension of, screen content (Calvert, Huston, Watkins, & Wright, 1982; Calvert, Strong, Jacobs, & Conger, 2007; Crawley, Anderson, Wilder, Williams, & Santomero, 1999; Huston, Bickham, Lee, & Wright, 2007). Educational television programs can enhance children’s learning (Fisch, Kirkorian, & Anderson, 2005), and historical theories of learning from media have focused on the
importance of observational learning and identification with onscreen characters or learning models (Bandura, 1997). This past research has demonstrated preschool children learn intended lessons and concepts from age-appropriate curriculum-based television, and the purpose of the current study is to examine how certain social cognitive perceptions of media characters may differentially impact learning (Anderson, Huston, Schmitt, Linebarger, & Wright, 2001; Anderson, Lorch, Field, & Sanders, 1981; Fisch, 2004; Kirkorian, Wartella, & Anderson, 2008; Rice, Huston, Truglio, & Wright, 1990).

Newer literature has proposed how children's perceptions of characters may influence their identification with, and learning from, mass media characters during early childhood (Bond & Calvert, 2014; Calvert et al., 2007; Lauricella, Gola, & Calvert, 2011; Richert, Robb, & Smith, 2011). A variety of social cognitive factors have been hypothesized to support children's learning from television. The current study focused specifically on hypothesized relations between learning and children's perceptions of characters' social realism (Hawkins, 1977; Richert, Shawber, Hoffman, & Taylor, 2009; Richert & Smith, 2011), children's social and emotional identification with characters (Calvert et al., 2007), and children's trust in characters as knowledgeable informants (Corriveau & Harris, 2009; Corriveau, Pickard, & Harris, 2011; Koenig & Harris, 2005; Woolley & Ghossainy, 2013). Although there is a growing body of literature hypothesizing relations between social cognitive perceptions of mass media characters and learning from those characters, there is little empirical research to support these hypothetical relations (Bond & Calvert, 2014; Calvert et al., 2007; Corriveau & Harris, 2009; Corriveau et al., 2011; Hawkins, 1977; Koenig & Harris, 2005; Lauricella et al., 2011; Richert & Smith, 2011; Richert et al., 2009, 2011; Woolley & Ghossainy, 2013). The current correlational study fills this gap in the literature by examining three previously untested hypotheses about the relations between children's social cognitive character perceptions and their learning from television characters: the hypotheses are that children will be more likely to learn from a character that children (a) view as having higher social realism, (b) have a stronger identification with, and (c) believe provides trustworthy information about the relevant domain.

**Social realism**

Social realism refers to the extent to which viewers believe a character is real or similar to people in the real world (Bond & Calvert, 2014; Busselle & Greenberg, 2000; Wright, Huston, Reitz, & Piemyat, 1994). In the current study, assessment of social realism focused on children's judgments of an animated character that does not engage in activities that violate realistic principles, and how the character and his actions are similar to those in the real world (Busselle & Greenberg, 2000). The hypothesized relation between social realism and learning from screen media was derived from evidence suggesting preschool-aged children selectively learn from realistic stories rather than fantasy stories. In a between-subjects study, preschool-aged children were introduced to either fantastical or realistic storybooks in which characters solved a problem (Richert & Smith, 2011). Children who heard the realistic stories were significantly more likely to transfer story problem solutions to real-world problems than children who heard the fantastical stories. In contrast, children in the fantastical condition did not significantly as often apply information from the fantastical story when presented with a realistic transfer problem (Richert & Smith, 2011).

Early research examining children's perceptions of social realism of television characters and television events found preschool-aged children were more likely than elementary or
middle school children to believe the television screen displayed socially real content (Hawkins, 1977). Specifically, Hawkins (1977) argued preschool-aged children tended to believe television was a magic window, displaying real people engaging in real events as they unfolded that may have relevance to the real world. These findings are consistent with traditional Piagetian conceptualizations of cognitive development suggesting children have difficulty distinguishing between fantasy and reality until early adolescence (Piaget, 1929), however more recent research has found preschool-aged children are adept at discriminating fantastical characters as distinct from real people (Morison & Gardner, 1978; Skolnick & Bloom, 2006), impossible from possible events (Shtulman & Carey, 2007), pretend from real actions (Flavell, Flavell, & Green, 1987), and imagination from reality (Woolley & Wellman, 1993). Woolley and Ghossainy (2013) have argued young children are naïve skeptics, and are far less likely to identify fantastical figures as real than is often portrayed in child development literature and in the public arena. Based on findings that preschoolers can distinguish between fantasy and reality along some dimensions, vary in their views of the reality status of television characters, and are more likely to transfer analogical problem solutions from realistic characters, we hypothesize that if children perceive a character as less socially real (i.e., more fantastical), they may be less likely to apply information provided by that character to solve a problem in the real world.

