

## ARTICLE

# Transformative tales: The role of story videos on children's reasoning about transgender identities

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**Abstract**

The current study explored whether positive contact through stories could influence how young children think about transgender identities and gender in general. A total of 174 children ages 5–6 and 9–10 were randomly assigned to one of three conditions: Jazz (participants watched a video regarding a transgender child named Jazz), Blue (participants watched a video regarding a marker that looked red on the outside but inside was really blue) and control (no video). Both videos described the main character as feeling different inside than outside, and their social transition to their preferred identity; researcher scaffolding supported the video messages. Children who viewed the Jazz video had: (a) greater understanding of transgender identities and (b) no overall differences in gender essentialism, but (c) lower gender essentialism on three specific measures (gender immutability, innate toy behaviours and innate preferences). Also, gender essentialism was lower in older versus younger children. In this study, a direct, realistic story was the only effective means of teaching children about transgender identities and reducing belief in gender immutability. Thus, stories can be a way to teach children about the social world and change essentialist beliefs, but the impact may be limited and greatly affected by features of the story.

**KEYWORDS**

cognitive development, essentialism, gender, social cognition

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### Key points

- Studied understanding of transgender and gender essentialism in children ages 5–6 and 9–10.
- Hearing a story about a transgender child increased children's understanding of transgender identities.
- Hearing a metaphorical story about a marker that looked red on the outside but was really blue did not.
- Gender essentialism was slightly reduced after hearing the transgender story.

## INTRODUCTION

Recently, people with diverse gender identities have garnered more attention in the media, politics and society in general (David, 2017; Herman et al., 2022; Steinmetz, 2014). Given this relatively large increase in the visibility of transgender people, the moment is ripe for better understanding of how gender diversity may influence children's conceptualizations of gender. Gender identities outside of the binary may challenge adults to rethink their notions about gender, including their essentialist beliefs (Fine et al., 2023). Furthermore, gender diversity in children has garnered attention from politicians in parts of the United States with some questioning the impact of exposure to gender diversity on children's understanding of their and others' gender (Alfonseca, 2023).

The present study examines whether introducing young children to gender diversity would influence their understanding of transgender identities, as well as their endorsement of gender-essentialist beliefs (lay beliefs that gender is a category that is based in biology, composed of discrete and immutable identities and informative about the potential traits and preferences of those with a particular identity; Gelman, 2003). Young children's gender essentialism has been documented in a range of cultures around the world (e.g., Davoodi et al., 2020; Diesendruck et al., 2013; Smyth et al., 2017), but can vary as a function of both age and cultural context. Whereas preschool and early elementary school children show consistently high levels of gender essentialism, in the United States, this decreases between 5 and 10 years of age, especially in more liberal communities (Fine et al., 2024; Rhodes & Gelman, 2009; Taylor, 1996; Taylor et al., 2009). These findings suggest that, at least in the United States, children may be open to non-essentialist messages about gender by about 9–10 years of age. In contrast, explaining transgender identities (identities of people whose gender differs from that assigned at birth) to younger children may be difficult, given their strict endorsement of gender roles and stereotypes (e.g., insisting that only girls like to play with dolls and only boys like to play soccer; Trautner et al., 2005). Likewise, young children may have difficulty grasping transgender identities, as such identities may be perceived as conflicting with two essentialist beliefs: that gender is immutable and that gender is biologically determined. Indeed, even many adults struggle with how to understand and accept transgender people (e.g., Elischberger et al., 2016; Payne & Smith, 2014).

One potential mode of explaining diverse gender identities to children is stories. Recently, picture books have been written that aim to help young children understand what it means to be transgender. This literature may be instrumental in exposing children to transgender identities and influencing children's gender-essentialist beliefs. However, because of the discrimination and prejudice transgender people face (Barbee et al., 2022; Kosciw et al., 2019; Miller & Grollman, 2015), it is important that books convey their messages in a way that is sensitive and informative. Furthermore, although there is evidence that children learn from stories, whether stories are a good means of delivering messages about the social structure of the world has been less studied (Strouse et al., 2018). For example, how closely stories reflect real life may greatly affect how well knowledge is transferred to children's everyday lives (Richert & Smith, 2011).

We examine how a realistic story with a transgender girl (in this case, a girl assigned male/boy at birth), and a metaphorical story with an anthropomorphized marker possessing an outside that does not match its inside, explain transgender identities to young children and, importantly, how these stories influence children's endorsement of gender-essentialist beliefs. We look specifically at children in two age groups, 5- to 6-year-olds and 9- to 10-year-olds, because prior research shows developmental changes between these age groups in endorsement of gender essentialism (Fine et al., 2024; Rhodes & Gelman, 2009; Taylor, 1996; Taylor et al., 2009).

## Impact of intergroup contact on essentialist beliefs

One way to learn about diverse identities is to have contact with people with those identities. Allport (1954) proposed that contact with stigmatized outgroup members can lead to reduced biases, especially under optimal conditions. Intergroup contact has been extensively studied in adults and children and found to reduce biases and discrimination against outgroup members such as people of other races, ethnicities, sexual orientations and abilities (Aboud & Brown, 2012; Guerra et al., 2010; Pettigrew & Tropp, 2006).

Research indicates that intergroup contact is also associated with changing essentialist beliefs, in children as well as adults (Deeb et al., 2011; Fine et al., 2023; Lytle et al., 2017; Martin et al., 2017; Merrilees et al., 2023; Pauker et al., 2018). For example, essentialist beliefs about ethnicity were found to be lower in Israeli and Arab children who attended a multi-ethnic school in Israel compared to mono-ethnic schools (Deeb et al., 2011). Pauker et al. (2016) also found that older children of their 4- to 11-year-old participants differed in race essentialism as a function of the US state in which they resided. Older children from Massachusetts, a less racially diverse state, expressed more race essentialism and racial stereotyping than older children from Hawaii, a more racially diverse state. However, to our knowledge, prior research has not investigated the role of contact in children's essentialist beliefs about gender diversity.

Although estimating the population of transgender people is challenging due in part to differences in definitions and methodology (Collin, Reisner, Tangpricha, & Goodman, 2016), the rates are typically estimated to be quite small (less than 1%) in both the United States (Meerwijk & Sevelius, 2017) and worldwide (Collin, Goodman, & Tangpricha, 2016; Meier & Labuski, 2013; Winter et al., 2016), making it relatively unlikely that children will meet many transgender people in their day-to-day life. This presents an obstacle in encouraging the type of direct, in-person contact Allport (1954) originally proposed. However, intergroup contact by means of indirect contact, including contact with media that features outgroup members (Hoffarth & Hodson, 2018; Tropp et al., 2016), has also been shown to reduce biases and anxiety about outgroup members in adults and children (Cao & Meng, 2020; Husnu et al., 2018; Pettigrew et al., 2007; Vezzali et al., 2017; Wölfer et al., 2019). Moreover, media contact involving LGBTQ people has been found to relate to positive attitudes towards the LGBTQ community in adults (Lissitsa & Kushnirovich, 2021). Given that many children may not have the opportunity to have in-person interactions with transgender people, children's stories, a form of media, offer a way to provide children with indirect contact.

## Children's learning from books and other media

Children's books have long been used to educate children about a range of issues (for a review, see Strouse et al., 2018). Much research on children's media, both books and TV shows, focuses on academic themes such as science, analogical problem solving (i.e., transferring a solution from one context to another similar context) and vocabulary (e.g., Ganea et al., 2008; Kelemen et al., 2014; Richert et al., 2009). Although less is known about how children learn from stories that teach social lessons about culture, diversity and morality, children can recognize the morals conveyed through stories (Larsen et al., 2018; Walker & Lombrozo, 2017). Children as young as 4 years old who heard a story about a child sharing

were more likely afterwards to share stickers compared to a control group (Larsen et al., 2018). Walker and Lombrozo (2017) found when children as young as 5 years old were read a story and asked to explain the feelings of the main characters, they were able to glean the moral. Children's TV programming also aims to teach children about cultural, racial and ethnic diversity. A meta-analysis of the impact of Sesame Street, a show known for highlighting and promoting interracial and interethnic relationships, on young children's educational outcomes finds the show does promote academic and social learning (Mares et al., 2015). All this work suggests children's media may be an impactful way to educate children on important real-world lessons.

Storytelling via books and shows can be a powerful way to teach young children, although they also pose challenges, due to the use of analogies and fantastical characters that may introduce obstacles to transferring information from the fictional world to the real world (Strouse et al., 2018). Although even very young children are capable of learning biological information from anthropomorphized animals in storybooks (Geerdts et al., 2016) and can separate the real world and fantasy (Woolley, 1997), fantastical stories and those relying on analogies may be less effective for teaching children about real-life concepts (Larsen et al., 2018; Richert et al., 2009; Richert & Smith, 2011; Sobel et al., 2013; Walker et al., 2015; Woolley, 1997; Woolley & Ghossainy, 2013). Richert and Smith (2011) offer a theory of quarantining to explain why children often do not apply messages from fantastical stories to real life. The basic idea of quarantining is that 'when children recognize salient differences between fantastical and realistic contexts, they may believe information presented in fantastical contexts is irrelevant to realistic contexts, and therefore, they do not apply information presented in fantastical contexts to the real world' (Richert & Schlesinger, 2017). Walker et al.'s (2015) work supports this theory, showing that 3- to 6-year-old children make causal inferences from realistic stories more often than from fantastical stories. So, although children do learn from stories, both fantastical and realistic, the features of the story and the type of information the story conveys are important in determining how successfully children transfer the knowledge presented to them. These findings suggest that more realistic stories may be a more effective means of influencing children's thinking about transgender identities as a reality in their worlds, as compared to fantastical stories.

