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Transgender and cisgender children's essentialist beliefs about sex and gender identity

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Abstract

Children essentialize gender from a young age, viewing it as inborn, biologically based, unchanging, and predictive of preferences and behaviors. Children's gender essentialism appears to be so pervasive that it is found within conservative and liberal communities, and among transgender and cisgender children. However, it remains unclear what aspect of gender the children participating in past studies essentialized. Such studies used labels such as "girl" or "boy" without clarifying how children (or researchers) interpreted them. Are they indicators of the target's biological categorization at birth (sex), the target's sense of their own gender (gender identity), or some third possible interpretation? This distinction becomes particularly relevant when transgender children are concerned, as their sex assigned at birth and gender identity are not aligned. In the present two studies, we discovered that 6- to 11-year-old transgender children, their cisgender siblings, and unrelated cisgender children, all essentialized both sex and gender identity. Moreover, transgender and cisgender children did not differ in their essentialism of sex (i.e., whether body parts would remain stable over time). Importantly, however, transgender children were less likely than unrelated cisgender children to essentialize when hearing an ambiguous gender/sex label ("girl" or "boy"). Finally, the two studies showed mixed findings on whether the participant groups differed in reasoning about the stability of a gender-nonconforming target's gender identity. These findings illustrate that a child's identity can relate to their conceptual development, as well as the importance of diversifying samples to enhance our understanding of social cognitive development.

KEYWORDS
gender diversity, gender essentialism, gender identity, transgender

1 | INTRODUCTION

Children tend to essentialize gender—they view gender as inborn, biologically based, unchanging, and prescriptive of categorical properties (Gelman & Taylor, 2000). However, what children—or researchers—mean by "gender" has not always been clear. Most studies of gender essentialism describe a given target as a "boy" or a "girl", finding that most children think, for example, that a "boy" was born as a boy, has underlying biological properties that explain his boyhood, and shares properties in common with other boys and not with girls (Diesendruck et al., 2013; Gelman et al., 1986; Gülgöz et al., 2019; Meyer & Gelman, 2016; Rhodes & Gelman, 2009; Rhodes et al., 2014; Taylor, 1996; Taylor et al., 2009). Yet it is unclear in most of these studies whether researchers use terms like "boy" to refer to the target's biological categorization identified at birth (henceforth, *sex*), the target's sense of their own gender (henceforth, *gender identity*), or something else entirely. On perceivers' side, it is unclear whether children believe sex, gender identity, or both are inborn, and whether

children's interpretations vary based on their own gender experiences (e.g., whether they view their own gender identity as aligning with their sex assigned at birth). These questions are especially timely, given increasing recognition that for some people (e.g., transgender, intersex, gender-nonconforming people), sex, gender identity, and other aspects of gender may be distinct.

To address these questions, we conducted two studies to assess children's essentialist beliefs about *gender/sex* (henceforth used to refer to what has been assessed in past work, which could be sex, gender identity, some combination, or neither; van Anders et al., 2017) and how this might relate to essentialist beliefs about gender identity (Studies 1 and 2) and sex (Study 2). Further, we assess these beliefs not only in children most often tested on questions of gender identity (i.e., those whose own sex and gender identity align; henceforth, *cisgender* children), but also in children whose sex and gender identity do not align (henceforth, *transgender* children).

RESEARCH HIGHLIGHTS

- Past research shows children essentialize gender from early on, viewing being a girl or boy as inborn, biological, immutable, and predictive of stereotypical properties.
- Children's interpretation of gender labels in past research (e.g., whether "girl" is used to mean sex, gender identity, or both) has been less clear.
- This ambiguity is especially relevant for transgender children, whose gender identities, being different from their sex, appear to be at odds with gender essentialism.
- This paper demonstrates that transgender and cisgender children might reason differently about sex, gender identity, or unspecified labels (e.g., "boy") used in previous research.

1.1 | Gender/sex essentialism in children

Research has shown that children's essentialist views of gender/sex emerge at a young age. Even in cases where the target child's appearance (Gelman et al., 1986) or rearing environment (Gülgöz et al., 2019; Taylor, 1996; Taylor et al., 2009) provides conflicting information, 3- to 11-year-old children rely on gender category labels (e.g., "girl") as sources of inference about others' behaviors and properties. For example, if two target characters are described as girls but differ in terms of gender-typical appearance, such that one has long hair and one has short hair, children report that the two targets have the same substance in their blood (indicating a belief about shared biology), which they also say differs from the substance found in the blood of a child labeled as a boy (Gelman et al., 1986). Thus, it appears that children believe these categories imply distinct, unseen traits, including biological properties.

In addition, 4- to 9-year-old children report that a baby labeled as a girl raised in a community of only boys and men would grow up to develop properties stereotypically associated with girls (Taylor, 1996; Taylor et al., 2009). That is, children at these ages are likely to believe that the gender/sex category implied by a verbal label such as boy or girl is more influential than their socialization environment in determining stereotypical outcomes. During the preschool years, children also develop a belief that a baby labeled as a girl will likely grow up to be a woman, indicating a sense of stability in their gender/sex category (Kohlberg, 1966; Slaby & Frey, 1975).

Most previous research has not explicitly distinguished between a target's sex and gender identity (e.g., not clearly explaining what is meant by the labels "girl" or "boy"), most likely as a result of the prevalent assumption that both are aligned and the same for children. We know of only one exception: Bem (1989) showed a group of 3- to 5-year-old children a photograph of an unclothed child—with their genitalia presumably signaling the child's sex, rather than gender identity—and found that children believed the target's sex was constant across life. Nevertheless, it is likely that different studies have used the same gender/sex labels to study children's beliefs about different constructs. For example, whereas some research used gender/sex labels in asking participants to make inferences about physical and behavioral properties that were analyzed separately (likely getting at a distinction between sex and gender identity; e.g., Taylor et al., 2009), others used these labels when assessing participants' inferences about an undifferentiated set of physical and behavioral properties (e.g., Gelman et al., 1986; Gülgöz et al., 2019).

Because the prompts in these previous studies do not indicate what the experimenter's labels *girl* or *boy* mean (i.e., not distinguishing between the target's sex and gender identity), it is unclear if the participants think that a child's sex or gender identity (or both) at birth is predictive of biological properties and stereotypical outcomes, and whether participants think sex, gender identity, or both stay stable. Even though most previous research did not explicitly distinguish between target sex and gender identity, it is possible that participating children interpreted the gender/sex label to apply differentially to sex or gender identity across different studies. For example, in what is commonly referred to as the Island Task, used across multiple studies of gender/sex essentialism (e.g., Gülgöz et al., 2019; Taylor, 1996; Taylor et al., 2009), children are presented with the gender/sex label of a newborn and asked to make predictions about the child's characteristics later on; it is likely that in this case the gender/sex label is interpreted as referring to the target child's sex rather than gender identity. In contrast, in other studies assessing children's gender/sex constancy (e.g., Fast & Olson, 2018; Slaby & Frey, 1975), stereotyping (e.g., Rubin et al., 2020; Signorella & Liben, 1985), and inductive potential (e.g., Gelman et al., 1986), gender/sex labels are used in reference to older target children or adults, and therefore could be interpreted as referring to either sex or gender identity.