Identification

Identification, particularly within the context of theories of vicarious learning, refers to one's perception of similarity to an entity (Bandura, 1997). Identification plays a prominent role in theories of vicarious learning; in the process of learning through observation of a person modeling a particular action and being rewarded or punished for the outcome, one notices similarities between the model (or the context the model is in) and oneself (or one's own context; Bandura, 1997). Although theorized to relate to children's learning from media characters, minimal empirical research has tested the relations of identification and learning from media.

In one study of the role of identification in children's learning, Calvert et al. (2007) examined the relations of comprehension of an episode of Dora the Explorer, children's identification with Dora, and children's divergent processes (i.e., transfer of episode content into different context). Comprehension was unrelated to identification with Dora and divergent processes. However, identification with Dora was significantly related to children's divergent processes, or how many unique ways children thought of uses for Dora's sticky tape outside of the episode context (Calvert et al., 2007). That is, children with greater identification with Dora were more likely to transfer content from the episode into a new context. This pattern of findings suggests the need for research to address the role of identification for learning specific content, and is consistent with the role identification plays in theories of vicarious learning (Bandura, 1997).

Another way researchers have conceptualized identification with characters has been within the framework of parasocial relationships, or the nature of children's emotional relationships with characters (Calvert et al., 2007; Giles, 2002). In parasocial relationships, viewers treat characters as if they share a normative social relationship, expressing empathy for example, even though there is no emotional contingency from the characters (Giles, 2002; Richert et al., 2011). Identification with characters, as part of the construct of and process of
developing parasocial relationships, has previously been hypothesized to predict learning from characters, as children with greater identification with characters may pay greater attention to those characters, and may be more likely to learn from them (Calvert et al., 2007; Richert et al., 2011). In sum, although researchers have speculated identification with characters is related to learning from characters, there is minimal (if any) empirical support for this hypothesis. Therefore, we sought to find support for the hypothesis that children will be more likely to learn from a character if they have greater identification with the character.

**Character trust**

Character trust refers to judgments of whether a character is a knowledgeable source of information. Children are sensitive to characteristics and past reliability of informants (Corriveau & Harris, 2009; Corriveau et al., 2011; Koenig & Harris, 2005). When given the option, preschool-aged children overwhelmingly choose reliable informants over informants who have previously made errors to learn specific words, morphological versions of words, and new information (Corriveau et al., 2011; Koenig & Harris, 2005). When children have little information about the past reliability of informants, children as young as 3 recognize informants have distinct expertise and knowledge on specific topics; for example, 3-year-olds are more likely to associate a broken car with a mechanic than a doctor (Lutz & Keil, 2002).

Although children tend to trust adult over peer informants, in certain situations children prefer peer to adult informants, especially when considering juvenile domains (e.g., knowledge about toys) or in a laboratory setting when child informants display more reliability than adult informants (Mills, 2013; VanderBorght & Jaswal, 2009). However, even if children do claim a child as an expert in a specific domain, children are unlikely to trust the child informant as knowledgeable in other domains (Koenig & Jaswal, 2011; Mills, 2013). Minimal research has assessed children’s view of televised people or events as sources of information, however, Hawkins (1977) found evidence children ages 4–5 were less likely than children ages 6–9 to believe the people or events on television were useful to their lives, therefore may be less knowledgeable sources of information. Based on this body of research, the current study hypothesized children will be more likely to learn from characters when they have greater trust in that character as a source of information.

**Transfer and learning from media**

In studies of children’s learning from educational media, learning has been operationalized as either comprehension of the relevant educational content or transfer to another context. Comprehension evaluates basic understandings of the educational content; in contrast, transfer evaluates children’s more complex developing abilities to apply information from one context to another. To successfully learn, children must attend to and remember content from the television program. An example of the distinction between comprehension and transfer as measures of learning is Crawley et al.’s (1999) study of children’s learning from Blue’s Clues. Blue’s Clues is a curriculum-based television show in which a live-action, adult host asks the audience to look for clues left by his animated puppy, Blue, to solve a problem. To gauge children’s comprehension of the educational content in the episode, children were asked to name the clues left by Blue, and to infer the solution to Blue’s problem (Crawley et al., 1999). Crawley et al. (1999) found a main effect of age; older children had higher comprehension scores. In the current study, comprehension is measured by asking children to recall events from a target video.
Distinct from measures of comprehension, Crawley et al. (1999) also used a measure of “far transfer” of relevant educational content from one context to another to evaluate learning. Children were asked to identify colors and shapes in objects similar to, but distinct from those used in the show, and again found a main effect of age; older children had greater far transfer scores (Crawley et al., 1999). Transfer is measured in the current study through the analogical problem-solving method; analogical problem-solving involves transferring a solution from a problem in one context to a new problem in a different context (Goswami, 2001; Holyoak, Junn, & Billman, 1984; Richert & Smith, 2011). To appropriately solve analogical transfer problems, children must (a) recall the elements of the source context, (b) notice analogical similarities between the source and target context, and (c) successfully apply the solution from the source to the target context. Because children must engage in three cognitive processes to successfully solve analogical transfer problems, there is variability in success rates throughout development (Richert & Smith, 2011). Previous research on children's abilities to learn and transfer problem-solving strategies has indicated transfer between a source context and a testing context is most likely for preschool children when there is a simple story structure (Goswami, 2001; Holyoak et al., 1984), familiarity with the characters in the source context (Goswami, 2001; Holyoak et al., 1984; Richert et al., 2009), a story-style format (Singer-Freeman, 2005; Tunteler & Resing, 2002), and a character that is meaningful to young children (Lauricella et al., 2011). Each of these factors are traditionally features of curriculum-based television programs for children; although research on children's learning from storybooks has validated learning outcomes through the analogical problem-solving methodology (Richert & Smith, 2011), to our knowledge no research on learning from television has used this method to evaluate learning. For the current study, children watched a 90-s video clip selected from a storybook-style television program in which a familiar character solves a physical problem; the video clip contained little distraction or information irrelevant to the problem-solving situation. Children's learning was evaluated by their successful application of the problem solution demonstrated in an educational television clip to an analogically similar real-life problem.