## The present study

In this study, we examined if/how contact with trans identities through stories affected children's understanding of transgender identities and their gender-essentialist beliefs. The stories we developed were video animations based on two commercially available books, *I am Jazz* (Herthel & Jennings, 2014) and *Red: A crayon's story* (Hall, 2015). As detailed in the [Method](#), below, we modified the stories for the purpose of the experimental task (e.g., shortening and rewriting them to make them precisely parallel to one another in content and length). *I am Jazz* tells Jazz Jennings's true autobiographical story of transitioning from a boy to a girl in early childhood. In *Red: A crayon's story*, Red is an anthropomorphized blue crayon with a red label. He is also treated as a red marker by those around him. By the end of the story, Red transitions to Blue. This story is not about gender but may be considered analogous to transgender identities because of the contrast between the crayon's outward appearance and its inner identity. Both stories emphasize how their protagonists' outsides do not match how they feel on the inside, how the physical self is separate from one's felt identity and how family and friends grow to understand and support the protagonists' identities. For ease of exposition, we refer to the realistic story in our experiment as 'Jazz', and the metaphorical story as 'Blue' (i.e., named with the protagonist's 'inner' identity).

We assessed what children learned about transgender identities from the two stories (one direct and realistic [Jazz]; the other metaphorical and fantastical [Blue]), and if/how these stories affected children's gender essentialism. We also included a third group of children who did not hear a story and served as a control group. We predicted that children in the control group would be less likely to say that a child can be transgender and would display higher levels of gender-essentialist beliefs. Additionally, we

explored if children's understanding of transgender identities and endorsement of gender essentialism differed for those who heard the direct (Jazz) versus metaphorical (Blue) story.

We tested children of two age groups—5–6 years of age and 9–10 years of age—as gender essentialism tends to decrease between these two age groups, with older children attributing gender-related behaviour relatively more to environmental reasons and mechanisms (Rhodes & Gelman, 2009; Taylor, 1996; Taylor et al., 2009). Additionally, because younger children are less skilled at drawing analogies and translating lessons from fantastical stories to the real world (Larsen et al., 2018; Walker et al., 2015), younger children may show a greater difference between the two stories than older children. We aimed to test roughly 58–60 children per condition (i.e., roughly 174–180 in total). Our sample size was based on the largest feasible sample we could recruit, instead of a power analysis, due to the lack of comparable studies.

In addition to assessing children's gender-essentialist beliefs broadly, we examined four different components of gender essentialism (specifically: biological basis, informativeness, discreteness and immutability) to explore whether these stories might have differential effects on different aspects of essentialism. Specifically, because these stories focused on changing identities, we hypothesized that they may especially lower children's adherence to the immutability component of gender essentialism.

Finally, we examined children's responses to three open-ended questions (why the character was sad at the beginning of the story and happy at the end of the story, as well as what lessons the participant learned) to gain further insight into what they learned from these stories.

## METHOD

### Participants

We included 174 participants: 87 five- and six-year-olds ( $M = 5.92$  years,  $SD = 0.61$ ) and 87 nine- and ten-year-olds ( $M = 9.82$  years,  $SD = 0.53$ ). All participants were cisgender as reported by their parents. Ninety-five (55%) participants were girls and 79 (45%) were boys. Self-reported race/ethnicity was: White ( $n = 92$ ; 53%), multi-racial ( $n = 11$ ; 6%), Asian ( $n = 8$ ; 5%), Latinx ( $n = 11$ ; 6%), did not report race ( $n = 8$ , 5%) and 55 (32%) who were not asked due to an error when transferring the consent form to an online format. Numbers exceed 100% because Latinx identity was counted separately from race. Seventy-eight participants (45%) completed the study in person in our laboratory. Due to the COVID-19 pandemic, 95 participants (55%) completed the study online via secure Zoom meetings. The only exclusions were participants who fell outside the determined age range.

### Materials

With the help of two research assistants, we created a video version of each story to maintain consistency across participants and to keep participants engaged. Each video consisted of a voice-over accompanying a series of motion capture animations, showing an artist's hand-drawing images that illustrated the text. Both stories were voiced by the same person, were drawn by the same artist and were 3:33 min long. The Jazz story video used a subset of the text from *I am Jazz* and featured drawings based on the illustrations from the book. The Blue story video adapted the text from *Red: A crayon's story* to be directly parallel, and relevant to activities a marker would do. We used a marker rather than a crayon in order to colour in blue with a seemingly red marker (i.e., the outward shell of the marker was red).<sup>1</sup> In this way, there was a contrast between the marker's outer appearance and its insides, just as gender identity can be for people.

<sup>1</sup>The ink emerged from an uncolored marker tip that changed to blue on the paper, so that there was no visible sign of the ink colour on the marker itself.

In both videos, the story begins by presenting the main character with their current (trans) identity, and what they like to do (e.g., Jazz likes the colour pink, singing, back flips, makeup, etc.; Blue likes drawing blueberries, skies, bluebirds, etc.). The character then explains that they are trans ('I have a girl brain but a boy body'; 'I have a blue inside but a red outside'). At that point, the story goes back in time to talk about their pre-transition self, their desire to change, their social transition, their acceptance by parents, teachers and friends, as well as some of the challenges they face due to their trans identity. They end by saying, 'I don't mind being different. Different is special! I think what matters most is what a person is like inside. And inside, I am happy. I am having fun. I am proud! I am [Jazz/Blue]!' Portions of the scripts for the two stories appear in the [Appendix 1](#), along with sample still images from the videos.

## Measures

Three measures were employed, one assessing transgender identity understanding, and two assessing gender essentialism (the GES-C, or Gender Essentialism Scale for Children, and the Island Task).

### Transgender identity understanding

To assess transgender identity understanding, we created a new measure based on the theoretical assumption that a core conceptual component is grasping that insides and outsides can differ. This measure is parallel to prior research examining children's understanding that appearances can be deceiving (Flavell et al., 1983; Jaswal & Markman, 2007; Lane et al., 2014), especially for natural kinds (Gelman & Markman, 1986; Keil, 1989) and that insides can be more important than outsides (Gelman & Wellman, 1991). All participants, regardless of condition, were asked, 'Can a girl be a boy on the inside? Yes, maybe, or no' and 'Can a boy be a girl on the inside? Yes, maybe, or no'. Participants in the Blue condition were also asked, 'Can an orange marker be green on the inside? Yes, maybe, or no' and 'Can a green marker be an orange marker on the inside? Yes, maybe, or no'. To analyse responses, yes was coded as '3', maybe as '2' and no as '1'. Responses to the two gender questions were averaged, and responses to the two marker questions were averaged. Final scores ranged from 1 to 3, with 3 indicating the most understanding of transgender or trans marker identity. Alphas for these measures in the present study were .87 for the two transgender identity questions, and .89 for the two marker identity questions.

### GES-C (Fine et al., 2024)

To assess gender essentialism, we used the Gender Essentialism Scale for Children, a 16-item scale consisting of a series of statements to which children were asked to agree or disagree, and then in response to a follow-up question, 'a little or a lot?'. The resulting scale ranged from 1 to 4, where higher scores indicated more essentialism after reverse-coded items were recoded. Alphas for the present dataset were as follows: GES-C full scale  $\alpha = .83$ , biological basis  $\alpha = .50$ , discreteness  $\alpha = .45$ , informativeness  $\alpha = .59$ , immutability  $\alpha = .83$ .

### Island task (Taylor et al., 2009)

Participants were told a story about a baby boy or girl who, when he or she was a tiny baby, went to live on an island with people of a different binary gender from the character child's gender and never saw another person of the same gender (e.g., the boy character never saw another boy or man; the girl character never saw another girl or woman). Participants then answered questions about what properties the child

TABLE 1 ANOVAs with Condition, Age and Condition  $\times$  Age, for all primary measures.

Measures	Condition				Age				Condition $\times$ Age			
	<i>F</i>	<i>df</i>	<i>p</i>	$\eta^2$	<i>F</i>	<i>df</i>	<i>p</i>	$\eta^2$	<i>F</i>	<i>df</i>	<i>p</i>	$\eta^2$
Transgender understanding	<b>5.60</b>	<b>2, 166</b>	<b>.004</b>	<b>.06</b>	<b>45.63</b>	<b>1, 166</b>	<b>&lt;.001</b>	<b>.22</b>	<b>1.76</b>	<b>2, 166</b>	<b>.176</b>	<b>.02</b>
GES-C full scale	1.00	2, 165	.369	.01	<b>106.05</b>	<b>1, 165</b>	<b>&lt;.001</b>	<b>.39</b>	0.08	2, 165	.920	.00
Biological basis	1.23	2, 165	.294	.02	<b>52.09</b>	<b>1, 165</b>	<b>&lt;.001</b>	<b>.24</b>	0.37	2, 165	.688	.01
Discreteness	1.31	2, 165	.273	.02	<b>29.68</b>	<b>1, 165</b>	<b>&lt;.001</b>	<b>.15</b>	0.98	2, 165	.379	.01
Immutability	<b>4.03</b>	<b>2, 165</b>	<b>.020</b>	<b>.05</b>	<b>70.84</b>	<b>1, 165</b>	<b>&lt;.001</b>	<b>.30</b>	0.65	2, 165	.526	.01
Informativeness	2.07	2, 165	.129	.03	<b>34.91</b>	<b>1, 165</b>	<b>&lt;.001</b>	<b>.18</b>	0.04	2, 165	.963	.00
Island Task—Social	1.25	2, 159	.290	.02	<b>42.65</b>	<b>1, 159</b>	<b>&lt;.001</b>	<b>.21</b>	1.11	2, 159	.333	.01
Island Task—Biological	0.69	2, 159	.505	.01	0.94	1, 159	.334	.01	0.84	2, 159	.435	.01