The essentialist beliefs described above have been demonstrated across cultural contexts, including Israel, India, and the United States (Diesendruck et al., 2013; Mahalingam, 2007; Rhodes & Gelman, 2009; Rhodes et al., 2014; Taylor, 1996; Taylor et al., 2009), though some variation has been found within cultural contexts at least in older children (e.g., Rhodes & Gelman, 2009). Additionally, variation

in children's gender-related beliefs can be predicted by differences in parental characteristics. Research suggests that parents' identities and beliefs about gender/sex correspond to children's gender stereotype and gender role endorsement (e.g., Bos & Sandfort, 2010; Goldberg et al., 2012; Halpern & Perry-Jenkins, 2016; also see Tenenbaum & Leaper, 2002, for a review). Together, these findings indicate that there is reason to expect children's early gender-related experiences could play a role in their developing beliefs about gender/sex.

Because research to date has almost exclusively included cisgender participants raised in environments where the prevailing assumption was that sex and gender identity are aligned, it is not surprising that theoretical constructs used in research would conflate sex and gender identity, and that participants are typically presented with unspecified gender/sex labels such as "boy" and "girl." However, transgender children, for whom sex and gender identity are more clearly distinct, are becoming increasingly visible (Ghorayshi, 2016; Steinmetz, 2014; Yong, 2019), which makes the question of how children might reason differently about sex and gender identity increasingly relevant. There is now an especially salient reason to understand children's beliefs about sex as potentially distinct from gender identity—an approach needed to better understand children's essentialist beliefs about gender/sex.

This approach can provide insight into how cisgender children reason about their transgender peers. We know of one prior study that has examined cisgender children's evaluations of transgender peers, which showed that cisgender children might be ambivalent in terms of their essentialist beliefs about transgender children's gender/sex categories (Gülgöz et al., 2018). This research also showed that cisgender children who essentialized gender/sex by categorizing transgender targets by their sex, versus their gender identity, also showed greater dislike of transgender peers. Thus, obtaining a more comprehensive understanding of cisgender children's beliefs about gender/sex labels, sex, and gender identity may be key to helping better understand the development of negative attitudes toward gender-diverse children.

1.2 | Essentialism of gender/sex in transgender children

In addition to studying how cisgender children think about transgender targets, the current work seeks an understanding of whether there are differences in how transgender children themselves think about gender/sex, gender identity, and sex, as compared to their cisgender peers. Before they socially transition[1], transgender children are typically treated as the gender associated with their sex; once they socially transition, they are typically treated in line with their gender identity, distinct from their sex. Their early experiences with gender/sex are markedly different from those of cisgender children, who have been treated as the same gender/sex their entire lives, and whose gender identity has always aligned, in essentialism-consistent ways, with their sex at birth.

[1] In recent years, some transgender children have elected to socially transition. This usually refers to a change in their gender pronouns, their appearance in terms of hair style and clothing, and their name, to live and present as the gender they identify with.

Aspects of transgender children's early experiences appear to defy assumptions of essentialist reasoning, which might lead to differences in how they reason about gender/sex. To our knowledge, only two studies have been conducted to date, examining transgender children's essentialism of gender/sex, when tested with ambiguous labels (e.g., boy, girl). In one study, Fast and Olson (2018) found that 3- to 5-year-old transgender children and their cisgender siblings were less likely than unrelated cisgender children to report that another person's gender/sex category would stay the same throughout the lifespan. Thus, there is some evidence that being transgender or being closely familiar with someone who is transgender, might affect children's essentialism of gender/sex. However, another study has shown that transgender and unrelated cisgender children might not differ from each other in their essentialist reasoning about gender/sex. Gülgöz and colleagues (2019) found that 3- to 11-year-old transgender children, cisgender siblings, and unrelated cisgender children were similarly likely to use a baby's gender/sex label at birth to make inferences about a child's later gender-typed preferences. Why findings from the two studies differ is unclear: it could be because different domains of essentialism were measured in the two tasks, or because the ages of participants were different, or because of differences in how participants interpreted the reference to gender/sex labels in each of the tasks, among other possible reasons. What is clear is that transgender children's essentialism on the basis of gender/sex labels, and how it might compare to that of cisgender children's, remains an open question.

1.3 | Current research

In the current research, we examined transgender and cisgender children's essentialist beliefs about gender/sex. In Study 1, we created a new measure (adapting the measure developed by Gelman et al., 2007) to assess whether transgender and cisgender children reason differently when they are asked about gender/sex as they have been traditionally studied (via a label that conflates sex and gender identity, e.g., "boy") versus specifically asking about gender identity. In Study 2, we directly compared participants' beliefs about sex and gender identity. Thus, in both studies children were asked about gender identity but the two studies differed in the comparison condition: in Study 1, reasoning about gender identity was compared to a conflation of sex and gender identity, and in Study 2, reasoning about gender identity was compared to a more direct reference to a child's sex, rather than their gender identity.

In both studies, we recruited transgender children, and two comparison groups. The first comparison group consisted of unrelated cisgender children, matched by age and gender identity to each of the transgender participants, to ensure that the two groups were maximally comparable. The second comparison group consisted of cisgender siblings of transgender participants, allowing us to explore how close contact with transgender identities (and/or being raised in a family that is supportive of transgender identities) might relate to children's reasoning about gender. The two studies were pre-registered (Study 1: https://aspredicted.org/e7xy6.pdf; Study 2: https://osf.io/7e3hy).

In Studies 1 and 2, we recruited 6- to 11-year-old children[2]. This age range was wide enough to allow us to assess possible age-related changes, though this was only an exploratory aim of the current studies. Previous research conducted primarily with cisgender children has shown that children living in certain environments (mainly, urban and liberal communities) sometimes show declines in their essentialism of gender/sex by around age 10 (Rhodes & Gelman, 2009; Taylor, 1996; but also see Davoodi et al., 2020).

All participants in these studies were part of a larger longitudinal study on gender development. Although data from measures unrelated to the current study that were completed by these participants have been published in the past (e.g., Fast & Olson, 2018; Glazier et al., 2020; Gülgöz et al., 2019; Olson & Enright, 2018; Rae et al., 2019; Rubin et al., 2020), the measures reported in this paper have not been published before and were preregistered as a distinct project.

2 | STUDY 1: DO TRANSGENDER AND CISGENDER CHILDREN ESSENTIALIZE GENDER/SEX TO A SIMILAR EXTENT?

In Study 1, we assessed essentialism of gender/sex and gender identity. We asked children whether they believed gender/sex was innate (e.g., are people born with it), inherent and biological (e.g., can you see it in their blood), or malleable (e.g., can people change it). We first framed the questions using potentially-ambiguous gender/sex labels ("boy," "girl") as have been used in nearly all previous work. We then were more specific, asking children about gender identity.

We pre-registered our hypotheses and initial data analysis plan (https://aspredicted.org/e7xy6.pdf). Specifically, we predicted that when reasoning about the gender/sex case (i.e., trials in which we did not specify whether we were describing sex or gender identity), children in all groups (transgender children, cisgender siblings, unrelated cisgender children) would be equally likely to essentialize (consistent with Gülgöz et al., 2019), believing that the child's gender/sex is inborn and biologically determined. The one exception we predicted was on the question discussing the ability to change one's gender/sex, where we predicted that transgender participants and cisgender siblings (compared to unrelated cisgender participants) would be more likely to say that the target's gender/sex could change. This prediction was based on the findings from Fast and Olson (2018), in which 3- to 5-year-old transgender children and their cisgender siblings were more likely than unrelated cisgender children to report that someone's gender/sex could change.

Additionally, we predicted that when asked to reason about gender identity by being presented with a target child whose gender/sex label and gender identity were not aligned (i.e., when they heard about "a boy who felt like a girl"), transgender participants and cisgender siblings would show higher rates of essentialism compared to unrelated cisgender children. That is, we predicted that transgender participants and their siblings would be more likely to think that the target's gender identity is inborn, immutable, and unlikely to change.