In summary, the current study examined three hypothesized social cognitive factors will relate to children's learning of educational content from an onscreen character: social realism, identification, and trust. These social cognitive factors have been examined independently in prior research, however, little research has examined how these factors relate to each other and relate to learning (Calvert et al., 2007). According to communication and social cognitive theories, these social cognitive variables should support children's learning from media (Bond & Calvert, 2014; Calvert et al., 2007; Corriveau & Harris, 2009; Corriveau et al., 2011; Giles, 2002; Hawkins, 1977; Koenig & Harris, 2005; Lutz & Keil, 2002; Richert et al., 2011), however, most of the empirical work on children's learning from television has focused on cognitive factors to enhance children's learning (Anderson et al., 1981, 2001; Fisch, 2004; Kirkorian et al., 2008; Rice et al., 1990). Therefore, the current study tested the relations of these theory-based social cognitive constructs to learning from media.

**Study**

In the current study, we examined whether children's learning of a problem-solving strategy from an onscreen character was supported by three social cognitive processes related to
children's perceptions of that character. Although many studies of children's learning from screen media involve the use of a full program or episode, this study was designed based on past studies of children's transfer of analogical solutions. In those past studies, analogical transfer was tested after children's exposure to short vignettes (e.g., Goswami, 2001; Holyoak et al., 1984). Within this methodological framework, the goal of the current study was to evaluate learning based on a short exposure to a specific problem. We chose a 90-s clip from an existing show that followed the pace of the show and encompassed a demonstration of a problem and its solution in its entirety. Because we used a short clip from a pre-existing show, we did not expect that children's perceptions of the character would be manipulated in such a short exposure. As such, children had to be familiar with the character in order to participate in this study, and we infer children's perceptions of the character reflect their views of the character built in their prior viewing.

The first hypothesis was that children would be more likely to transfer from a television program to a real-world problem if they believed the character was more socially real. The second hypothesis was that children with greater identification with the character would be more likely to learn from the character. The third hypothesis was that children would be more likely to learn how to solve a novel problem from a character the more they believed he is knowledgeable about solving the problem.

These character perceptions are likely related to each other; research has proposed children's identification with characters may be related to their perceptions of the characters' social realism (Bond & Calvert, 2014; Rosaen & Dibble, 2008). One study focusing on parents found parents' evaluations of their children's perceptions of character social realism predicted parent perceptions of their children's social and emotional relationships with characters (Bond & Calvert, 2014). Another study focusing on older children found children developed stronger social and emotional relationships with more realistic characters (Rosaen & Dibble, 2008), and children have greater wishful identification with intelligent characters (Hoffner, 1996), similar to conceptualizations of character trust, or trust an informant can provide knowledgeable information. Thus, the current study examined the relations between these perceptions as well as the contribution of each perception to children's learning of a problem solution from a specific character.

Method

Participants
Participants were 37 children ages 3 years, 9 months to 6 years, 9 months ($M = 5.54$, $SD = 0.91$). Just under half of the participants were female (44.5%). The majority (44.4%) identified as Caucasian, 33.3% identified as mixed race or other, 8.3% as Latino/Hispanic, 8.3% identified as African-American/Black, 2.8% identified as Asian American, and 2.8% declined to answer. Families were from Southern California, and were recruited through a laboratory database, community flyers, and community events to visit the lab for one hour-long session. To participate, parents and children did not have to be native English speakers, but English had to be the primary language spoken in the home. One participant was dropped due to experimenter error; the final sample included 36 children. Children received a small toy for their time, and parents received $20 compensation for travel costs.
**Materials**

**Video stimulus**
Each participant watched a 90-s clip of an episode of a popular curriculum-based television program that focused on teaching scientific concepts and skills, targeted at 3- to 6-year-old children. In the episode, a 4-year-old animated male protagonist created a new tool for cleaning up toys, akin to a lever. In the clip, the character verbally and visually explained how he created a lever by laying a shovel on top of a block, placing a toy on one side of the shovel, and stepping on the other side, making the toy fly through the air into a toy box.