The values in bold are statistically significant effects.



would have when they were 10 years old. There were eight gender-stereotypical social properties and seven gender-stereotypical biological properties (see Taylor et al., 2009, Table 2, for items). For example, a social property was ‘plays with a tea set/toy truck’, and a biological property was ‘has girl/boy blood inside’. The only changes from the original Taylor et al. task were that we did not include the item ‘Will grow up to have breasts / a beard’ and ‘preschool teacher’ replaced ‘nursery school teacher’. A response that coincided with a property that was stereotypical of the target child’s gender was considered essentialist and given a ‘1’, and a response that coincided with a property that was stereotypical of the gender of the other inhabitants of the island was considered non-essentialist and given a ‘0’. Responses were averaged across items, separately for social properties and biological properties, with higher scores indicating more essentialism. Alphas for the present dataset ranged from .83 to .91, for the four versions of the Island Task (boy baby or girl baby, named either Emery or Peyton).

## Procedure

Participants were tested individually, either in an on-campus laboratory setting (prior to the COVID-19 pandemic lockdowns) or over Zoom. Written informed consent was obtained from the parent/guardian of all participants, and child assent was obtained orally. They were randomly assigned to one of three conditions: Jazz (watching the story video of Jazz), Blue (watching the story video of Blue) and control (completing the measures without watching a story video). The experimenter asked three questions at different points through the video, in order to encourage children to attend to the video and to scaffold their understanding, including: ‘What is different about Jazz/Blue?’, ‘Why is Jazz/Blue sad?’ and ‘Why is Jazz/Blue happy?’ Regardless of the child’s answer, the researcher responded to these questions with (respectively), ‘Jazz has the body of a boy but is a girl on the inside’/‘Blue has the body of a red marker but is a blue marker on the inside’; ‘Jazz is sad because people treat her like a boy’/‘Blue is sad because people treat him like a red marker’; and ‘Jazz is happy because people treat her like a girl’/‘Blue is happy because people treat him like a blue marker’. Afterwards, children in the two video conditions were asked, ‘What did you learn from the story?’

Participants in the Blue condition answered the trans identity understanding questions about marker colours immediately after being asked about the meaning of the story. All participants, including those in the control condition, answered the questions about transgender identity and understanding of girls and boys. Next, participants were administered the GES-C and then the Island Task. Afterwards, children were thanked for their participation and received a small toy, and parents received \$10 as an appreciation for their help.

## RESULTS

Preliminary analyses indicated no differences in the transgender understanding question, the gender essentialism scale, or the Island Task due to any of the following factors: (a) whether the research session was conducted in person or via videoconferencing, (b) participants’ familiarity with the books that were the basis of the experimental materials or (c) participants’ familiarity with a transgender or gender-nonconforming individual. We therefore turn to the main analyses addressing our hypotheses and exploratory questions described in the [Present Study](#) section.

We conducted a series of 2 (Age Group: 5–6 years and 9–10 years)  $\times$  3 (Condition: Jazz, Blue and control) ANOVAs, one for each of the key variables: (a) Transgender understanding; (b) GES-C full scale and each of its four subscales (biological basis, discreteness, immutability and informativeness); (c) Island Task (social items); and (d) Island Task (biological items). See [Table 1](#) for a summary of the results. As can be seen, there were significant effects of condition and age, but no significant Age  $\times$  Condition interactions. We turn next to a summary of the findings for each task. All post hoc tests on the significant effects in [Table 1](#) used Tukey’s HSD.



TABLE 2 Coding of open-ended responses, with examples of actual responses, selected to best represent the codes.

Codes	Sample explanations (Jazz)	Sample explanations (Blue)
Why is Jazz/Blue sad?		
What others do or think	Because no one will let her be a girl	Because everyone is treating him like a red person
	Every time they play in gym she has to be on the boys team but she's a girl	Because he thinks that because he draws blue he should be on blue but he's made red so they think he should be red
	Because people say she's a boy and make fun of her	Because the teachers want them on the red side even though he's still blue
Identity	Cause he's transgender but the teachers don't know this	Because his body is red, he only had a blue cap
	Because he has a boy's body	Because it is red and it's not who he wants to be
	Because she's a girl	Because she's different because she is blue but she wants to be red
Explicit mention of gender or colour	Cause she still has to go into boy bathroom and soccer team	All the red people want the blue girl to be on the red team
Character's pronoun (masculine, feminine, gender neutral, N/A)	Because everyone thinks she is a boy. [feminine]	Because she wants to have blue not red. [feminine]
	Because he isn't on the girls team in gym. [masculine]	Because his parents don't understand that on inside, he is different than what they think. On outside, he is a red marker but on the inside he is a blue marker. [masculine]
Why is Jazz/Blue happy?		
What others do or think	Because now her mom and dad call her a girl and her friends like her	Because the teachers were understanding
	Because her teachers changed their minds	Because he got treated like a blue marker
	Because her friends don't treat her like a boy	Because now everyone is treating him blue
Identity	Because she is being herself	Everyone lets her be herself and be blue
	Because everyone says she can be what she wants	Because sometimes people want to [be] blue and they can't be blue. If you're happy, then your colour is happy
	Because everyone understands that she is a girl now	He gets to be blue on the inside
Explicit mention of gender or colour	Because now people aren't as confused and stuff and is now doing mostly stuff with girls on [the] girls soccer team and going to [the] girls bathroom	Because she's doing blue things now
Character's pronoun (masculine, feminine, gender neutral, N/A)	Because she is treated like a girl now. [feminine]	Because she's blue. [feminine]
	Because people treat him like a girl now. [masculine]	Because he got treated like blue then. [masculine]

TABLE 2 (Continued)

Codes	Sample explanations (Jazz)	Sample explanations (Blue)
What did you learn from the story?		
Identity/authentic self/ appearance vs. reality	You should be yourself	If you look different but you are different on the inside, how you are on the inside is correct
	That if people don't want to be a boy or girl, if someone doesn't want to be a boy they can be a girl, and if someone doesn't want to be girl they can be a boy	That it's OK to be yourself
	I learned that boys can be girls on the inside and girls can be boys on the inside. And it doesn't matter if you are transgender or cisgender or whatever	I learned that blue is great. My favourite colour is green so I like being green. The colour blue is the size and colour of the ocean
How to treat others	Not to treat others just by the way they look	To be kind
	Be nice	Just like people the way they are
	I learned that it is to be important from the inside and not from what they look like on the outside. Respect people for what they are	Don't treat people or markers—but I think markers are a representation of people—as what they are on the outside instead of what they are on the inside
OK to be different	Everyone is different	That it's okay to be different, and it's good to be different
	That's it's ok to be different and don't be like everyone else	I learned that being different is a good thing
	I learned you can be different in many different ways, like wanting to [be a] boy when you're a girl, or a girl when you're a boy	That if you be different, just be yourself
Explicit mention of gender or colour	I learned from this story because she was a girl not a boy	That I can be whatever colour I want on the inside
Pronoun of the lesson (masculine, feminine, gender neutral, generic- you, N/A)	In the first part she was treated like a boy all the time, and in the middle her family started treating her like a girl, and in the end everybody started treating her like a girl. [feminine]	I learned that blue marker was sad and he turned happier. [masculine]
	Not to treat others just by the way they look. [neutral]	That people can be nice to other people only if they treat them nice and be nice. [neutral]
	I learned from the story that if someone feels a certain way then you should just let them be happy. [generic you]	No matter what you are, people still love you. [generic you]

*Note:* The codes are not mutually exclusive, so a response can be coded in more than one category. For each participant, each code was coded as present or absent for a given question (e.g., ‘Because people say she’s a boy and make fun of her’ was coded only once for ‘feminine pronoun’, even though there were two feminine pronouns in this response [she and her]).

Understanding of trans identities

As can be seen in Table 1, understanding of transgender identities showed effects of both condition and age. Participants in the Jazz condition ( $M=2.76$ ,  $SD=0.55$ ) were more likely to report that a girl can be a boy on the inside (or vice versa) than those in either the Blue condition ( $M=2.46$ ,  $SD=0.81$ ,  $p=.019$ ) or the control condition ( $M=2.40$ ,  $SD=0.64$ ;  $p=.004$ ). Those in the Blue condition did not significantly differ from those in the control condition,  $p=.846$ . The age effect indicated that older

children understood transgender identities more than younger children,  $M_s$  ( $SD_s$ ) = 2.85 (0.065) and 2.24 (0.064) respectively.

We also examined how often children in the Blue condition indicated that an orange marker can be green on the inside (or vice versa). Analogous to the understanding of transgender identities, we obtained a significant effect of age, indicating that older children understood the message of the book better than younger children ( $M_s$  [ $SD_s$ ] = 2.85 [0.37] and 2.22 [0.79], respectively).