Based on prior literature (e.g., Rhodes & Gelman, 2009), we also predicted that on gender/sex label trials, children in all groups would show decreasing rates of essentialism with age. Because this is the first study assessing children's reasoning about gender identity, we did not have any predictions regarding whether essentialism of gender identity would differ as a function of participant age.

2.1 | Method

2.1.1 | Participants

Participants were recruited in three groups: transgender children, cisgender siblings of transgender participants (henceforth, siblings), and unrelated cisgender children. Participation was allowed only after parents had provided written consent, and children had provided verbal assent (ages 6–8 years) or verbal and written assent (ages 9–11 years). Participants received a small toy and $10 for incentive. Recruitment procedures for each group of participants are described in further detail below. Because this task was part of a larger longitudinal study, participants received additional measures at time of testing. For detailed participant demographics, please see Table 1.

In both studies, we also included a group of gender-nonconforming participants—children who show behaviors and preferences stereotypically associated with the gender other than their assigned sex, who have not socially transitioned. We present their results separately in the online supplement because the number of participants was so small. Results of the analyses with the gender-nonconforming participants are overall consistent with those found with transgender participants in this paper.

Transgender participants

Transgender participants were 85 6- to 11-year-olds (M_{age} = 8.86 years, SD = 1.65 years; 58 transgender girls/assigned males). Transgender participants were recruited through national support groups and conferences for families with gender-diverse children, via word-of-mouth, through our project's website, and in response to media coverage of the larger project. To collect data from transgender participants (and their siblings and parents), experimenters traveled throughout the United States, meeting the families in their homes, at conferences, or in private spaces in public buildings arranged in advance. Some transgender participants and their families were local to the primary researchers, in which case participants were tested in a developmental psychology lab.

Cisgender siblings

Cisgender siblings included 39 6- to 11-year-olds (M_{age} = 9.11 years, SD = 1.61 years; 21 girls). Recruitment and testing procedures for siblings were identical to those of transgender participants.

[2] In line with our preregistration, we dropped 3- to 5-year-olds when it became apparent they did not understand the task.

TABLE 1 Participant demographics for Study 1

	Transgender	Cisgender siblings	Unrelated cisgender participants
Participants *N*	85	39	81
Age *M* (*SD*)	8.86 (1.65)	9.11 (1.61)	8.88 (1.60)
Gender	58 girls	21 girls	54 girls
M age of transitioning	7.10	N/A	N/A
Race/ethnicity			
White/Europe	71.76%	74.36%	75.31%
Hispanic/Latino	9.41%	7.69%	3.70%
Black/African	1.18%	2.56%	1.23%
Asian	1.18%	0%	1.23%
Multiracial/ethnic	15.29%	10.26%	17.28%
Income			
Less than $25,000/year	1.18%	2.56%	1.23%
$25,001–50,000/year	11.76%	10.26%	9.88%
$50,001–75,000/year	23.53%	25.64%	9.88%
$75,001–125,000/year	22.35%	25.64%	33.33%
Greater than $125,000/year	41.18%	30.77%	45.68%
Missing	0%	5.13%	0%
Parent political orientation[a] *M* (*SD*)	1.83 (1.17)	2.03 (1.32)	2.54 (1.45)

[a]Mean and standard deviation of parents' political ideology on a scale ranging from (1) very liberal to (7) very conservative.

Unrelated cisgender participants

Unrelated cisgender participants were matched to transgender participants and included in the current studies according to our pre-established lab protocol (https://osf.io/duy7b/). For every transgender participant recruited, we recruited an unrelated cisgender participant of the same age and gender identity. For example, a 6-year-old transgender girl (i.e., a child assigned male at birth who had socially transitioned to present as a girl) would be matched to a 6-year-old cisgender girl. Unrelated cisgender participants included 81 6- to 11-year-olds (M_{age} = 8.88 years, *SD* = 1.60 years; 54 girls). Four additional unrelated cisgender participants were excluded because their transgender match did not complete this task. Unrelated cisgender participants were recruited through the child participant database of a university in the Pacific Northwest, United States. During recruitment, families of participants were informed that their child was being recruited for a longitudinal study on gender diversity.

2.1.2 | Measures and procedure

Participants were given an essentialism task (adapted from Gelman et al., 2007) in which they heard about four different children: a smart child, a boy, a mean child, and a boy who feels like a girl. In order to keep the task a manageable length, we did not include additional target characters (e.g., those who were described as a girl or a girl who feels like a boy). For each target child, participants were asked five questions tapping into various tenets of essentialist thinking relating to traits (as control trials), to gender/sex ("boy"), and to gender identity ("boy who feels like girl"): whether each property was inborn, in the brain, in the blood, influenced by the environment (reverse-coded), or changeable (reverse-coded). Participants could respond "yes," "no," or "maybe." The gender/sex label trial was designed to provide a typical assessment of gender essentialism. For such trials, no details were provided about the target child's gender identity (i.e., how the child felt), and when the question included a contrast category, the contrast category was a girl, as in prior studies of gender essentialism (e.g., "Remember that Andrew is a boy. A different kid, a kid named Stacey, is a girl. Do you think Stacey's brain is different from Andrew's brain?"). In contrast, for the gender identity trial, when a contrast category was needed, it was a "boy who feels like a boy," so that the relevant contrast was focused on gender identity (e.g., "Remember that Mike feels like a girl. A different boy, a boy named Jake, feels like a boy. Do you think Mike's brain is different from Jake's brain?").

All participants received the same four trials and in the following order: smart (control trial), boy (gender/sex label trial), mean (control trial), boy who feels like a girl (gender identity trial). This ensured that participants received the ambiguous gender/sex label trial before they were prompted to think about a child whose gender/sex label and gender identity contrasted, making sure that participants' reactions to the more ambiguous or unspecified mention of gender/sex label would not be influenced by the more specific mention of gender identity. Within each trial, questions were presented in the following identical order: born, brain, blood, environment, change (see Table 2 for the full vignettes for the test trials; vignettes for control trials can be seen in the online supplement).

Scoring

Scoring of the test questions was pre-registered. Every essentialist response was scored as "1" (yes for the born, brain, and blood questions; no for the environment and change questions), every "maybe" was coded as "0," and every nonessentialist response was scored as "−1." In line with our pre-registration, for the smart, mean, and gender identity trials, scores on all five questions were averaged, creating a composite essentialism score for each of those trials. For the gender/sex label trial, scores on the first four questions (born, brain, blood, environment) were averaged into a composite score of essentialism (assessing the inborn and biologically determined nature of gender), whereas the fifth question (change) was scored on its own. The scoring for this question was separated because we had a different prediction for the first four questions

TABLE 2 Question scripts for the gender/sex label and gender identity trials in Study 1

	Trial type	
Question	Gender/sex label	Gender identity
	A kid named Andrew is a boy. Andrews likes to be called Andy, wants to wear clothes that mostly boys wear, and play with toys that mostly boys play with.	*A boy named Mike feels like a girl. He wants to be called Michelle, wears clothes that mostly girls wear, and plays with toys that mostly girls play with.*
Born	Do you think Andrew was born a boy?	Do you think Mike was born feeling like a girl?
Brain	Remember that Andrew is a boy. A different kid, a kid named Stacey, is a girl. Do you think Stacey's brain is different from Andrew's brain?	Remember that Mike feels like a girl. A different boy, a boy named Jake, feels like a boy. Do you think Mike's brain is different from Jake's brain?
Blood	In the future, will scientists be able to figure out who is a boy by looking at their blood under an x-ray or a microscope?	In the future, will scientists be able to figure out which boys feel like girls by looking at their blood under an x-ray or a microscope?
Environment	Why is Andrew a boy—is it because of things that people around him did?	Why does Mike feel like a girl—is it because of things that people around him did?
Change	Do you think Andrew can change whether or not he is a boy if he wants to?	Do you think Mike can change whether or not he feels like a girl if he wants to?