**Measures**
Measures for this study included character exposure, social realism, identification, character trust, comprehension, and transfer.

**Character exposure.** All children were asked if they had ever seen the target character before; “yes” responses were scored as 1, and “no” or other responses were scored as 0.

**Social realism.** Social realism measured how much the participant believed the target character was real and if s/he could interact with the character in the real world (Bond & Calvert, 2014; Wright et al., 1994). Children's beliefs were assessed through a measure of social realism derived from realism perception questions asked by Hawkins (1977). Children were asked about two implicit traits (i.e., whether the child could run into the character at the store; whether the child could play tag with the character), and one explicit trait (i.e., whether the character was real or pretend). Children's “yes” or “real” responses were scored as 1, and “no” or “pretend” responses were scored as 0. The responses to all three questions were summed to create a social realism score. These scores ranged from 0 to 3, with higher scores indicating the child believed the character was more socially real.

**Identification.** The three questions that assessed children's identification with the video character were derived from Calvert et al.'s (2007) study. Children were asked (a) how much they like, (b) how much they are like, and (c) how much they want to be like the character. This measure of identification evaluated children's already existing identification with the character prior to visiting the laboratory. The researcher verbally offered children three response options for each question: not at all (0), a little (1), and a lot (2). Responses to these three questions were averaged to create continuous composite scores ranging from 0 (no identification) to 2 (strong identification) (Cronbach's $\alpha = .84$).

**Character trust.** Based on the body of research examining children's selective trust of informants (e.g., Corriveau & Harris, 2009; Corriveau et al., 2011), character trust was measured by asking children to respond to three questions: (a) who they would ask to make a novel object work; (b) who they would ask about what a novel object was called; and (c) who they would ask to find out about how to make a toy fly through the air. For the novel object, children were presented with an image of a combination school bus-submarine; this image was unrelated to the character or the content in the video clip. The third question asked about the events in the video clip, although there was no specific reference to the clip in the question. For each question, children were presented with three character options: the
character from the clip, another popular/familiar animated male child character, and a novel animated male character. Children indicated who among these characters they would ask first for an answer to the question, and who they would ask second if the first choice character did not know how to answer the question. Responses to each question were coded for whether children chose the character from the clip first (1). The instances in which children chose the character from the clip first were summed to create the character trust score, which ranged from 0 to 3, with higher scores indicating the child perceived the character as more trustworthy.

**Learning.** Children’s learning from the video was measured in two variables, comprehension and transfer, which were validated in a pilot study (described below). For comprehension, children were asked to describe what happened in the clip. If children did not spontaneously describe the character’s construction of a lever, then children were explicitly asked how the character got a toy to fly into the toy box. Children’s comprehension responses were coded dichotomously for whether they correctly (1) or incorrectly (0) described the lever construction.

The measure of children’s solution transfer was derived from prior research on children’s analogical transfer (e.g., Brown & Kane, 1988; Richert & Smith, 2011). Children’s transfer was measured through solving a real-world problem that was analogically similar to the problem-solving task in the video clip. Children were presented with three items: a ball, a spoon, and a pen. Children were asked to use the pen and the spoon together to make the ball fly through the air. Children successfully transferred the lever solution when they used the pen as a fulcrum for the spoon, placed the ball on the bulb end of the spoon, and tapped the handle end of the spoon to make the ball fly through the air. If children did not produce this solution immediately, they were prompted to “think of another way to make the ball fly through the air.”

If after a second attempt, children still did not correctly produce the lever solution, children were provided a hint, asked to think back to the video and to think about whether anything from that video gives them another idea. The hint was presumed to increase the saliency of the relation of the source clip and the target problem for those who did not make that connection of their own, capturing which children did and did not notice the analogical similarities of between the source and target on their own (Brown & Kane, 1988). When considering the analogical transfer paradigm, children who produced the lever solution immediately or after a prompt were similar groups as they both successfully solved the problem without any hinting from the researchers explicitly to think about the video, and they were therefore grouped for analyses (Brown & Kane, 1988; Goswami, 2001; Holyoak et al., 1984). Transfer was coded on a three-point scale; 2 if the child produced the lever solution immediately or with a prompt to keep trying, 1 if the child produced the lever solution after a hint to consider what the character did in the video, and 0 if the child never produced the lever solution.

A small group of pilot participants, consisting of 14 children ages 3 years, 7 months to 4 years, 11 months ($M = 4.22, SD = .45$) were asked to solve the transfer task without exposure to the video stimuli. Nine pilot participants were male (64.3%), 21.4% identified as White non-Hispanic, 28.6% identified as Latino or Hispanic, 7.1% identified as Asian American, 7.1% identified as American Indian/Alaska Native, and 35.7% declined to answer. Pilot participants engaged in the problem-solving task in schools, and parents and children provided consent.
and assent, respectively, as part of a larger study. In the pilot group, 14.3% of children correctly solved the problem on the first try, 28.6% of children correctly solved the problem in three or fewer tries, and 71.4% of never produced a correct solution. The fact that very few children solved the problem on their own suggests children's production of the problem solution in the current study reflects learning the solution from the character (see Richert & Smith, 2011).