## GES-C: Full score and components

As shown in Table 1, there was no effect of condition on the gender essentialism full score or the components of biological basis, discreteness or informativeness. However, we did obtain a significant main effect of condition on the immutability component. Those in the Jazz condition ( $M = 2.27$ ,  $SD = 1.00$ ) expressed less immutability than those in the control condition ( $M = 2.75$ ,  $SD = 1.10$ ),  $p = .008$ , but did not significantly differ from those in the Blue condition ( $M = 2.46$ ,  $SD = 0.90$ ),  $p = .473$ . Those in the Blue condition did not differ significantly from those in the control condition,  $p = .153$ . Overall essentialism on the GES-C full score also declined with age ( $M_s$  [ $SD_s$ ] = 2.62 [0.45] and 1.88 [0.48], for younger vs. older children, respectively). This age effect was also observed in each of the four components.

## Island Task

On the Island Task, we saw no overall difference as a function of condition, nor interaction involving condition and age, for either social or biological properties. Thus, participants in the three conditions were equally likely to report that a baby's gender at birth would determine their later characteristics, although as expected these rates were considerably higher for biological than social properties (overall social  $M$  [ $SD$ ] = 0.63 [0.37]; overall biological  $M$  [ $SD$ ] = 0.89 [0.18];  $t(164) = 10.27$ ,  $p < .001$ ). Consistent with prior research, we also found that rates of responding based on the child's gender at birth were higher for younger children than older children ( $M_s = .85$  and  $.67$ , respectively;  $F(1, 159) = 25.50$ ,  $p < .001$ ).

We also wished to explore whether condition differences might emerge for a subset of the items, given that the properties in the Island Task measure varied in content, and thus children may have constructed different causal theories regarding their origins. For example, some of the properties that constituted a given item may be less gender stereotypical for the children in our study (e.g., building things or being a nurse) than in the past. In order to test this, we reran the two Island Task ANOVAs (one for social properties and one for biological properties), but this time included a third factor, for item, in addition to the previous factors of condition and age group. Of special interest was whether we would see a Condition  $\times$  Item interaction, indicating that condition affected a subset of the items. Here, we just report the results of item, given that analyses of condition and age group appear in Table 1. For social properties, we obtained a significant effect of item,  $F(7, 1099) = 3.06$ ,  $p = .003$ ,  $\eta^2 = .02$ , and of greatest interest, an Item  $\times$  Condition interaction,  $F(14, 1099) = 2.48$ ,  $p = .002$ ,  $\eta^2 = .03$ . Post-hoc tests of the interaction indicated that essentialism was lower for Jazz than for the other two conditions for 'plays with a tea set/toy truck' (Jazz [ $M$  ( $SD$ ) = 0.42 (0.50)] vs. control [ $M$  ( $SD$ ) = 0.70 (0.46)]:  $p = .004$ ; Jazz vs. Blue [ $M$  ( $SD$ ) = 0.63 (0.49)]:  $p = .020$ ), and lower for Jazz [ $M$  ( $SD$ ) = 0.50 (0.50)] than for the control condition [ $M$  ( $SD$ ) = 0.70 (0.46)] for 'likes to put on make-up/go fishing' ( $p = .047$ ). For biological properties, there was a significant effect of item,  $F(7, 1099) = 3.06$ ,  $p = .003$ ,  $\eta^2 = .02$ , but no interaction with condition.

Finally, as indicated in Table 1, essentialism of social properties on the Island Task was higher for younger than older children ( $M_s$  [ $SD_s$ ] = 0.80 [0.28] and 0.46 [0.36], respectively), whereas there was no age difference for biological properties ( $M_s$  [ $SD_s$ ] = 0.91 [0.14] and 0.88 [0.21], respectively). This is consistent with the results of Taylor et al. (2009).

## Responses to open-ended questions

We coded children's responses to three open-ended questions: 'Why is Jazz/Blue sad?', 'Why is Jazz/Blue happy?' and 'What did you learn from the story?' (see Table 2 for the coding categories with examples). Note that children in the control condition did not receive a story and so did not receive any open-ended questions. Two coders independently coded 20% of the responses to determine reliability, and disagreements were resolved by discussion. Rates of agreement ranged from 89% to 100% agreement, and Cohen's kappas ranged from .73 to 1.00.

### Analyses of sad/happy open-ended responses

We collapsed over the sad and happy questions because the codes were identical, and conducted four ANOVAs, one for each coding category.

#### *What others do or think*

We conducted a 2 (Condition: Jazz and Blue)  $\times$  2 (Age Group: younger and older) ANOVA on the mean scores across the two items (sad and happy). Older children were more likely to mention what others do or think than younger children ( $M_s$  [ $SD_s$ ] = 0.77 [0.33] and 0.47 [0.43], respectively),  $F(1, 110) = 17.15$ ,  $p < .001$ ,  $\eta_p^2 = .14$ . There were no effects involving condition.

#### *Identity*

We conducted a 2 (Condition: Jazz and Blue)  $\times$  2 (Age Group: younger and older) ANOVA on the mean score across the two items (sad and happy). Older children were more likely to mention identity than younger children,  $F(1, 110) = 10.81$ ,  $p = .001$ ,  $\eta_p^2 = .09$ . However, this must be interpreted in light of a significant Age  $\times$  Condition interaction,  $F(1, 110) = 6.15$ ,  $p = .015$ ,  $\eta_p^2 = .05$ . Follow-up  $t$ -tests indicated that in the Blue condition, older children were significantly more likely than younger children to mention identity ( $M_s$  [ $SD_s$ ] = 0.67 [0.38] and 0.27 [0.34], respectively). There were no significant age differences in the Jazz condition ( $M_s$  [ $SD_s$ ] = 0.46 [0.41] and 0.41 [0.37], for older and younger children, respectively).

#### *Explicit mention of gender or colour*

We conducted a 2 (Condition: Jazz and Blue)  $\times$  2 (Age Group: younger and older) ANOVA on the mean scores across the two items (sad and happy). There were no significant effects (overall  $M = 0.75$ ,  $SD = 0.34$ ).

#### *Pronouns*

To analyse the pronouns, we focused on masculine and feminine pronouns only because gender-neutral pronouns (e.g., it or they) were so rare (4% of responses; primarily for children in the Blue condition). We conducted a 2 (Pronoun: masculine and feminine)  $\times$  2 (Condition: Jazz and Blue)  $\times$  2 (Age Group: younger and older) ANOVA on the mean scores across the two items (sad and happy). There was a main effect of pronoun,  $F(1, 110) = 35.46$ ,  $p < .001$ ,  $\eta_p^2 = .24$ , a main effect of age group,  $F(1, 110) = 17.75$ ,  $p < .001$ ,  $\eta_p^2 = .14$ , and a main effect of condition,  $F(1, 110) = 5.49$ ,  $p = .021$ ,  $\eta_p^2 = .048$ . However, this must be interpreted in light of a significant Pronoun  $\times$  Condition interaction,  $F(1, 110) = 71.98$ ,  $p < .001$ ,  $\eta_p^2 = .40$ . The interaction indicated that children in the Jazz condition used feminine pronouns almost exclusively ( $M_s$  [ $SD_s$ ] = 0.83 [0.28] feminine, 0.06 [0.19] masculine), whereas children in the Blue condition used masculine pronouns non-significantly more than feminine pronouns ( $M_s$  [ $SD_s$ ] = 0.44 [0.38] masculine, 0.31 [0.43] feminine). There was also an Age Group  $\times$  Condition interaction,  $F(1, 110) = 12.55$ ,  $p < .001$ ,  $\eta_p^2 = .10$ , indicating that younger children were less likely to provide any pronoun in the Blue condition than the Jazz condition,  $p < .001$ , whereas the older children produced pronouns equally in the two conditions. This is

difficult to interpret as it collapses over pronoun type (masculine vs. feminine), but may simply indicate that younger children were less apt to provide a pronoun in the Blue condition due to the absence of gender cues.

## Analyses of lessons-learned open-ended responses

We conducted six ANOVAs on the lessons learned coding: two for the pronoun coding category (as detailed below), and one each for the other four coding categories.

### *How to treat others*

We conducted a 2 (Condition: Jazz and Blue)  $\times$  2 (Age Group: younger and older) ANOVA. There were no significant effects (overall  $M = 0.21$ ,  $SD = 0.41$ ).

### *Identity/Authentic self/Appearance versus reality*

We conducted a 2 (Condition: Jazz and Blue)  $\times$  2 (Age Group: younger and older) ANOVA. Older children were more likely to mention identity, authenticity or appearance–reality distinctions than younger children ( $M$ s [ $SD$ s] = 0.81 [0.40] and 0.44 [0.50], respectively),  $F(1, 110) = 18.39$ ,  $p < .001$ ,  $\eta_p^2 = .14$ . There were no effects involving condition.

### *OK to be different*

We conducted a 2 (Condition: Jazz and Blue)  $\times$  2 (Age Group: younger and older) ANOVA. Older children were more likely to mention it being OK to be different, than did younger children ( $M$ s [ $SD$ s] = 0.25 [0.43] and 0.11 [0.31], respectively),  $F(1, 110) = 3.97$ ,  $p = .049$ ,  $\eta_p^2 = .04$ . There were no effects involving condition.