Note. Participants could respond to each question with one of three answer choices: "yes," "maybe," or "no." Identical questions were asked for the control trials (more information included in the online supplement). Each participant received the trials in the following order, with the question order shown above: "smart," gender/sex label, "mean," gender identity.

than for the last question (as described above). Note that scoring of the "environment" and "change" questions were such that positive scores meant participants reported the environment did *not* shape gender/sex or gender identity, and that one could *not* change their gender/sex or gender identity if they wanted to (i.e., essentialist responses); negative scores meant that participants reported that the environment *could* shape gender/sex or gender identity, and that one *could* change their gender/sex or gender identity (i.e., nonessentialist responses).

2.2 | Results

2.2.1 | Preliminary analyses

As per our preregistration, we first assessed whether there were unexpected discrepancies in the ages of the three participant groups, by conducting a one-way ANOVA of participant group (3: transgender, cisgender siblings, unrelated cisgender participants) on age. Results showed no significant effects as a function of participant group, as intended, $F(2,202) = 0.34$, $p = 0.710$, $\eta_p\check{s} < 0.01$.

2.2.2 | Primary analyses

We pre-registered three sets of primary analyses to examine different groups of participants' responses on the questions about the boy (i.e., the gender/sex label trial), questions about the boy who feels like a girl (i.e., the gender identity trial), and the control trials (traits: smart and mean). Because they are the main focus of the current study, we present findings from the first two trials here; results of control trials are included in the online supplement and show no significant differences as a function of participant group.

The gender/sex label trial

In the classic gender/sex label vignette (i.e., describing a "boy"; see Table 2), we conducted two ANOVAs as per our preregistered plan. First, a 2 (age group: 6- to 8-year-olds, 9- to 11-year-olds) × 3 (participant group: transgender, cisgender siblings, unrelated cisgender participants) ANOVA was conducted on the composite of the first four questions (born, brain, blood, environment). In contrast to our hypothesis, this analysis yielded a significant main effect of participant group, $F(2,199) = 5.65$, $p = 0.004$, $\eta_p\check{s} = 0.05$. Post-hoc Tukey HSD comparisons showed that transgender participants ($M = 0.33$) and cisgender siblings ($M = 0.28$) did not differ in their essentialism on the composite ($p = 0.741$), whereas unrelated cisgender participants ($M = 0.50$) were more essentialist than cisgender siblings ($p = 0.012$) and transgender participants ($p = 0.020$). Consistent with our hypothesis, there was a significant effect of age group, $F(1,199) = 6.02$, $p = 0.015$, $\eta_p\check{s} = 0.03$, where older participants ($M = 0.31$, $SD = 0.43$) had a lower average essentialism score on the composite when compared to the younger participants ($M = 0.44$, $SD = 0.38$). We had no predictions about and did not find a significant age group × participant group interaction, $F(2,199) = 0.48$, $p = 0.619$, $\eta_p\check{s} = 0.01$.

Second, for the change question (i.e., "Do you think Andrew can change whether or not he is a boy if he wants to?"), we conducted a separate 2 (age group: 6- to 8-year-olds, 9- to 11-year-olds) × 3 (participant group: transgender, cisgender siblings, unrelated cisgender participants) ANOVA. We found a significant main effect of participant group, $F(2,199) = 29.33$, $p < 0.001$, $\eta_p\check{s} = 0.23$. Post-hoc Tukey HSD comparisons showed that, consistent with our prediction, unrelated cisgender participants ($M = -0.01$) were more likely than either transgender participants ($M = -0.82$, $p < 0.001$) or cisgender siblings ($M = -0.80$, $p < 0.001$) to report that the boy's gender could not change (i.e., unrelated cisgender participants were more essentialist), and the latter two groups did not differ from one another ($p = 0.988$). Contrary to our prediction of a decline in essentialism of gender/sex with age, there was not a significant main effect of age group, $F(1,199) = 2.89$, $p = 0.090$, $\eta_p\check{s} = 0.01$. Finally, we had no predictions about the age group × participant group interaction, which was not significant, $F(2,199) = 1.22$, $p = 0.299$, $\eta_p\check{s} = 0.01$.

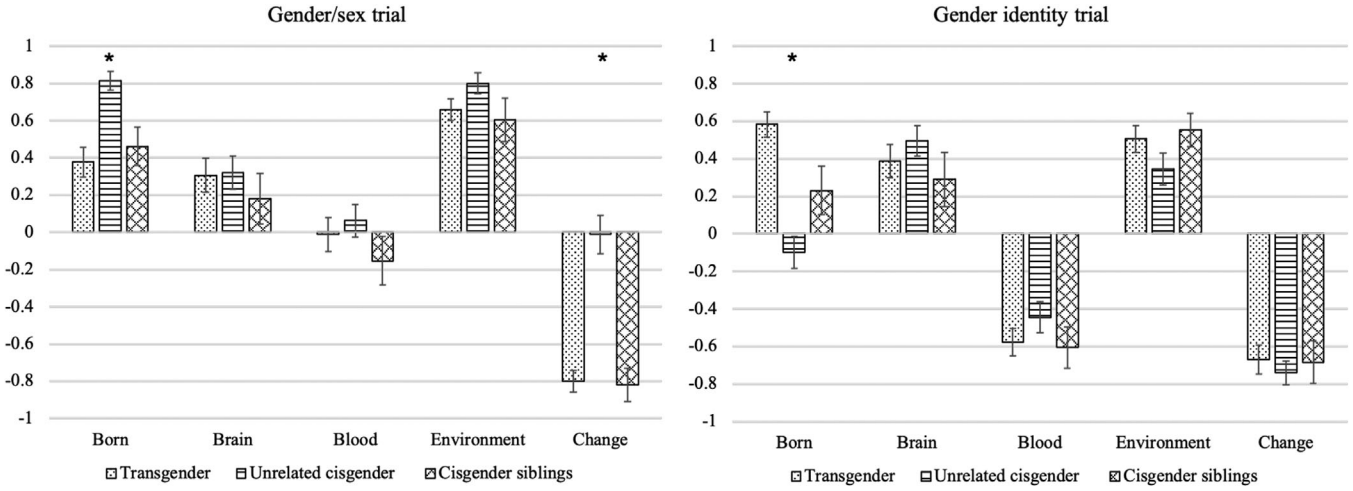

FIGURE 1 Mean essentialist responses given to individual questions in Study 1. *Note.* The figure shows the response patterns by participant group to each question for the gender/sex label ("A kid named Andrew is a boy") and gender identity ("A boy named Mike feels like a girl") trials in Study 1. Full text for each of the five questions within each trial can be seen in Table 1. Asterisks indicate questions where a significant participant group difference was found (see Table 3 for statistical values)

The gender identity trial

In line with our preregistration, a 2 (age group: 6- to 8-year-olds, 9- to 11-year-olds) × 3 (participant group: transgender, cisgender siblings, unrelated cisgender participants) ANOVA was conducted on the five-question (i.e., born, brain, blood, environment, change) composite essentialism score for the gender identity trial (i.e., "boy who feels like a girl," see Table 2). Consistent with predictions, we found a significant effect of participant group, $F(2,199) = 3.74$, $p = 0.026$, η_pš $= 0.04$. Post-hoc Tukey comparisons showed that transgender participants ($M = 0.05$, $SD = 0.31$) were more likely than unrelated cisgender participants ($M = -0.09$, $SD = 0.31$) to essentialize gender identity ($p = 0.023$), but they did not differ significantly from cisgender siblings ($M = -0.06$, $SD = 0.41$, $p = 0.206$); siblings and unrelated cisgender participants also did not differ from each other ($p = 0.903$). We had not made a prediction about an age effect, but found a significant effect of age group, $F(1,199) = 4.55$, $p = 0.034$, η_pš $= 0.022$, where older participants ($M = -0.09$) essentialized gender identity to a lesser extent than younger participants ($M = 0.02$). This finding was consistent with responses on the gender/sex label vignette, described above. Finally, we had no predictions about the interaction of participant group × age group and found no significant effect, $F(2,199) = 2.70$, $p = 0.070$, η_pš $= 0.03$.