Procedure
Families visited an on-campus laboratory for a one-hour session. Children spent the majority of the session in the data collection room with the researcher, and parents sat in an adjacent hallway in which they could watch the interview while completing a survey on media exposure and preschool children’s behavior as part of a larger study. After completing the assent process, participants watched the short video clip. After viewing the clip, children's social realism judgments, identification, and character trust judgments were evaluated; these questions also served as distractor tasks between viewing the video clip and the analogical transfer task. Once children completed the character perception questions, children’s comprehension was tested and then children were asked to solve the transfer problem.

Results
Analysis overview
We examined how the three different social cognitive character perceptions related to learning: social realism, identification, and character trust. Each variable was examined separately using Independent Samples t-tests for comprehension as the independent variable and Univariate Analysis of Covariance (ANCOVA) for solution transfer as the independent variable.

Preliminary analyses
All variables were examined for gender differences and relations with age. All children indicated they were familiar with the character, and therefore character exposure was excluded in further analyses. Independent Samples t-tests revealed no significant differences in social realism, identification, or character trust by gender. Chi-square tests indicated no difference in the pattern of responding on the comprehension and transfer scores by gender; therefore, gender was excluded from further analysis. There was a significant negative correlation between age and character identification, $r = -0.34, p < 0.05$ (see Table 1 for correlations). As
children's age increased, they had lower identification with the character. There were no other significant relations of age and character perceptions.

**Learning: overall comprehension and transfer**

Analyses of learning first examined children's comprehension of the problem solution demonstrated in the video; 72.2% of children correctly described the construction of a lever. We then examined children's transfer of the lever-building solution the character demonstrated in the video to a novel problem; 41.7% of children produced the solution without needing a hint, 13.9% of children produced the solution after a hint to think about the video, and 44.4% of the children never produced the solution. A One-Way Analysis of Variance (ANOVA) revealed children's age significantly differed across the transfer groups, $F(2,33) = 4.23, p < .05$. Bonferroni post hoc tests indicated children who never solved the problem ($M = 5.09, SD = .91$) were significantly younger than children who solve the problem without a hint ($M = 5.91, SD = .68$). Therefore, age was included as a covariate in all transfer analyses.

**Social realism**

Children did not strongly believe the character was socially real and did not really believe they could play tag with him or see him at the store (see Table 1 for means and standard deviations; $M = 1.08, SD = 1.20$). Independent-Samples t-tests were used to examine the first hypothesis that children who comprehended the solution from the video would be more likely to perceive the character as more socially real than children who did not comprehend the solution from the video. Findings revealed no significant differences in perceptions of social realism for children who correctly or incorrectly described the construction of the lever. A Univariate ANCOVA examined children's perceptions of character social realism as grouped by whether they produced the solution before or after the hint, or not at all, with
age as a covariate, and revealed no significant differences by transfer group. Overall, children’s perceptions of character social realism did not significantly relate to learning.

**Identification**

Generally, children had moderate identification with the character (see Table 1; $M = 1.18$, $SD = .75$). Independent-Samples $t$-tests were used to examine the second hypothesis that children who comprehended the solution from the video would be more likely to identify highly with the character than those who did not comprehend the solution from the video. Findings revealed no significant differences in identification for children who correctly or incorrectly described the construction of the lever. A univariate ANCOVA examined children’s identification with the character as grouped by whether children produced the solution before or after the hint, or not at all, with age as a covariate, and revealed no significant differences by group. Children’s identification with the character was not significantly related to learning.

**Character trust**

Children had moderate trust of the character as a reliable informant (see Table 1; $M = 1.46$, $SD = .92$). Independent-Samples $t$-tests were used to examine the third hypothesis that children who comprehended the solution from the video would have higher character trust than those who did not comprehend the solution from the video, revealing significant differences in children’s character trust scores, $t(31) = 2.25$, $p < .05$, Cohen’s $d = .87$. Children who correctly answered the comprehension question ($M = 1.58$, $SD = .95$) had significantly higher character trust scores than children who incorrectly answered the comprehension question ($M = .86$, $SD = .69$; see Figure 1).

A Univariate ANCOVA examining children’s character trust as the dependent variable, whether children produced the solution before or after the hint, or not at all as the
between-subjects variable, and age as a covariate, revealed a main effect of transfer group, $F(2,32) = 3.43, p < .05$, partial $\eta^2 = .18$, on trust. Bonferroni post hoc tests indicated this effect was driven by significant differences between the children who correctly produced the solution after a hint and children in the other two groups. Figure 2 depicts that children who produced the solution after a hint ($M = 2.50, SD = 1.00$) had significantly higher character trust scores than children who either did not produce the solution at all ($M = 1.31, SD = .79$) or who produced the solution without needing a hint ($M = 1.27, SD = .88$).