### *Explicit mention of gender or colour*

We conducted a 2 (Condition: Jazz and Blue)  $\times$  2 (Age Group: younger and older) ANOVA. Older children were *less* likely to mention gender or colour than younger children ( $M$ s [ $SD$ s] = 0.28 [0.45] and 0.53 [0.50], respectively),  $F(1, 110) = 7.92$ ,  $p = .006$ ,  $\eta_p^2 = .07$ , indicating that they were more likely to draw broader lessons that extended beyond the particulars of the story. There was also a main effect of condition,  $F(1, 110) = 5.55$ ,  $p = .020$ ,  $\eta_p^2 = .05$ , indicating that children were more likely to mention gender in the Jazz condition ( $M$  [ $SD$ ] = 0.51 [0.51]) than to mention colour in the Blue condition ( $M$  [ $SD$ ] = 0.31 [0.46]).

### *Pronouns (masculine vs. feminine)*

As in the sad/happy analyses above, we conducted a 2 (Pronoun: masculine and feminine)  $\times$  2 (Condition: Jazz and Blue)  $\times$  2 (Age Group: younger and older) ANOVA on the pronouns that children produced in response to the lessons learned question. There was a main effect of pronoun,  $F(1, 110) = 6.08$ ,  $p = .015$ ,  $\eta_p^2 = .05$ , which must be interpreted in light of a significant Pronoun  $\times$  Condition interaction,  $F(1, 110) = 11.88$ ,  $p < .001$ ,  $\eta_p^2 = .10$ . The interaction indicated that children in the Jazz condition used feminine pronouns exclusively ( $M$ s [ $SD$ s] = 0.20 [0.40] feminine, 0.00 [0.00] masculine), whereas children in the Blue condition used masculine pronouns non-significantly more than feminine pronouns ( $M$ s [ $SD$ s] = 0.07 [0.25] masculine and 0.03 [0.18] feminine).

### *Pronouns (generic-you)*

We included an additional code for the generic-you pronouns, which refer to people generally, as prior research has shown that children as well as adults produce and interpret these pronouns to express general insights or lessons, or making sense out of experiences (Orvell et al., 2017, 2019, 2023). It was of interest how often children would draw broader lessons from these stories. We conducted a 2 (Condition: Jazz and Blue)  $\times$  2 (Age Group: younger and older) ANOVA. Older children were more likely than

younger children to use generic-you when expressing what they had learned ( $M_s [SDs] = 0.47 [0.50]$  and  $0.21 [0.41]$ , respectively),  $F(1, 110) = 9.04, p = .003, \eta_p^2 = .08$ . There were no effects involving condition.

## DISCUSSION

This study suggests that hearing a story regarding a transgender character, with some adult scaffolding, has modest but consistent effects on several aspects of children's reasoning about gender. Children ages 5–6 and 9–10 years of age who viewed an illustrated video story about an actual transgender girl named Jazz differed from those in the no-video control condition, in several respects: they showed higher understanding of trans identities, were less likely to view gender as immutable and were less likely to judge that gender at birth would determine two specific gender-stereotyped properties (playing with a tea set vs. toy truck; liking to put on make-up vs. go fishing). In contrast, a parallel video that could be construed as a metaphor for a transgender character (a red crayon that felt truly blue) did not show any of these effects. Thus, in this study, hearing a direct, realistic story was the only significant means of teaching children about transgender identities and reducing belief in gender immutability. It is also important to note that the effects were limited, as the Jazz video did not influence gender essentialism overall.

Although overall gender essentialism was not affected by the stories, immutability was reduced by exposure to a transgender character. This may be a result of the story discussing the character's social transition. Change was a significant theme throughout both stories (e.g., 'Then one amazing day, everything changed') and was stressed in the questions asked by the experimenter. Moreover, although overall social essentialism on the Island Task was not changed by the stories, the two items that did show lower gender essentialism included well-known gender stereotypes (that boys play with trucks, and that girls like to put on make-up), and the Jazz video focused on Jazz's preference for stereotypically gendered activities, including wearing make-up. These findings suggest that children may be particularly clued into specific information that is provided, but this may not be sufficient to lower gender essentialism more broadly.

Informativeness and discreteness were unaffected by the story. This may also be the result of the stories. In order to showcase the difference between each character's body and their feelings inside, the character's gender/colour stereotypical behaviour and preferences for their true gender/colour identity were emphasized (e.g., liking mermaids and drawing bluebirds). In fact, discussing the outside and inside differences is reminiscent of children's understanding that internal, inherent properties may be more important than outward, environmental influences, for natural and social kinds (Astuti et al., 2004; Gelman, 2003; Moya et al., 2015; Rhodes & Mandalaywala, 2017). So, although the videos effectively showcased social transitions and the mutability of gender/colour, this message may have been delivered by highlighting gender- (and colour-) stereotypical behaviours and preferences that uphold existing essentialist beliefs.

In addition to the key dependent variables reviewed above, we also coded children's responses to the open-ended questions (why the character felt sad at the beginning of the story and happy at the end, and what messages the participant took away from the story) in order to gain insights into children's interpretations of the stories and the messages they received. One important result from the open-ended coding was that children overwhelmingly referred to Jazz with a feminine pronoun, thereby indicating acceptance of her transgender identity. (Children were split in the pronouns that they used to refer to Blue, with equivalent numbers of masculine and feminine pronouns.) Additionally, many children expressed broader messages, such as 'It's OK to be different' and 'It's what's inside that counts'. These messages were provided in the books, but notably, children selected to mention these general lessons relatively frequently, rather than strictly recounting specific events that happened to Jazz or Blue in the story. Furthermore, many children expressed these messages using generic-you, thus signalling that the lesson applies not just to the character in the book, but to people more generally (Orvell et al., 2017). At the same time, it should be noted that the older children were more likely than younger children to report certain relevant themes, about Jazz's feelings (that they were due to identity, or what others do or



think) and about lessons they themselves had learned (about identity, authentic self or appearance vs. reality and that it is OK to be different). These findings are suggestive of an openness in these participants to reasoning about gender in an expansive way that extends beyond an essentialized gender binary. At the same time, the present assessment of transgender identities in this study provided only a first step, a limitation that we hope is addressed in future research.

To summarize the key results, this study revealed that stories can be a way to teach children about the social world and change essentialist beliefs, but the impact may be limited and greatly affected by features of the story. At the same time, although overall the findings were generally modest, we believe they are nonetheless promising, given that the manipulation was only 3 and a half minutes in length. A more powerful manipulation may show stronger effects. Potential ways of strengthening the manipulation could include, for example: a longer story; repeated readings of the story; having the story read in person by a familiar person rather than a stranger on video; more interactive discussions with a parent or other adult; and/or studying older children, who may be less rigid in their gender beliefs (Trautner et al., 2005).

We now turn to potential future directions with this research. If our interpretation (above) about how the stories influenced and did not influence essentialism components is supported, a different story that does not highlight mutability at the expense of reinforcing beliefs about gender-stereotypical behaviour may be more successful at reducing gender essentialism more broadly. Since the publication of *I am Jazz* and *Red: A crayon's story*, more children's books have been published that address gender diversity and other non-binary and non-conforming identities. It is possible that some of these stories may be more effective at reducing gender essentialism in children through indirect contact with different gender identities. Exposing children to other gender identities such as genderfluid or non-binary identities may better illustrate counterexamples to essentialist beliefs as well. The more exposure children have to people with varying diverse identities, the more expansive their understanding of gender may become, thus potentially reducing gender essentialism. Developing stories that highlight components or aspects of identities that better challenge essentialist notions and introduce anti-essentialist beliefs related to more components may lead to more significant findings in essentialist reduction. In future research, it would also be valuable to include a story of a child with a girl's body who feels like a boy. Given asymmetries in gender attitudes and essentialism when reasoning about boys or men versus girls or women (Hort et al., 1990; Smiler & Gelman, 2008), these cases may be treated differently by children. It would also be informative to determine what role if any the experimenter's scaffolding of the story played in children's understanding.

Another aspect of the stories to consider is the role of acceptance from others. Not only did Jazz transition from a boy to a girl and Blue from a red marker to a blue marker but they both came to be supported by friends and family. The support modelled for participants in the story may have contributed to their acceptance of transgender identities. Furthermore, the friends in these stories could be ingroup members for participants, as participants were also school-aged children. This presents the opportunity for vicarious contact, a type of indirect contact that happens when another ingroup member has positive contact with an outgroup member. This contact has been explored through stories presented as videos and read aloud to school-aged children by experimenters; results of such studies showed a reduction in prejudice against outgroup members (Cocco et al., 2021; Husnu et al., 2018). A study conducted in Turkey with school-aged Turkish Cypriots found that a 3-week intervention of hearing stories about friendships between Turkish Cypriot children and Greek Cypriot children resulted in Turkish children reporting more positive attitudes towards Greek Cypriot children, more intention to socialize with Greek Cypriot children, and more trust towards Greek Cypriot children (Husnu et al., 2018). This is notable due to a tendency towards animosity between Turkish Cypriots and Greek Cypriots. Similarly, in a study with Italian non-disabled school-aged children, children who saw a video of children playing with a child with a disability or were read a story about children playing with a child with a disability by an experimenter reported more positive attitudes towards, more willingness to socialize with and more willingness to help children with disabilities than children who did not see a video or hear a story (Cocco et al., 2021). Although our study does not explore prejudice, research shows a relationship



between prejudice and essentialism (Ching et al., 2020; Ching & Xu, 2018; Fine et al., 2024; Haslam et al., 2002) and an effect of contact in reducing essentialist beliefs (Deeb et al., 2011; Fine et al., 2023; Lytle et al., 2017; Pauker et al., 2018). Therefore, the vicarious contact demonstrated in the Jazz and marker stories may have aided in reducing immutability beliefs for those participants in the experimental conditions.

