

Gender Cognition in Transgender Children

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Abstract

A visible and growing cohort of transgender children in North America live according to their expressed gender rather than their natal sex, yet scientific research has largely ignored this population. In the current study, we adopted methodological advances from social-cognition research to investigate whether 5- to 12-year-old prepubescent transgender children ($N = 32$), who were presenting themselves according to their gender identity in everyday life, showed patterns of gender cognition more consistent with their expressed gender or their natal sex, or instead appeared to be confused about their gender identity. Using implicit and explicit measures, we found that transgender children showed a clear pattern: They viewed themselves in terms of their expressed gender and showed preferences for their expressed gender, with response patterns mirroring those of two cisgender (nontransgender) control groups. These results provide evidence that, early in development, transgender youth are statistically indistinguishable from cisgender children of the same gender identity.

Keywords

transgender children, implicit cognition, gender development, social cognition

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Transgender children are receiving increasing attention in the national media and, as a result, are the focus of considerable public debate. For instance, a court recently ruled that 6-year-old Coy Mathis had the right to use the girl's restroom in her Colorado school, although she had been assigned male identity at birth¹ (Payne, 2013). The story of Ryland Whittington, a transgender child who was assigned female identity at birth but who socially transitioned to living as a boy early in childhood, became a viral sensation on YouTube (The Whittington Family, 2014). After months of heated debate, the Minnesota State High School League voted to allow transgender children to play on the sports teams of other children who share their gender identity (rather than their natal sex; Raddatz, 2014). Responses to these and other cases involving transgender children have varied, but a prominent theme has been skepticism. This skepticism takes many forms: concerns that these children are "confused" and that they therefore need therapy (McHugh, 2014), that these children are "delay[ed]" in their understanding of gender in part because of the behavior of their parents (Zucker et al., 1999), or that these children are merely

saying they are the "opposite"² gender, much as they might say on any given day that they are a dinosaur or princess (Walsh, 2014).

What scientific evidence exists one way or another on the topic of transgender identities in childhood? The majority of evidence that children are (or are not) transgender comes from what the children themselves report. Decades of research with gender-nonconforming children, including those who experience *gender dysphoria* (historically *gender identity disorder*), have suggested that these children are much more likely than other children to say that they are the "opposite" gender from their natal sex (e.g., Zucker et al., 1999). However, these data are open to precisely the concerns raised above—any children who are confused, delayed in understanding gender, or just engaging in imaginative play could say that they are the opposite gender, much as children might claim to

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be a cartoon character or superhero. For this reason, self-report measures, while useful in some ways, can be problematic in evaluating these types of concerns.

The current study aimed to inform the discussion of gender cognition in transgender children by supplementing self-reports with a methodology less open to these types of response-bias concerns: implicit measures, such as the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998). Implicit measures are harder to control and are less susceptible to modification than explicit self-report measures (which can be changed on command; e.g., Gregg, Seibt, & Banaji, 2006; McDaniel, Beier, Perkins, Goggin, & Frankel, 2009), have been widely used with child participants (e.g., Rutland, Cameron, Milne, & McGeorge, 2005), correlate with behavior (Greenwald, Poehlman, Uhlmann, & Banaji, 2009), and can be used to assess multiple aspects of cognition, including, for the present purposes, both identity and preferences (e.g., Greenwald et al., 2002). Thus, in the current study, we assessed a group of transgender children's responses on implicit measures of gender cognition in addition to explicit self-reports.

Our primary sample comprised children who present themselves in terms of and appear to other people to be their gender identity (not their natal sex) in all aspects of their lives. Aside from helping to address the central research questions, this population of expressly transgender children was important to study for two other reasons. First, this group is increasingly prominent and likely growing in size in North America as more transgender children are raised in supportive environments (Spack et al., 2012); however, studies using this group are entirely absent from the psychological literature. Second, these children can be thought of as a more "pure" expression of the transgender experience than transgender children who do not present themselves according to their gender identity. The conflict the children in our sample experience is tension between their natal sex and their gender identity—the core of the lived transgender experience. Such a sample is more informative than one comprising transgender children who do not outwardly live in terms of their gender identity, because these children's responses would reflect a conflict between their inner view of themselves and other people's views or society's expectations of them, in addition to the central tension between their gender identity and natal sex. As such, our sample allowed us to reduce potential confounding factors (e.g., incongruence between self-perception and perception by other people) and arrive at clearer conclusions about childhood transgender identities in their full expression. We compared these children with two control groups: cisgender (nontransgender) children matched by gender identity and our transgender participants' own cisgender siblings.