**Relations of character perceptions**

Bivariate correlations examined the relations of children's character perceptions (see Table 1). One significant correlation revealed children's perceptions of social realism were significantly positively correlated with character identification, $r = .40, p < .05$. In other words, children were more likely to identify with the character when they believed he was higher on social realism, and could exist outside the television world. However, character trust was not significantly correlated with social realism or identification.

**Discussion**

The current study examined how children's pre-existing character perceptions related to learning, by examining how children's social realism, identification, and character trust judgments differed by their comprehension and transfer of a problem solution demonstrated by a popular animated character. Preschool-aged children watched a short video clip of an animated child from a curriculum-based television series solve a problem. After children watched the clip, they were interviewed for whether they thought the character was socially real, how much they identified with the character, and how trustworthy they thought the character was. Additionally, children were tested for their comprehension of how the character solved the problem and for whether they could transfer the problem solution to a new problem. Although children who indicated greater certainty that the character was real were more likely to identify with that character, the only aspect of character perceptions that was related to comprehension and transfer was whether children indicated they trusted the character as a source of information. In particular, children who comprehended the solution to the video problem had greater trust in the character; and children who solved the target problem after being prompted to think about the character were more likely to have higher character trust. These patterns of findings are discussed in relation to their implications for the different aspects of character perceptions.

**Character trust**

The findings in the current study indicated children's trust of the character as a knowledgeable informant was related to children's comprehension of the way the character solved a problem and whether children transferred that problem solution to an analogously-similar problem. These findings build on past research indicating children selectively believe the information provided by knowledgeable rather than novice informants (see Woolley & Ghossainy, 2013 for review) and suggest trust plays an important role in how children encode information from televised sources. Children who had greater trust in the character as a
source of novel information were also more likely to comprehend how the character constructed the lever (e.g., content from the video).

In addition to increases in comprehension, the relation of trust to children's transfer of the problem solution revealed an intriguing pattern. Some children solved the problem immediately, and this better developed ability to transfer the solution from the video clip did not seem to be related to character trust. The fact that some children solved the problem without a hint indicates individual differences in the importance of character features for children's transfer of learning. Some children may be likely to learn simple lessons from characters and other learning models without evaluating their trust in those characters or other models as knowledgeable informants. However, the relation between trust and transfer after a hint reinforces the findings about the relation between character trust and comprehension.

Specifically, children who had greater trust in the character were more likely to transfer information from the video to a novel problem particularly after being given a hint to think about what the character did in the video. In concert with the findings on comprehension and character trust, one possible explanation is that trust influenced children's encoding of the character's solution. Children who had higher trust of the character may have encoded the video solution in such a way that they could only transfer the solution to another problem when they were explicitly reminded about the character, triggering their recall of the character engaging in the video solution. This encoding was likely different from children who were unable to ever solve the problem, and who's comprehension and encoding of the problem solution was not supported by a perception of the character as trustworthy.

These findings should be considered in the context of two limitations. First, the transfer groups were uneven in size and emerged organically from children's actions rather than through experimental control or manipulation. A second limitation is that the measure of character trust, although derived from previous research on children's selective trust (Corriveau & Harris, 2009; Corriveau et al., 2011; Hawkins, 1977) did not allow for a thorough examination of the construct of trust. The findings indicate that a global sense that the character is a trustworthy source of information was related to children's learning and transfer. However, this measure was not sensitive enough to delineate what constitutes a “trustworthy” character for preschool-aged children, especially in a curriculum-based media context.

Future research should examine the construct of character trust in more detail, and differentiate character trust from trust of a reliable real-life human informant, such as a teacher, peer, or parent. Building upon previous selective trust research (see Mills, 2013 for review), the factors contributing to children's trust in a character likely rely upon variability in previous exposure to characters, such as whether the characters always (a) provide reliable compared with unreliable information, (b) display expertise in particular domains or global expertise, and (c) succeed in attempts to solve problems. With much selective trust research, informants or characters are static, one-dimensional, and display consistent attributes (e.g., knowing how to correctly label objects) over a series of trials for experimental control reasons, out-of-the-lab learning informants (and media characters) are dynamic and display success and failure in different situations. The pattern of findings in the current study suggests that when children are focused on the character and actively evaluating the character, their view on how trustworthy the character is matters for learning. Thus, future research should examine
how variety in television characters’ reliability, expertise, and success contributes to children’s trust of the character.