Beyond the themes discussed above, our study also contributes to the literature on how children extend information from fantastical and/or metaphorical stories versus more realistic, direct stories when reasoning about the real world. Prior work showed that, even though it is possible for children to learn from fantastical stories, it is more difficult because children may be overcautious with the information they transfer from these stories to real life (Geerdts et al., 2016; Richert & Smith, 2011; Walker & Lombrozo, 2017). Also, children's ability to understand metaphor develops over time (Di Paola et al., 2020; Gentner, 1988). One study found that 4- to 6-year-old children had a more difficult time transferring information from a fantastical story to the real world than they did with a realistic story (Richert et al., 2009). This indicates that it may be worth exploring when and how metaphors and fantastical story features can be effective in conveying messages about the social world.

This study also helps address a gap in the literature about what types of lessons children can learn from stories (Richert & Schlesinger, 2017). Much of the research examining how children learn from stories has focused on more academic topics such as science and vocabulary. Our work contributes to the small literature that focuses on social learning (Cocco et al., 2021; Husnu et al., 2018; Larsen et al., 2018; Mares et al., 2015; Strouse et al., 2018; Walker & Lombrozo, 2017). Given that so much of children's literature aims to teach children about the social world (e.g., *Ada Twist, Scientist* [Beaty, 2016] and *Hair Love* [Cherry, 2019]), it is important to study how children may learn from them.

Stories similar to the ones in this study also provide important indirect contact with transgender people. Earlier we noted that the transgender/gender-non-conforming population is estimated to be very small. Of the parents in our study who were asked if their child had contact with someone who is gender non-conforming, only 21% reported that they had. Although this may seem like a large percentage given the estimate of the transgender population, we must also consider that each transgender person knows many other non-transgender people, making the percentage of the population that knows someone who is transgender larger than the transgender population itself. This 'social penumbra' has been shown to be an important factor in people's political attitudes (Gelman & Margalit, 2021).

Another important consideration is that these parents volunteered their children to participate in a study that they were told was explicitly about how reading a story about a transgender character may influence children's beliefs about gender. Because this study focused on gender diversity, a topic that has been surrounded by debate and controversy in the media and politics, this likely led to bias in who was interested in having their children participate. In fact, almost half of the parents who were asked reported having heard of the books that inspired our study. As a result, these topics and types of storylines may not be completely new to some participants. It is unclear, however, whether this selection factor would lead to reduced potential effects (because the children may have already been exposed to positive attitudes towards gender diversity at home) or greater potential effects (because the children may have been more open to the messaging in the videos). We may thus find different effects (either larger or smaller) with children who have more conservative parents or who come from more conservative areas, given the cultural differences in gender essentialism between US children in liberal, urban areas and conservative, rural areas (Fine et al., 2024; Rhodes & Gelman, 2009).

Even with the obstacles to studying potentially sensitive subjects like gender identity, it is important to explore how we can teach young children about gender diversity. LGBTQ+ children throughout the world face high rates of bullying based on their gender expression (e.g., Espino et al., 2024; Kosciw & Zongrone, 2019; Kosciw et al., 2019), as well as legislative efforts to limit their access to places such as restrooms and the military (Fausset, 2017; Hersher & Johnson, 2017; Montgomery, 2017). We hope that this work contributes to research that supports inclusivity and examines how children can learn about important social concepts like gender diversity, in the hopes that the world can become a safe place for gender-non-conforming and non-binary people. This study suggests that introducing children to

transgender characters through direct, realistic stories is one potential way to educate children and may reduce certain essentialist beliefs.

## CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to declare.

## AUTHOR CONTRIBUTIONS

**Rachel D. Fine:** Conceptualization; investigation; formal analysis; project administration; writing – original draft; methodology; data curation; validation; supervision; writing – review and editing. **Solangel Troncoso:** Writing – review and editing; conceptualization; formal analysis. **Susan A. Gelman:** Conceptualization; formal analysis; funding acquisition; writing – review and editing; methodology; supervision.

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## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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## REFERENCES

- Aboud, F. E., & Brown, C. S. (2012). Positive and negative intergroup contact among children and its effect on attitudes. In G. Hodson, M. Hewstone, & H. Swart (Eds.), *Advances in intergroup contact* (pp. 176–199). Psychology Press. <https://doi.org/10.4324/9780203095461>
- Alfonseca, K. (2023). So-called 'Don't Say Gay' rules expanded through 12th grade in Florida. *ABCNews*. <https://abcnews.go.com/Politics/called-dont-gay-rules-expanded-12th-grade-florida/story?id=98691183>
- Allport, G. W. (1954). *The nature of prejudice*. Addison-Wesley.
- Astuti, R., Carey, S., & Solomon, G. (2004). Constraints on conceptual development: A case study of the acquisition of folkbiological and folksociological knowledge in Madagascar. *Monographs of the Society for Research in Child Development*, 69(3), 1–161.
- Barbee, H., Deal, C., & Gonzales, G. (2022). Anti-transgender legislation—A public health concern for transgender youth. *JAMA Pediatrics*, 176(2), 125–126. <https://doi.org/10.1001/jamapediatrics.2021.4483>
- Beatty, A. (2016). *Ada Twist scientist*. Abrams Books for Young Readers.
- Cao, C., & Meng, Q. (2020). Functional roles of mediated and extended mediated contact in promoting intergroup attitudes and post-conflict forgiveness: Mediating effects of cultural affinity. *Current Psychology*, 41(2), 816–826. <https://doi.org/10.1007/s12144-020-00612-8>
- Cherry, M. A. (2019). *Hair lore*. Penguin.
- Ching, B. H. H., & Xu, J. T. (2018). The effects of gender neuroessentialism on transprejudice: An experimental study. *Sex Roles*, 78(3–4), 228–241. <https://doi.org/10.1007/s11199-017-0786-3>
- Ching, B. H. H., Xu, J. T., Chen, T. T., & Kong, K. H. C. (2020). Gender essentialism, authoritarianism, social dominance orientation, and filial piety as predictors for transprejudice in Chinese people. *Sex Roles*, 83, 426–441. <https://doi.org/10.1007/s11199-020-01123-3>
- Cocco, V. M., Bisagno, E., Di Bernardo, G. A., Cadamuro, A., Riboldi, S. D., Crapolicchio, E., Trifiletti, E., Stathi, S., & Vezzali, L. (2021). Comparing story reading and video watching as two distinct forms of vicarious contact: An experimental intervention among elementary school children. *British Journal of Social Psychology*, 60(1), 74–94. <https://doi.org/10.1111/bjso.12404>