We reasoned that if children are confused by the particular questions posed to them (i.e., as a result of general confusion or a gender "delay"; Zucker et al., 1999), if they are merely self-reporting the "wrong" gender identity (Walsh, 2014) much as one might report being Superman on Halloween, or even if they are just oppositionally reacting to the question of their gender identity—in all cases by stating they are a different gender from their natal sex—these children should show one of two patterns of confusion. First, they could be truly confused, as indicated by random responding and no systematic response across measures and participants. Alternatively, they could implicitly identify as their natal sex (because they actually understand gender and are merely self-reporting this "incorrect" gender).

In contrast, if these children are not confused, delayed, or pretending, and in fact their expressed gender represents their true identity, we would expect them to respond similarly to gender-matched control participants not only on self-report measures, but also on implicit ones. Thus, while the IAT should not be seen as a lie detector test, nor as the final say in determining a child's gender, it can fill in some of the gaps left by the extant literature because it is not open to the same types of criticism as explicit self-report measures. Used in tandem, implicit and explicit measures can be highly informative about the gender cognition of transgender children, and the current study is the first to take such an approach. We focused specifically on 5- to 12-year-olds, whom previous literature suggests are old enough to complete implicit measures (Dunham, Baron, & Banaji, 2007) yet because of their prepubescence are subject to more scientific debate than older transgender individuals about the persistence of their transgender identities (Byne et al., 2012).

Method

Participants

Thirty-two prepubertal transgender children (12 natal females/transgender boys, 20 natal males/transgender girls; mean age = 9 years, 1 month, $SD = 25$ months, range = 5–12 years; 23 White, 2 Asian, 1 White/Asian biracial, 1 Black/White biracial, 3 White/Hispanic biracial, 1 Black, 1 Pacific Islander) were recruited through online and in-person support groups for families with gender-nonconforming children as well as through conferences for gender-nonconforming children and by word of mouth. To be included in the current study, children had to be 5 to 12 years old and live in all contexts as the gender expression "opposite" of their natal sex. These requirements resulted in the exclusion of 4 additional gender-nonconforming participants.

Cisgender siblings of transgender participants were recruited when available and in the study's age range. This resulted in the inclusion of 18 siblings (12 males, 6 females; 13 White, 1 Hispanic, 1 Black, 1 Black/White biracial, 2 White/Hispanic biracial) who were on average approximately 3 months older than their transgender siblings (mean age = 9 years, 4 months, $SD = 26$ months, range = 5–12 years).

Thirty-two control participants (20 female, 12 male; mean age = 9 years, 1 month, $SD = 25$ months, range = 5–12 years; 27 White, 1 Asian, 1 Black/White multiracial, 2 Asian/White biracial, 1 White/Native American/Alaska Native multiracial) matched to the transgender participants were recruited through the first author's research lab from a database of families interested in participating in developmental psychology research studies. They were required to have no significant history of gender nonconformity. Each control participant was matched to a transgender participant by age (within 4 months of age at time of test) and was selected as the "opposite" natal sex of the transgender participants (to match for expressed gender in daily life). Matched control participants also did not differ from transgender participants in performance on the fourth edition of the Peabody Picture Vocabulary Test (PPVT-IV; Dunn & Dunn, 2007; a proxy for verbal IQ), $t(27) = 1.13$, $p = .268$, $d = 0.21$, or in terms of parental income, $t(31) = 1.05$, $p = .304$, $d = 0.19$.

We initially set a criterion of running participants until at least 15 transgender children (who were living in terms of their expressed identity in all aspects of their life) were recruited. At the location where the 15th participant was recruited, additional children were interested in participating, so we ran all available children at that site, which resulted in an N of 19. The manuscript was reviewed for publication in *Psychological Science* at that time. During the review process, 13 additional transgender children (and their siblings and control participants) were run and, after consultation with the associate editor who reviewed the article, we decided to add them to the current report. No substantive changes resulted from the addition of these participants, but all estimates became more precise.

Measures

Gender-preference IAT. We assessed participants' implicit gender preferences with a half-length IAT (modeled after those used by Newheiser & Olson, 2012). This length was feasible for use with all but the youngest children in this study and was short enough to allow participants to complete the other measures without losing their attention. In the IAT, participants must classify stimuli from four categories using two response keys. For the

gender-preference IAT, the categories were "male," "female," "good," and "bad." One response key in the IAT was used to classify stimuli from two categories (one target item, such as "male," and one valence item, such as "good"), and the other response key was used to classify stimuli from the remaining target and valence categories (e.g., "female" and "bad").