**Social realism**

In addition to character trust, we explored whether children judged a character from a fairly realistic, but animated, television program as more or less socially real. This exploratory hypothesis stemmed from Hawkins (1977) finding that preschool-aged children were likely to believe television is a magic window that displays reality and Piagetian theory (1929) arguing children have difficulty distinguishing between fantasy and reality, as well as contrasting work finding children are good at discriminating between real and pretend (Flavell et al., 1987; Morison & Gardner, 1978; Shtulman & Carey, 2007; Skolnick & Bloom, 2006; Woolley & Wellman, 1993). In the current study, participants generally judged the character as less socially real, meaning these findings did not replicate Hawkins (1977), but do support more recent research indicating children identify real people as distinct from fantastical characters (Morison & Gardner, 1978; Skolnick & Bloom, 2006) and imagination from reality (Woolley & Wellman, 1993).

Although children did not view the character as socially real overall, there was some variation in children’s belief that the animated character was real. Thus, we examined whether variations in social realism judgments were related to children’s comprehension or transfer of learning. Based on past research, we expected that children who did not believe the character was real would be less likely to transfer the solution from the character. This expectation was derived from a study finding that children who heard realistic stories were more likely to transfer the solution to a real-world problem (Richert & Smith, 2011), therefore we hypothesized children in the current study who perceived the character as high on social realism would be more likely to transfer the problem solution than children who perceived the character as low on social realism. This hypothesis was not supported, and there are several possibilities to explain this finding.

First, in the current study, we did not compare rates of transfer from a real boy to transfer from an animated boy. Therefore, it remains unclear whether children’s transfer would be even higher from a video clip if the character on screen was not animated. Although children are commonly exposed to animated programs, they may perceive the social realness, and possible applicability, of live-action and animated programs differently (Busselle & Greenberg, 2000). Future research should consider how children may apply information differently to real world situations when the programs are animated or live action.

Second, almost all children viewed the character as fantastical, but some children in this study did transfer from the character. These findings suggest that when presented with animated characters who engage in primarily realistic activities, social realness may not be a salient character feature that influences children’s encoding of relevant information (and thereby transfer of that information into a new context). The hypothesis that perceptions other than social realism judgments may aid children’s learning from media characters is supported by work finding preschool-aged children do learn intended content from educational media, even when such media is fantastical or animated (Anderson et al., 1981, 2001; Fisch, 2004; Kirkorian et al., 2008; Rice et al., 1990). The findings in our current study do not mean that perspectives of social realism never influence what children learn from television characters, and it is possible that social realism matters for some kinds of content.
and not others. However, when social realism is not a salient cue, our findings suggest that children use aspects of their perceptions of characters other than social realism (e.g., character trust) to guide their learning.

**Identification**

The findings on identification were similar to those for social realism. We examined if children's identification with the character was significantly related to learning, based on literature hypothesizing children who identify with characters may attend to characters more and therefore learn more from those characters (Calvert et al., 2007; Richert et al., 2011). Within theories of vicarious learning, identification refers to one's perception of similarity to an entity (Bandura, 1997). According to these theories, children should be more likely to imitate the behaviors of models with whom children identify. From this perspective, we hypothesized that children who identified more with the onscreen character would be more likely to display learning of the actions that character performed. In contrast to this hypothesis, there was no significant relation between identification with the character and either comprehension of the character's actions or transfer of learning from the character.

Although these findings are inconsistent with Calvert et al.'s (2007) findings regarding the relationship between identification and children's divergent thinking for one of the tasks that Dora faced in an episode, they reveal a number of potential issues related to the role of identification in children's learning from television. First, the children in this study did generally indicate being similar to and wanting to be like the character, and there were no differences in identification by gender. One possibility is that children may not learn if there was a character with whom children strongly did not identify. Additionally, although there was not a ceiling effect of identification (e.g., not all children had extremely strong identification with the character), it is possible that identification was not a salient feature contributing to learning in this short viewing.

One way to increase the saliency of identification may be through a longer viewing experience. For example, in Calvert et al.'s (2007) study, children watched an entire episode of Dora during which many children actively engaged in the viewing (e.g., by responding to prompts from Dora). These interactions could have highlighted children's sense of identification for Dora in a way that was not possible in the current study. Because we chose a shorter clip in this study for methodological reasons, our measure of children's identification with the familiar character reflects their sense of identification built through their previous exposure to this character's show. As such, we did not necessarily expect a sense of identification to develop over the course of the viewing. Thus, one possibility is that longer viewing episodes are required for children's identification with characters to become salient and therefore to influence encoding and transfer processes. Future research should consider whether increased viewing times (as well as variation in interactivity) increases children's identification with the characters and thereby learning.

Another difference between Calvert et al.'s (2007) study and the current study was in the gender of the characters. Calvert et al. (2007) found girls had higher identification with Dora than boys. In the current study, the character was a preschool-aged boy, and there were no gender differences in identification with the character. A male character was selected to avoid gender biases, as unpublished research has found boys and girls have similar mean identification with male characters, but overall children have significantly greater
identification with characters of the same gender than characters of opposite genders (Schlesinger & Richert, 2015). Therefore, selecting a female character or multiple characters varying in gender may have provided more variability in identification, and possibly learning. Thus, future research should also consider the extent to which children’s identification with characters that share the child’s demographic characteristics (e.g., same gender, same age, or same race) influence learning.