2.2.3 | Exploratory analyses

The following analyses were not pre-registered.

Participants' responses to individual questions

We tested how participants in each group responded to each of the test questions. Here, we report only the significant effects (all results and response patterns can be seen in Table 3 and Figure 1). Importantly, because so many tests were run, these are speculative and preliminary results, useful primarily for generating hypotheses for future research.

As can be seen in Table 3 and Figure 1, on the gender/sex label ("boy") trial, unrelated cisgender participants were more likely than transgender and sibling participants to report that the boy was born a boy, and the latter two groups did not differ from each other. This finding was consistent with the change question on the gender/sex label trial that was reported above and also showed differences between groups such that transgender children and siblings thought the boy's gender could change more than unrelated cisgender participants. Additionally, on the gender identity trial (i.e., "boy who feels like a girl"), transgender participants and cisgender siblings were more likely than unrelated cisgender participants to report that the boy was born feeling like a girl, whereas former two groups did not differ from each other. Additionally, as can be seen in Figure 1, the participant groups did not differ from each other in the extent to which they thought a boy feeling like a girl could change that feeling (i.e., the change question on the gender identity trial). This is in contrast to the findings from the change question on the gender/sex label trial, where we found that transgender participants and cisgender siblings were more likely than unrelated cisgender participants to say that a boy could change whether or not he is a boy if he wanted to.

2.3 | Discussion

Based on previous research (Gülgöz et al., 2019), we had predicted that when reasoning about gender/sex ("boy"), transgender participants, cisgender siblings, and unrelated cisgender participants would similarly believe that a target child's gender is inborn and biologically determined, but that transgender participants and siblings would be more likely than unrelated cisgender participants to believe that

TABLE 3 Mean essentialism scores (standard deviations) for each question in each test trial in Study 1, and group comparisons on each question

		Descriptive statistics[a]			
Trial type	Question	Transgender	Cisgender siblings	Unrelated cisgender participants	Group comparisons[b]
Gender/sex label	Born	**0.38 (0.72)**	**0.46 (0.64)**	**0.81 (0.45)**	**$F(2,199) = 10.92$, $p < 0.001$, $\eta_p\check{s} = 0.01$**[c]
	Brain	**0.31 (0.85)**	0.18 (0.85)	**0.32 (0.80)**	$F(2,199) = 0.49$, $p = 0.615$, $\eta_p\check{s} = 0.01$
	Blood	−0.01 (0.84)	−0.15 (0.81)	0.06 (0.80)	$F(2,199) = 1.17$, $p = 0.312$, $\eta_p\check{s} = 0.01$
	Environment[f]	**0.66 (0.55)**	**0.61 (0.72)**	**0.80 (0.51)**	$F(2,199) = 2.01$, $p = 0.137$, $\eta_p\check{s} = 0.02$
	Change[f]	**−0.80 (0.55)**	**−0.82 (0.56)**	−0.01 (0.94)	**$F(2,199) = 29.68$, $p < 0.001$, $\eta_p\check{s} = 0.23$**[d]
Gender identity	Born	**0.58 (0.62)**	0.23 (0.81)	−0.10 (0.77)	**$F(2,199) = 19.41$, $p < 0.001$, $\eta_p\check{s} = 0.16$**[e]
	Brain	**0.39 (0.82)**	0.29 (0.90)	**0.49 (0.73)**	$F(2,199) = 0.86$, $p = 0.426$, $\eta_p\check{s} = 0.01$
	Blood	**−0.58 (0.68)**	**−0.61 (0.68)**	**−0.44 (0.76)**	$F(2,199) = 0.95$, $p = 0.391$, $\eta_p\check{s} = 0.01$
	Environment[f]	**0.51 (0.67)**	**0.55 (0.55)**	**0.35 (0.76)**	$F(2,199) = 1.48$, $p = 0.229$, $\eta_p\check{s} = 0.02$
	Change[f]	**−0.67 (0.71)**	**−0.68 (0.70)**	**−0.74 (0.57)**	$F(2,199) = 0.18$, $p = 0.832$, $\eta_p\check{s} < 0.001$

Note. Trial types and questions are shown in the order that was presented to participants. Essentialism scores ranged from −1 to 1, where higher scores indicated more essentialist responses, and lower scores indicated less essentialist responses.

[a]Each score is compared to chance level. Scores that were significantly different from chance (0) are shown in bold.

[b]Group comparisons that are significant are shown in bold.

[c]Post-hoc Tukey comparisons showed that unrelated cisgender participants were more likely to think a boy was born a boy, when compared to both transgender and sibling groups ($ps \leq 0.008$; the latter two did not differ, $p = 0.846$).

[d]Post-hoc Tukey comparisons showed that unrelated cisgender participants were less likely to think a boy could change being a boy, when compared to both transgender and sibling groups ($ps < 0.001$; the latter two did not differ, $p = 0.999$).

[e]Post-hoc Tukey comparisons showed that unrelated cisgender participants were less likely to think a boy feeling like a girl was born feeling like a girl, when compared to both transgender participants ($p < 0.001$) and siblings ($p = 0.023$). Siblings did not differ from transgender participants ($p = 0.060$).

[f]Questions were reverse-coded, so higher scores on the environment question indicated that participants did not think the environment caused the targets' gender/sex label or gender identity, and higher scores on the change question indicated that participants did not think that one's gender/sex label or gender identity could change.

gender could change across development (in line with Fast & Olson, 2018). Instead, transgender children and their siblings essentialized gender/sex less than unrelated cisgender children across both the composite of four inborn/biological questions and the single question about change. Interestingly, and consistent with our hypotheses, transgender children essentialized gender identity *more* than unrelated cisgender children.

Thus, it appears that one's own group membership and how a researcher asks about gender essentialism may affect the degree to which some groups of children essentialize gender/sex. When the gender/sex label was provided, transgender children essentialized less than their cisgender peers, but when questions were more specifically about gender identity then they essentialized more.

Additionally, in preliminary, post-hoc analyses of item-level data, it appeared that the biggest differences between participant groups occurred on the innateness ("born") items. This exploratory discovery is therefore the basis of Study 2, a confirmatory study focused specifically on beliefs about the innateness of gender/sex. Study 2 also provided an opportunity to more systematically compare children's reasoning about sex and gender identity.

In additional analyses, we found that although there were no age differences regarding children's beliefs about whether gender identity was inborn and biologically (vs. socially) determined, older participants were more likely to report that a target's gender/sex label could change with age, and they were less likely to essentialize gender/sex overall with age. The latter set of findings is consistent with some previous literature using vignettes similar to the gender/sex label trial (e.g., Taylor, 1996; but also see Davoodi et al., 2020), and extends previous findings in that we find that transgender children also showed decreases in their essentialism with age. Thus, it appears that as children grow older, their essentialist beliefs about gender/sex become increasingly flexible, at least in these samples.