- Collin, L., Reisner, S. L., Tangpricha, V., & Goodman, M. (2016). Prevalence of transgender depends on the “case” definition: a systematic review. *The Journal of Sexual Medicine*, 13(4), 613–626. <https://doi.org/10.1016/j.jsxm.2016.02.001>
- David, E. (2017). Capital T: Trans visibility, corporate capitalism, and commodity culture. *Transgender Studies Quarterly*, 4(1), 28–44. <https://doi.org/10.1215/23289252-3711517>
- Davoodi, T., Soley, G., Harris, P. L., & Blake, P. R. (2020). Essentialization of social categories across development in two cultures. *Child Development*, 91(1), 289–306. <https://doi.org/10.1111/cdev.13209>
- Deeb, I., Segall, G., Birnbaum, D., Ben-Eliyahu, A., & Diesendruck, G. (2011). Seeing isn't believing: The effect of intergroup exposure on children's essentialist beliefs about ethnic categories. *Journal of Personality and Social Psychology*, 101(6), 1139–1156. <https://doi.org/10.1037/a0026107>
- Di Paola, S., Domaneschi, F., & Pouscoulous, N. (2020). Metaphorical developing minds: The role of multiple factors in the development of metaphor comprehension. *Journal of Pragmatics*, 156, 235–251. <https://doi.org/10.1016/j.pragma.2019.08.008>
- Diesendruck, G., Goldfein-Elbaz, R., Rhodes, M., Gelman, S., & Neumark, N. (2013). Cross-cultural differences in children's beliefs about the objectivity of social categories. *Child Development*, 84(6), 1906–1917. <https://doi.org/10.1111/cdev.12108>
- Elischberger, H. B., Glazier, J. J., Hill, E. D., & Verduzco-Baker, L. (2016). “Boys don't cry”—Or do they? Adult attitudes toward and beliefs about transgender youth. *Sex Roles*, 75(5–6), 197–214. <https://doi.org/10.1007/s1199-016-0609-y>
- Espino, E., Jiménez-Díaz, O., Del Rey, R., & Elipe, P. (2024). Outlining individual and contextual factors related to LGBTQ+ bullying: A systematic review of two decades of research. *Trauma, Violence & Abuse*, 25(2), 898–917. <https://doi.org/10.1177/15248380231165724>
- Fausset, R. (2017). Deal on North Carolina bathroom law would expand transgender protections. *The New York Times*. <https://www.nytimes.com/2017/10/18/us/north-carolina-bathroom-bill.html>
- Fine, R. D., Gelman, S. A., & Ho, A. K. (2023). Changing beliefs about gender: The relation between contact with gender nonconforming individuals and gender essentialism. *Psychology & Sexuality*, 14(3), 542–558. <https://doi.org/10.1080/19419899.2023.2181706>
- Fine, R. D., Olson, K. R., Gülgöz, S., Horton, R., & Gelman, S. A. (2024). Gender essentialism predicts prejudice against gender nonconformity in two cultural contexts. *Social Development*, 33(1), e12720. <https://doi.org/10.1111/sode.12720>
- Flavell, J. H., Flavell, E. R., & Green, F. L. (1983). Development of the appearance-reality distinction. *Cognitive Psychology*, 15(1), 95–120. [https://doi.org/10.1016/0010-0285\(83\)90005-1](https://doi.org/10.1016/0010-0285(83)90005-1)
- Ganea, P., Pickard, M. B., & DeLoache, J. (2008). Transfer between picture books and the real world by very young children. *Journal of Cognition and Development*, 9(1), 46–66. <https://doi.org/10.1080/15248370701836592>
- Geerds, M. S., van de Walle, G. A., & LoBue, V. (2016). Learning about real animals from anthropomorphic media. *Imagination, Cognition and Personality*, 36(1), 5–26. <https://doi.org/10.1177/0276236615611798>
- Gelman, A., & Margalit, Y. (2021). Social penumbras predict political attitudes. *Proceedings of the National Academy of Sciences of the United States of America*, 118(6), e2019375118. <https://doi.org/10.1073/pnas.2019375118>
- Gelman, S. A. (2003). *The essential child: Origins of essentialism in everyday thought*. Oxford University Press.
- Gelman, S. A., & Markman, E. M. (1986). Categories and induction in young children. *Cognition*, 23(3), 183–209. [https://doi.org/10.1016/0010-0277\(86\)90034-X](https://doi.org/10.1016/0010-0277(86)90034-X)
- Gelman, S. A., & Wellman, H. M. (1991). Insides and essences: Early understandings of the non-obvious. *Cognition*, 38(3), 213–244.
- Gentner, D. (1988). Metaphor as structure mapping: The relational shift. *Child Development*, 59(1), 47–59. <https://doi.org/10.2307/1130388>
- Guerra, R., Rebelo, M., Monteiro, M. B., Riek, B. M., Mania, E. W., Gaertner, S. L., & Dovidio, J. F. (2010). How should intergroup contact be structured to reduce bias among majority and minority group children? *Group Processes & Intergroup Relations*, 13(4), 445–460. <https://doi.org/10.1177/1368430209355651>
- Hall, M. (2015). *Red: A crayon's story*. Greenwillow Books.
- Haslam, N., Rothschild, L., & Ernst, D. (2002). Are essentialist beliefs associated with prejudice? *British Journal of Social Psychology*, 41(1), 87–100. <https://doi.org/10.1348/014466602165072>
- Herman, J. L., Flores, A. R., & O'Neill, K. K. (2022). *How many adults and youth identify as transgender in the United States?* The Williams Institute, UCLA School of Law.
- Hersher, R., & Johnson, C. (2017). Trump administration rescinds Obama rule on transgender students' bathroom use. NPR. <https://www.npr.org/sections/thetwo-way/2017/02/22/516664633/trump-administration-rescinds-obama-rule-on-transgender-students-bathroom-use>
- Herthel, J., & Jennings, J. (2014). *I am Jaꝛꝛ*. Dial Book.
- Hoffarth, M. R., & Hodson, G. (2018). When intergroup contact is uncommon and bias is strong: The case of anti-transgender bias. *Psychology and Sexuality*, 9(3), 237–250. <https://doi.org/10.1080/19419899.2018.1470107>
- Hort, B. E., Fagot, B. I., & Leinbach, M. D. (1990). Are people's notions of maleness more stereotypically framed than their notions of femaleness? *Sex Roles*, 23, 197–212. <https://doi.org/10.1007/BF00289866>
- Husnu, S., Mertan, B., & Cicek, O. (2018). Reducing Turkish Cypriot children's prejudice toward Greek Cypriots: Vicarious and extended intergroup contact through storytelling. *Group Processes & Intergroup Relations*, 21(1), 178–192. <https://doi.org/10.1177/1368430216656469>

- Jaswal, V. K., & Markman, E. M. (2007). Looks aren't everything: 24-month-olds' willingness to accept unexpected labels. *Journal of Cognition and Development*, 8(1), 93–111. <https://doi.org/10.1080/15248370709336995>
- Keil, F. (1989). *Concepts, kinds, and cognitive development*. Bradford Book/MIT Press.
- Kelemen, D., Emmons, N. A., Seston Schillaci, R., & Ganea, P. A. (2014). Young children can be taught basic natural selection using a picture-storybook intervention. *Psychological Science*, 25(4), 893–902. <https://doi.org/10.1177/0956797613516009>
- Kosciw, J. G., Clark, C. M., Truong, N. L., & Zongrone, A. D. (2019). *The 2019 National School Climate Survey*. <https://www.glsen.org/sites/default/files/2020-11/NSCS19-111820.pdf>
- Kosciw, J. G., & Zongrone, A. D. (2019). *A global school climate crisis: Insights on lesbian, gay, bisexual, transgender, and queer Students in Latin America*. A report from the GLSEN Research Institute. Gay, Lesbian and Straight Education Network (GLSEN).
- Lane, J. D., Harris, P. L., Gelman, S. A., & Wellman, H. M. (2014). More than meets the eye: Young children's trust in claims that defy their perceptions. *Developmental Psychology*, 50(3), 865–871. <https://doi.org/10.1037/a0034291>
- Larsen, N. E., Lee, K., & Ganea, P. A. (2018). Do storybooks with anthropomorphized animal characters promote prosocial behaviors in young children? *Developmental Science*, 21(3), e12590. <https://doi.org/10.1111/desc.12590>
- Lissitsa, S., & Kushnirovich, N. (2021). Coevolution between parasocial interaction in digital media and social contact with LGBT people. *Journal of Homosexuality*, 68(14), 2509–2532. <https://doi.org/10.1080/00918369.2020.1809891>
- Lytle, A., Dyar, C., Levy, S. R., & London, B. (2017). Essentialist beliefs: Understanding contact with and attitudes towards lesbian and gay individuals. *British Journal of Social Psychology*, 56(1), 64–88. <https://doi.org/10.1111/bjso.12154>
- Mares, M. L., Sivakumar, G., & Stephenson, L. (2015). From meta to micro: Examining the effectiveness of educational TV. *American Behavioral Scientist*, 59(14), 1822–1846. <https://doi.org/10.1177/0002764215596555>
- Martin, C. L., Fabes, R. A., Hanish, L. D., Gaertner, B., Miller, C. F., Foster, S., & Updegraff, K. A. (2017). Using an intergroup contact approach to improve gender relationships: A case study of a classroom-based intervention. In A. Rutland, D. Nesdale, & C. S. Brown (Eds.), *The Wiley handbook of group processes in children and adolescents* (pp. 435–454). Wiley.
- Meerwijk, E. L., & Sevelius, J. M. (2017). Transgender population size in the United States: A meta-regression of population-based probability samples. *American Journal of Public Health*, 107(2), e1–e8. <https://doi.org/10.2105/AJPH.2016.303578>
- Meier, S. C., & Labuski, C. M. (2013). The demographics of the transgender population. In A. K. Baumle (Ed.), *International handbook on the demography of sexuality* (pp. 289–327). Springer Netherlands.
- Merrilees, C. E., Taylor, L. K., Klotz, M., Goeke-Morey, M. C., Shirlow, P., & Cummings, E. M. (2023). Timing is everything: Developmental changes in the associations between intergroup contact and bias. *International Journal of Behavioral Development*, 47(3), 243–252. <https://doi.org/10.1177/01650254221146409>
- Miller, L. R., & Grollman, E. A. (2015). The social costs of gender nonconformity for transgender adults: Implications for discrimination and health. *Sociological Forum*, 30(3), 809–831. <https://doi.org/10.1111/socf.12193>
- Montgomery, D. (2017). Texas transgender bathroom bill falters amid mounting opposition. *New York Times*. <https://www.nytimes.com/2017/08/08/us/time-is-running-out-on-texas-bathroom-bill.html>
- Moya, C., Boyd, R., & Henrich, J. (2015). Reasoning about cultural and genetic transmission: Developmental and cross-cultural evidence from Peru, Fiji, and the United States on how people make inferences about trait transmission. *Topics in Cognitive Science*, 7(4), 595–610. <https://doi.org/10.1111/tops.12163>
- Orvell, A., Elli, G., Umscheid, V., Simmons, E., Kross, E., & Gelman, S. A. (2023). Learning the rules of the game: The role of generic “you” and “we” in shaping children's interpretations of norms. *Child Development*, 94(1), 159–171. <https://doi.org/10.1111/cdev.13846>
- Orvell, A., Kross, E., & Gelman, S. A. (2017). How “you” makes meaning. *Science*, 355(6331), 1299–1302. <https://doi.org/10.1126/science.aaj2014>
- Orvell, A., Kross, E., & Gelman, S. A. (2019). Lessons learned: Young children's use of generic-you to make meaning from negative experiences. *Journal of Experimental Psychology: General*, 148(1), 184–191. <https://doi.org/10.1037/xge0000445>
- Pauker, K., Carpinella, C., Meyers, C., Young, D. M., & Sanchez, D. T. (2018). The role of diversity exposure in Whites' reduction in race essentialism over time. *Social Psychological and Personality Science*, 9(8), 944–952. <https://doi.org/10.1177/1948550617731496>
- Pauker, K., Xu, Y., Williams, A., & Biddle, A. M. (2016). Race essentialism and social contextual differences in children's racial stereotyping. *Child Development*, 87(5), 1409–1422. <https://doi.org/10.1111/cdev.12592>
- Payne, E., & Smith, M. (2014). The big freak out: Educator fear in response to the presence of transgender elementary school students. *Journal of Homosexuality*, 61(3), 399–418. <https://doi.org/10.1080/00918369.2013.842430>
- Pettigrew, T. F., Christ, O., Wagner, U., & Stellmacher, J. (2007). Direct and indirect intergroup contact effects on prejudice: A normative interpretation. *International Journal of Intercultural Relations*, 31(4), 411–425. <https://doi.org/10.1016/j.ijintrel.2006.11.003>
- Pettigrew, T. F., & Tropp, L. R. (2006). A meta-analytic test of intergroup contact theory. *Journal of Personality and Social Psychology*, 90(5), 751–783. <https://doi.org/10.1037/0022-3514.90.5.751>
- Rhodes, M., & Gelman, S. A. (2009). A developmental examination of the conceptual structure of animal, artifact, and human social categories across two cultural contexts. *Cognitive Psychology*, 59(3), 244–274. <https://doi.org/10.1016/j.cogpsych.2009.05.001>