Future research should also consider whether emotional aspects of identification might make it an especially salient mechanism for social-emotional developmental processes. Identification has been discussed within the framework of children’s emotional relationships with characters, hypothesizing children who feel strong emotional connections to characters will be more likely to learn from those characters (Calvert et al., 2007; Richert et al., 2011). The current study did not measure the emotional nature of children’s identification with the character, which may be expected to relate more strongly to social-emotional developmental processes than to the learning and transfer measured in the current study. Despite the limitations related to the measurement of identification, as a whole, these findings suggest that although identification with characters may play a role in children’s general viewing experiences (Hoffner, 1996) and may be related to learning some content from television (Calvert et al., 2007), identification with characters may not consistently influence children’s learning of the kind of physical problem solution that were the focus of the current study. Identification may more likely impact children’s learning of social problem solving solutions or morals, future research on children’s social and moral learning should focus on identification with characters as a potential mechanism of learning.

Finally, although identification and social realism did not relate to learning, we found evidence that social realism and identification were related to each other. In the current study, children were more likely to identify with the character when they believed he was higher on social realism, supporting prior arguments that social realism may predict emotional relationships and identification with characters (Bond & Calvert, 2014; Rosaen & Dibble, 2008). Thus, although social realism and identification were not related directly to learning as measured in this study, we do not argue that they are irrelevant generally for understanding children’s engagement with and learning from television characters. However, what these findings do indicate is that in instances when social realism and identification do not relate to differences in children’s learning, children’s views on character trust are a salient indicator of whether or not children will learn from a character.

**Limitations**

Throughout this discussion, we have addressed some of the limitations to the study that influence our interpretation of the findings (e.g., the length of the viewing episode, the focus on one character). A couple of other limitations warrant discussion. One limitation concerns the dichotomous nature of the exposure variable. The exposure variable categorized children who did or did not recognize the character from the video clip; and because all children recognized the character, the exposure variable was not considered in analyses. Due to its dichotomous nature, the exposure variable did not capture differences between children with extensive or minimal exposure to the target character. This variable was created purposefully to be an ecologically valid measure of recognition only, as the goals of this study...
were to evaluate how children’s perceptions of the character, regardless of how those per-
ceptions were initially formed, contributes to learning from the character. Future research
should continue to examine how the social cognitive perceptions of characters develop, are
constructed, and relate to learning.

One other limitation is noteworthy, namely the relatively small sample size for this study.
Although the sample size was small, our sample incorporates diversity in gender and eth-
nicity. Additionally, power analyses indicated that our sample size was sufficient for the
detection of moderate effect sizes, and those are the effects that indeed emerged as signif-
ificant. However, the lack of significant correlations for social realism and identification with
trust and learning may have resulted from small effect sizes in a small sample. Despite the
small sample size, however, the effects that emerged significant are theoretically meaningful
and provide a foundation for future research into the role that children’s trust of characters
as a source of information plays in children’s reliance on those characters as sources of
information.

Conclusions

Previous research examining children’s learning from educational media has focused on
cognitive aspects of learning (Calvert et al., 1982, 2007; Huston et al., 2007; Schmidt,
Crawley-Davis, & Anderson, 2007); however, children’s character perceptions may also
contribute to children’s learning from media characters (Bond & Calvert, 2014; Calvert et al.,
2007; Hawkins, 1977; Lauricella et al., 2011; Richert & Smith, 2011; Richert et al., 2009, 2011).
The current study indicated that one social cognitive factor in particular, trust, is related
to children’s learning of problem-solving solutions from characters. The implications of
these findings for the producers of educational media are that it is important to provide
children with trustworthy characters and reliable informants in educational and edu-tain-
ment media contexts if the goal is to facilitate children’s learning. Trust may be primed
through reliability and displays of expertise (Corriveau & Harris, 2009; Corriveau et al., 2011;
Lutz & Keil, 2002), or could be increased through similarity (Bond & Calvert, 2014; Calvert
et al., 2007); however, additional research is needed to understand how perceptions of
trust for mass media characters are formed, and how those perceptions can be sustained
to impact learning.

Children’s quantitative exposure to and qualitative experiences with specific characters
vary dramatically, and may influence children’s trust in different characters. Educational
media producers have the challenging task of creating television shows with the goals of
reaching a wide audience of children who can learn from the programs even though their
experiences with the programs and characters differ. Therefore, future research should con-
tinue to examine the wide diversity in children’s perceptions of characters and the ways in
which these perceptions relate to learning different kinds of content from educational tel-
evision programs.

Note

1. Children who immediately solved the problem ($M = 1.21$, $SD = .89$) were not significantly
different from those who solved the problem after a prompt to keep trying ($M = 2.00$, $SD = 0.0$)
in their trust measurement $t(13) = 0.85, p = .41$, Cohen’s $d = −1.26$. 
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References