3 | STUDY 2: CHILDREN'S VIEWS OF SEX AND GENDER IDENTITY AS INBORN

The aim of Study 2 was to delineate transgender and cisgender children's essentialist reasoning about sex and gender identity. In Study 2, we used a new set of questions to specifically ask about whether participants believed sex (described through body parts) and gender identity (described through how one feels) are inborn. Subsumed within this study, we also sought to run a confirmatory study on differences between transgender and unrelated cisgender participants with regard to beliefs about the innateness of gender/sex, as compared to sex and gender identity separately.

3.1 | Method

3.1.1 | Participants

Participants were recruited for the same three groups as in Study 1, using the same criteria and procedure. Accidentally, 30 additional participants (13 unrelated cisgender participants, 4 cisgender siblings, 13 transgender participants) who participated in Study 1 were also recruited in Study 2 at a later visit as part of the longitudinal study. We excluded these overlapping participants from all analyses of Study 2, as these two studies were too similar. For detailed participant demographics, please see Table 4.

Transgender participants

Transgender participants were 86 transgender children between ages 6 and 11 years (M_{age} = 8.72, SD = 1.64 years; 66 transgender girls).

Unrelated cisgender participants

Age- and gender-matched unrelated cisgender participants included 84 6- to 12-year-olds (M_{age} = 8.78, SD = 1.66 years; 65 girls).

Cisgender siblings

We recruited 42 cisgender siblings of transgender children (M_{age} = 9.06, SD = 1.70 years; 15 girls). Because of the relatively smaller sample size of cisgender siblings we expected to recruit, for this study, analyses related to siblings' responses were pre-registered as secondary analyses.

3.1.2 | Measure and procedure

In two trials, participants were told about a 6-year-old gender-nonconforming girl and boy with the target character's current sex (i.e., body parts) and gender identity (i.e., how they feel). For example, in the trial describing a gender-nonconforming girl, participants heard the following description: "Karen is a 6-year-old. Karen has girl body parts and feels like a boy." After hearing each vignette, participants received two memory checks; if they did not remember the target's current sex or gender identity correctly, the experimenter corrected them. Then, participants were asked if they thought the target child had the same sex and gender identity when the child was born (e.g., "When Karen was born and came out of Karen's mom's tummy, do you think Karen [had boy body parts or girl body parts] / [felt like a boy or like a girl]?"). Responses that implied consistency over time (e.g., saying that Karen was born with girl body parts and was born feeling like a boy) were scored as essentialist responses and assigned 1 point; other responses were scored with 0 points.

In addition to the trials describing gender-nonconforming targets, we included four more trials for exploratory purposes. In two trials, participants heard the same information about a cisgender girl and boy (e.g., "Robert is a 6-year-old. Robert has boy body parts and feels like a boy."). Additionally, participants heard two vignettes describing a girl and a boy for whom it was not specific whether they were cisgender or gender nonconforming (henceforth, gender/sex label trials; e.g., "Lily is a 6-year-old girl."). After each vignette, participants received the same questions as described above (see Table 5 for full vignettes). Scoring was identical across all trials.

TABLE 4 Participant demographics for Study 2

	Transgender	Cisgender siblings	Unrelated cisgender participants
Participants *N*	86	42	84
Age *M* (*SD*)	8.72 (1.64)	9.06 (1.70)	8.78 (1.66)
Gender	66 girls	15 girls	65 girls
M age of transitioning	5.55	N/A	N/A
Race/ethnicity			
White/European	65.12%	71.43%	59.52%
Hispanic/Latino	4.65%	11.90%	3.57%
Black/African	4.65%	0%	0%
Asian	1.16%	4.76%	7.14%
Multiracial/ethnic	10.47%	9.52%	26.19%
Income			
Less than $25,000/year	2.33%	0%	2.38%
$25,001–50,000/year	5.81%	2.38%	4.76%
$50,001–75,000/year	13.95%	9.52%	8.33%
$75,001–125,000/year	25.58%	33.33%	29.76%
Greater than $125,000/year	52.33%	52.38%	53.57%
Missing	0%	2.38%	1.19%
Parent political orientation[a] *M* (*SD*)	1.60 (0.79)	1.70 (0.75)	2.26 (1.29)

[a]Mean and standard deviation of parents' political ideology on a scale ranging from (1) very liberal to (7) very conservative.

TABLE 5 Vignettes used in Study 2

Trial type	Vignette
Gender nonconforming	1. Karen is a 6-year-old. Karen has girl body parts, and feels like a boy. 2. Harry is a 6-year-old. Harry has boy body parts, and feels like a girl.
Cisgender	1. Ashley is a 6-year-old. Ashley has girl body parts, and feels like a girl. 2. Robert is a 6-year-old. Robert has boy body parts, and feels like a boy.
Gender/sex label	1. Lily is a 6-year-old girl. 2. Tom is a 6-year-old boy.

Note. All participants heard all six vignettes. Across participants, there were two orders of items used. All participants first heard the gender/sex label trials, in counter-balanced order across the two order versions. Then, participants were presented with the cisgender and gender nonconforming trials in unique random order. After hearing each vignette, participants were asked two memory check questions ("Does ___ have boy body parts or girl body parts?" and "Does ___ feel like a boy or a girl?") followed by two test questions: "When ___ was born and came out of ___'s mom's tummy, do you think ___ had boy body parts or girl body parts?" and "When ___ was born and came out of ___'s mom's tummy, do you think ___ felt like a boy or like a girl?"

Participants received the current measure as part of a larger battery of tasks. All participants first received the two gender/sex label trials, one describing a girl and one describing a boy, so that interpretation on these trials was not influenced by descriptions of cisgender and transgender targets. After completing these trials, participants completed tasks unrelated to the current paper, which acted as distractor tasks and to avoid fatigue and confusion from answering similar questions. After the distractor tasks, participants were presented with two of the remaining four trials (gender nonconforming and cisgender). Once they completed these two trials, they were given another distractor task, followed by the last two trials. The order of presentation for the last four trials was randomized for each participant with the use of a random sequence generator. All participants received the same distractor tasks in-between blocks of trials. Participants were randomly assigned to one of two orders, where the order of the two questions within each trial (i.e., sex and gender identity) and the gender/sex label mentioned first within each question were counterbalanced.

3.2 | Results

3.2.1 | Analysis plan

Our analysis plan was pre-registered on OSF prior to data collection (https://osf.io/7e3hy).

3.2.2 | Preliminary analyses

As per our pre-registration, we first examined whether target gender/sex label (i.e., whether the target was described as a boy or girl) influenced participants' responses. Collapsing across participant group, we conducted McNemar's tests, separately for the sex and gender identity questions. These tests showed that target gender was not a significant predictor of participants' responses on sex ($p = 0.058$) or gender identity ($p = 0.583$) questions. We conducted the same tests for the cisgender and gender/sex label trials and did not find any significant effects of target gender (sex: cisgender trials, $p = 0.109$, gender/sex label trials, $p = 0.832$; gender identity: cisgender trials, $p = 1.000$, gender/sex label trials, $p = 0.607$). Because there were no significant effects of target gender, for subsequent analyses, we averaged participants' scores on the girl and boy trials of each of the sex and gender identity questions.