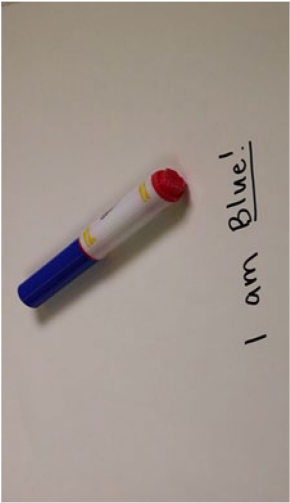
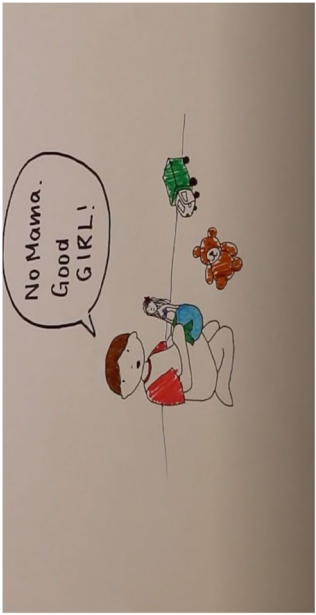
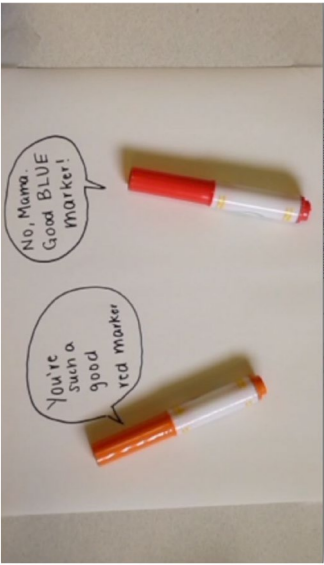
- Rhodes, M., & Mandalaywala, T. M. (2017). The development and developmental consequences of social essentialism. *Wiley Interdisciplinary Reviews: Cognitive Science*, 8(4), e1437. <https://doi.org/10.1002/wcs.1437>
- Richert, R. A., & Schlesinger, M. A. (2017). The role of fantasy–reality distinctions in preschoolers' learning from educational video. *Infant and Child Development*, 26(4), e2009. <https://doi.org/10.1002/icd.2009>
- Richert, R. A., Shawber, A. B., Hoffman, R. E., & Taylor, M. (2009). Learning from fantasy and real characters in preschool and kindergarten. *Journal of Cognition and Development*, 10(1–2), 41–66. <https://doi.org/10.1080/15248370902966594>
- Richert, R. A., & Smith, E. I. (2011). Preschoolers' quarantining of fantasy stories. *Child Development*, 82(4), 1106–1119. <https://doi.org/10.1111/j.1467-8624.2011.01603.x>
- Smiler, A. P., & Gelman, S. A. (2008). Determinants of gender essentialism in college students. *Sex Roles*, 58, 864–874. <https://doi.org/10.1007/s11199-008-9402-x>
- Smyth, K., Feeney, A., Eidson, R. C., & Coley, J. D. (2017). Development of essentialist thinking about religion categories in Northern Ireland (and the United States). *Developmental Psychology*, 53(3), 475–496. <https://doi.org/10.1037/dev0000253>
- Sobel, D. M., Bloom, P., Weisberg, D. S., & Goodstein, J. (2013). Young children are reality-prone when thinking about stories. *Journal of Cognition and Culture*, 13(3–4), 383–407. <https://doi.org/10.1163/15685373-12342100>
- Steinmetz, K. (2014, June). The transgender tipping point. *Time*. <http://time.com/135480/transgender-tippingpoint/>
- Strouse, G. A., Nyhout, A., & Ganea, P. A. (2018). The role of book features in young children's transfer of information from picture books to real-world contexts. *Frontiers in Psychology*, 9, 50. <https://doi.org/10.3389/fpsyg.2018.00050>
- Taylor, M. G. (1996). The development of children's beliefs about social and biological aspects of gender differences. *Child Development*, 67(4), 1555–1571. <https://doi.org/10.1111/j.1467-8624.1996.tb01814.x>
- Taylor, M. G., Rhodes, M., & Gelman, S. A. (2009). Boys will be boys; cows will be cows: Children's essentialist reasoning about gender categories and animal species. *Child Development*, 80(2), 461–481. <https://doi.org/10.1111/j.1467-8624.2009.01272.x>
- Trautner, H. M., Ruble, D. N., Cyphers, L., Kirsten, B., Behrendt, R., & Hartmann, P. (2005). Rigidity and flexibility of gender stereotypes in childhood: Developmental or differential? *Infant and Child Development*, 14(4), 365–381. <https://doi.org/10.1002/icd.399>
- Tropp, L. R., Mazziotta, A., & Wright, S. C. (2016). Recent developments in intergroup contact research: Affective process, group status, and contact valence. In F. Barlow & C. Sibley (Eds.), *Cambridge handbook of the psychology of prejudice* (pp. 463–480). Cambridge.
- Vezzali, L., Hewstone, M., Capozza, D., Trifiletti, E., & di Bernardo, G. A. (2017). Improving intergroup relations with extended contact among young children: Mediation by intergroup empathy and moderation by direct intergroup contact. *Journal of Community and Applied Social Psychology*, 27(1), 35–49. <https://doi.org/10.1002/casp.2292>
- Walker, C. M., Gopnik, A., & Ganea, P. A. (2015). Learning to learn from stories: Children's developing sensitivity to the causal structure of fictional worlds. *Child Development*, 86(1), 310–318. <https://doi.org/10.1111/cdev.12287>
- Walker, C. M., & Lombrozo, T. (2017). Explaining the moral of the story. *Cognition*, 167, 266–281. <https://doi.org/10.1016/j.cognition.2016.11.007>
- Winter, S., Diamond, M., Green, J., Karasic, D., Reed, T., Whittle, S., & Wylie, K. (2016). Transgender people: Health at the margins of society. *The Lancet*, 388(10042), 390–400. [https://doi.org/10.1016/S0140-6736\(16\)00683-8](https://doi.org/10.1016/S0140-6736(16)00683-8)
- Wölfer, R., Christ, O., Schmid, K., Tausch, N., Buchallik, F. M., Vertovec, S., & Hewstone, M. (2019). Indirect contact predicts direct contact: Longitudinal evidence and the mediating role of intergroup anxiety. *Journal of Personality and Social Psychology*, 116(2), 277–295. <https://doi.org/10.1037/pspi0000146.supp>
- Woolley, J. D. (1997). Thinking about fantasy: Are children fundamentally different thinkers and believers from adults? *Child Development*, 68(6), 991–1011. <https://doi.org/10.1111/j.1467-8624.1997.tb01975.x>
- Woolley, J. D., & Ghossainy, M. E. (2013). Revisiting the fantasy–reality distinction: Children as naïve skeptics. *Child Development*, 84(5), 1496–1510. <https://doi.org/10.1111/cdev.12081>

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APPENDIX 1

EXCERPTS FROM THE SCRIPTS FOR THE STORY VIDEOS, WITH ACCOMPANYING SCREENSHOTS OF THE VIDEO IMAGES

Jazz Story Script	Marker Story Script	
		<p>I am Jazz! For as long as I can remember, my favourite colour has been pink. My second-favourite colour is silver, and my third-favourite colour is green. I have a girl brain but a boy body. I was born this way!</p>
		<p>When I was very little, and my mom would say, 'You're such a good boy,' I would say, 'No, Mama. Good GIRL!' At first my family was confused. They'd always thought of me as a boy</p> <p>When I was very little, and my mom would say, 'You're such a good red marker,' I would say, 'No, Mama. Good BLUE MARKER!' At first my family was confused. They'd always thought of me as red</p>

Jazz Story Script



I was so happy when the teachers changed their minds. I can't imagine not playing on the same team as Casey and Samantha. Even today, there are kids who tease me, or call me by a boy name, or ignore me altogether. This makes me feel crummy. Then I remember that the kids who get to know me usually want to be my friend. They say I'm one of the nicest girls at school

Marker Story Script



I was so happy when the teachers changed their minds. I can't imagine not playing on the same team as Royal and Sky. Even today, there are kids who tease me, or call me by a red name, or ignore me altogether. This makes me feel crummy. Then I remember that the kids who get to know me usually want to be my friend. They say I'm one of the nicest blue markers at school