3.2.3 | Chance comparisons

We conducted chi-square goodness-of-fit tests on participants' responses for gender-nonconforming targets, to assess whether participants were more likely than chance to report that a gender-nonconforming target's sex and gender identity were inborn. We conducted these tests within transgender participants and unrelated cisgender participants, separately for the sex and gender identity questions. Both transgender and unrelated cisgender participants were more likely than chance to report that a gender-nonconforming child's sex (transgender: $X^2 = 138.08$, $p < 0.001$; unrelated cisgender participants: $X^2 = 189.31$, $p < 0.001$) and gender identity (transgender: $X^2 = 69.21$, $p < 0.001$; unrelated cisgender participants: $X^2 = 71.24$, $p < 0.001$) were the same at birth as they are now. The same tests were conducted for the cisgender and gender/sex label trials, and both transgender and unrelated cisgender participants on all questions were more likely than chance to report that sex and gender identity would remain stable ($ps < 0.001$). Additionally, we compared siblings' responses on each question type to chance distributions and found that siblings were also more likely than chance to report that sex and gender identity were inborn on the gender-nonconforming, cisgender, and gender/sex label trials ($ps < 0.001$).

3.2.4 | Group comparisons

To understand whether transgender and unrelated cisgender participants differed from each other, we conducted chi-square tests of independence for each trial type. First, we examined whether participants said sex and gender identity were inborn on gender/sex label trials. Transgender participants were less essentialist about gender/sex than unrelated cisgender participants; when hearing a sentence such as "Lily is a girl," transgender participants were less likely than unrelated cisgender participants to report that Lily was born with girl body parts (i.e., sex, $X^2 = 21.85$, $p < 0.001$), and that Lily was born feeling like a girl (i.e., gender identity, $X^2 = 6.11$, $p = 0.047$). Next, we examined responses regarding gender-nonconforming targets and found that transgender and unrelated cisgender participants did not differ in their inferences regarding whether the gender-nonconforming target's sex,

TABLE 6 Percentage of different patterns of participant responses in Study 2 for each trial type and participant group

		Trial type					
		Gender/sex label		Cisgender		Gender nonconforming	
Participant group	Response type	Body	Feel	Body	Feel	Body	Feel
Transgender	Inborn on both trials	67%	79%	94%	92%	80%	64%
	Inborn on one trial	12%	11%	6%	8%	18%	23%
	Not inborn on both trials	21%	11%	0%	0%	2%	13%
Unrelated cisgender participants	Inborn on both trials	92%	93%	96%	93%	90%	65%
	Inborn on one trial	8%	5%	4%	6%	8%	25%
	Not inborn on both trials	0%	2%	0%	1%	1%	10%
Cisgender siblings	Inborn on both trials	76%	88%	95%	95%	71%	49%
	Inborn on one trial	12%	12%	5%	3%	29%	35%
	Not inborn on both trials	12%	0%	0%	3%	0%	16%

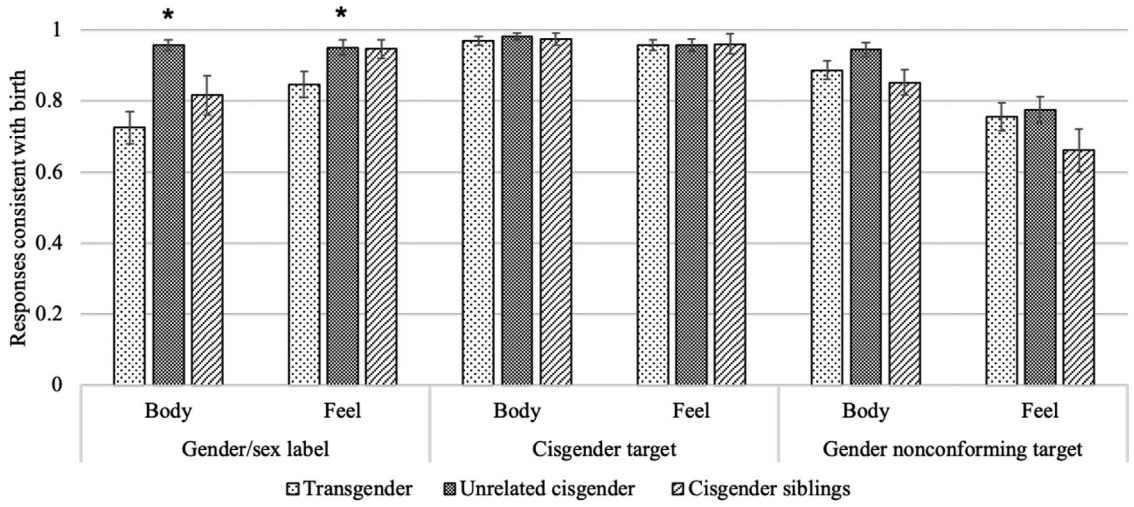

FIGURE 2 Inferences consistent with provided information in Study 2. *Note.* Asterisks indicate questions where there were significant group differences. As can be seen in Table 6 and as described in the Results section of Study 2, transgender children and cisgender siblings were less likely than unrelated cisgender children to say that sex was inborn on gender/sex label trials. Additionally, transgender children were also less likely than unrelated cisgender children to say that gender identity was inborn on gender/sex label trials

$X^2 = 3.56$, $p = 0.168$, and gender identity, $X^2 = 0.57$, $p = 0.753$, were inborn. Finally, we examined responses regarding the cisgender targets, and again found that transgender and cisgender participants did not significantly differ in their reports that a cisgender target's sex, $X^2 = 0.50$, $p = 0.479$, and gender identity, $X^2 = 1.34$, $p = 0.512$, are inborn.

Secondary comparisons conducted between siblings and transgender participants, and siblings and unrelated cisgender participants, mostly yielded no significant group differences ($ps \geq 0.109$; see Table 6 for descriptive statistics). The only exception was that siblings were significantly less likely than unrelated cisgender participants to state that sex was inborn on the gender/sex label trials (e.g., when siblings heard about a girl named Lily, they were less likely than unrelated cisgender participants to assume that Lily was born with girl body parts; $X^2 = 11.49$, $p = 0.003$). Figure 2 shows the overall response patterns in each participant group.

3.3 | Discussion

In Study 2, we examined transgender and cisgender children's responses about the inborn nature of sex and gender identity separately, as well as the gender/sex trial in which a target was described simply as a boy or a girl, as in past work. As in Study 1, transgender children were less essentialist than cisgender children in the gender/sex case (i.e., when hearing about a child described simply as a boy or a girl).

The current study further clarified, however, that once a child's sex and gender identity were stated directly, as in the gender-nonconforming and cisgender cases, the two groups did not differ in their likelihood of seeing sex or gender identity as stable.

This latter finding partially contrasts with one finding from Study 1 in which transgender children were more likely than unrelated cisgender children to believe that a boy who felt like a girl was born feeling that way. Whether this difference is because the finding in Study 1 was not very strong (and was perhaps spurious), because scenarios in two studies were different (describing a boy who feels like a girl using gender pronouns in Study 1 vs. explicitly describing the target's sex and gender identity without gender pronouns), or because of sample fluctuations across the two studies is unclear. Further studies are needed to understand if or when transgender children might be more or less likely than cisgender children to essentialize gender identity.

4 | GENERAL DISCUSSION

Across two studies, we assessed the extent to which transgender children, their cisgender siblings, and unrelated cisgender children essentialize sex, gender identity, and an unspecified mix of the two (gender/sex; e.g., when hearing an unspecified label like "boy"). These studies yielded several novel findings. First, regardless of whether they were cisgender or transgender, participants were essentialist about both sex and gender identity. This finding is consistent with previous research examining transgender and cisgender children's essentialist reasoning about gender/sex (Gülgöz et al., 2019), but is the first demonstration of transgender and cisgender children's reasoning about sex and gender identity separately.

Second, in both studies, transgender children were less likely to essentialize gender/sex compared to unrelated cisgender children. For example, when they heard that a child was a boy, transgender children were less likely than unrelated cisgender children to say that the child was born a boy, with boy body parts, or feeling like a boy. That is, transgender children were less likely to assume that a child simply described as a boy (i.e., without specifying sex and gender identity), was necessarily born with boy body parts and feeling like a boy. This suggests that transgender children might interpret information about gender/sex as more *ambiguous*, which might result from the fact that transgender children, especially prior to socially transitioning, are frequently misgendered by others and assumed to have sex and gender identity that are aligned and present from birth.

It is worth noting that these findings contrast with findings from Gülgöz et al. (2019), where transgender and cisgender children did not differ in the degree to which they essentialized gender/sex (i.e., when described with the labels "boy" or "girl"). However, an important distinction between the two sets of studies is that they assessed reasoning about different facets of essentialism: whereas the current studies examined children's beliefs about the inborn and stable nature of gender/sex, the study reported in Gülgöz et al. (2019) examined children's beliefs about the extent to which one's gender/sex category is causally predictive of their later gender-typed preferences. Whereas previous studies of children's essentialist beliefs have sometimes found the two facets (*inductive potential* and *innateness*) to be related, in some cases they have been found to differ (see Rhodes & Mandalaywala, 2017). In addition, there has been some evidence that transgender and cisgender children may differ in their stereotyping (Olson & Enright, 2018; cf. Fast & Olson, 2018; Rubin et al., 2020), suggesting the difference across papers could be based on the stereotype component rather than the innateness component. It is possible that although someone might essentialize gender identity, for example, by viewing it as innate, they might also view it as open to change, or independent of sex. Future research is needed to understand whether these findings will replicate, and if so, why and how transgender and cisgender children's reasoning about gender/sex differ across these two facets of essentialism.

We found somewhat contradictory results regarding potential differences between transgender and unrelated cisgender participants in their essentialism of gender identity. In Study 1, when given gender/sex labels and gender identity information, transgender children essentialized gender identity more than unrelated cisgender children. In Study 2, when told about a child's sex (i.e., target's body parts) and their gender identity (i.e., how the target feels), transgender and cisgender children did not differ in the degree to which they essentialized gender identity. Whether this difference was caused by context (e.g., knowing the target's gender/sex label vs. sex), whether the finding in Study 1 was spurious (the *p*-value was not small, which provides some possibility for skepticism; Lakens, 2015; Simonsohn et al., 2014), or whether this difference reflects sample fluctuations is unknown. A replication is needed to select among these potential reasons.

Consistent with prior research examining transgender children's, cisgender siblings', and unrelated cisgender children's gender/sex essentialism (Gülgöz et al., 2019), the current studies largely found that transgender children and their cisgender siblings reasoned similarly about sex, gender identity, and gender/sex labels. When there were differences between cisgender siblings and other participant groups, typically they were between cisgender siblings and unrelated cisgender participants (most differences in general were between transgender children and unrelated cisgender children, with the siblings as intermediate). For example, in Study 1, unrelated cisgender participants were more likely than cisgender siblings (and transgender participants) to essentialize gender/sex labels across various questions. Similarly, in Study 2 when reasoning about gender/sex labels, unrelated cisgender participants were more likely than cisgender siblings to state that the target's sex was inborn (transgender participants did not differ from either group).

These findings suggest that cisgender siblings, by virtue of having a transgender sibling, may have unique experiences that influenced their gender concepts. For example, one possibility that remains to be tested, is that families with a transgender family member might have more explicit conversations about sex and gender identity—especially as it relates to their sibling, starting at young ages. Alternatively, just knowing someone who once knew as a member of one gender group and then later knew as another gender could shift how one thinks of gender (e.g., as more flexible). Additionally, it is possible that other factors may influence cisgender siblings' beliefs about gender, factors such as

whether they are younger or older than their transgender sibling, and whether or not they witnessed their sibling's transition. Larger samples in future research might be able to provide a more detailed picture of gender beliefs in cisgender siblings of transgender children. Importantly, the data in the current work indicate that being transgender is not a necessary condition for developing varied beliefs about sex and gender identity, but deeply knowing or living with someone who is transgender might be sufficient. All of this being said, it is important to note that these speculations should be considered in light of the overall finding that transgender children's, cisgender siblings', and unrelated cisgender children's reasoning about sex, gender identity, and gender/sex labels appear to be largely similar, especially when given explicit information about a target's sex and gender identity. The differences must therefore be understood also within the context of considerable similarity.

4.1 | Limitations

As stated earlier, all participants in these studies are part of a larger longitudinal study on gender development. Therefore, it is possible that simply participating in this study might have led children to think more deeply and reflectively about transgender identities. This might especially be the case for transgender participants and their cisgender siblings. Although we took measures to increase comparability between our transgender and unrelated cisgender participant groups, because transgender participants likely discuss the study in more detail with their parents and might be hyper-aware that their identity is the focus of the study, responses might be filtered through this experience. Furthermore, their responses in these studies might at least in part reflect conversations taking place in their homes regarding gender identities. Of course, it is also possible that transgender children, in coming to assert their identities, construct this understanding on their own, and that parents in time adopt their children's beliefs. It would be interesting for future work to examine the possible co-construction of gender concepts within families with transgender or gender-nonconforming members, examining the quantity and content of parent-child conversations taking place around gender, to contribute to our understanding more broadly of how gender concepts are constructed.

The transgender participants in this study are also a unique group of children who are unlikely to be representative of all transgender individuals. These children are raised in environments that are supportive enough to enable childhood social transitions, as well as support participation in long-term research studies. The unrelated cisgender participants were also likely not representative of all cisgender children. The unrelated cisgender participants in the current studies were recruited in an urban city known for its LGBTQ+ friendly policies. Thus, if these studies were replicated in a more conservative environment, cisgender children might be less likely to endorse essentialist beliefs regarding transgender identities. Further research is needed in this area.

One additional limitation has to do with the description of the gender-nonconforming children in the vignettes of Study 2. In these vignettes, gender-nonconforming targets were described as using names that aligned more stereotypically with their sex, and not their gender identity. Whether participants' responses would have differed if we had used stories of children who, for example, had fully socially transitioned, is currently unknown.

4.2 | Conclusions and implications for future research

These studies suggest that the classic way that researchers investigate gender (or gender/sex) is interpreted differently by transgender and cisgender children. Specifically, cisgender children appear to view being a boy or a girl as more inborn than transgender children do, a finding that replicated across both studies and is consistent with Fast and Olson (2018). In contrast, once researchers specify what is meant by "boy" or "girl," the groups appear to reason more similarly.

These findings demonstrate the importance of including diverse populations in developmental research. Children's own identities and experiences with others' identities (i.e., whether they are transgender, the cisgender sibling of a transgender child, or a cisgender child not in such a family) are reflected in their conceptual development, which suggests that limiting our samples to cisgender populations also limits our understanding of gender development. In addition, this work demonstrates that inclusion of transgender children can change the ways that we researchers think about our stimuli; the authors themselves had often conducted research in which a target was described as a boy or a girl and not given additional thought to how different children might interpret those labels in different ways. In moving toward more inclusive developmental science practices, the current work demonstrates the need for carefully operationalizing the constructs we use.

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CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

DATA AVAILABILITY STATEMENT

De-identified data are stored on OSF and can be accessed at this link: https://osf.io/2v73b/

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Additional supporting information may be found online in the Supporting Information section at the end of the article.

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