Stimuli for the categories "male" and "female" were pictures of four male and four female children. An additional two photographs (one male, one female) were used as category labels. Pictures were used so that reading was not necessary. Stimuli for the attributes of "good" and "bad" were taken from Newheiser and Olson (2012). The "good" stimuli consisted of a present, puppies, an ice cream cone, and flowers; the "bad" stimuli were a snake, a spider, a car accident, and a fire. The labels for these attributes were represented by a smiley face (good) and a frowny face (bad). Scoring followed the Newheiser and Olson (2012) algorithm, which is based on the general IAT scoring algorithm (Greenwald, Nosek, & Banaji, 2003) with a modification for the shorter length of the current test. This scoring involves the computation of an effect size, D , in which a score of 0 indicated that participants were just as quick to associate "male" with "good" and "female" with "bad" as they were to associate "male" with "bad" and "female" with "good." Positive scores meant that control participants were faster to associate their natal sex with "good" and the "other" sex with "bad," while negative scores meant the opposite. Transgender participants were coded both ways in the analyses—once with positive scores indicating an association between their expressed gender and "good," and once with positive scores indicating an association between their natal sex and "good" (the conversion involved merely multiplying one coding scheme by -1 to get the other).

Gender-identity IAT. Participants' implicit gender identity was assessed with a second IAT that was similar to the gender-preference version, except that the categories "me" and "not me" replaced "good" and "bad." The stimuli for the "me" category were "I," "mine," "me," and "myself," whereas the stimuli for the "not me" category were "they," "them," "theirs," and "other." Scoring was similar, with 0 meaning participants were just as quick to associate "me" with "male" and "not me" with "female" as they were to associate "me" with "female" and "not me" with "male." Positive scores meant control participants were faster to associate their sex with "me" and the other sex with "not me," while scores for transgender participants were coded both ways (according to expressed gender and according to natal sex) for comparison. This task required some very basic reading skills and therefore was not used with the very youngest children.

Explicit gender peer preferences. To assess explicit gender peer preferences, we asked participants, in each of eight trials, which of two people they would prefer to be friends with. On six of these eight trials (the only ones analyzed), the pair involved one boy and one girl, matched for approximate age and attractiveness. The other two trials were fillers—one with a pair of boys and one with a pair of girls. The appearance of each target child on the left versus the right of the screen was counterbalanced; half of the critical trials for all participants had a boy on the left, and half had a boy on the right. For control participants, responses were coded in terms of the number of times out of six that children selected the peer who matched their own sex, and 3 was subtracted from this total so that 0 indicated no preference for males or females. Positive scores indicated a preference for one's own sex, and negative scores indicated a preference for the other sex. For transgender participants, responses were coded once in terms of the number of times they selected the same-gender peers and then reverse-scored for a same-sex score.

Explicit object preferences. Participants' explicit preferences for objects were measured across six trials on which they were shown pairs of photographs of children and told that each one had a preferred toy or food. The names of these items were in fact novel words (e.g., "This is Amanda and she likes to play *flerp*. This is Andrew and he likes to play *babber*"). Our interest here was whether children would use the gender of the person endorsing the item to inform their own preferences (this task was based on one devised by Shutts, Banaji, & Spelke, 2010). Children were subsequently asked, for example, whether they would prefer *flerp* like Amanda or *babber* like Andrew. Scoring was the same as for gender peer preferences.

Explicit gender identity. We measured participants' gender identity by telling them that people have outsides (their physical body) and insides (their feelings, thoughts, and mind). They were told that some people feel like they are boys on the outside, and some feel like they are girls on the outside, and that those people might feel the same way or different on the inside. They were told some people feel, for example, like a boy on the outside and inside, and that others feel like a boy on the outside but a girl on the inside. Further, they were told that some people feel like both or neither, or that their feelings change over time. Children were asked whether, on the inside, they felt like a boy, a girl, neither, or both; whether their gender identity changed over time; or whether they did not know.

Missing data and other measures. One sibling, 1 control participant, and 2 transgender participants were too young to read and therefore did not complete the

gender-identity IAT (all 5- to 6-year-olds). Two transgender participants, 3 control participants, and 5 siblings did not complete the PPVT-IV because they were too young and did not have the attention span to complete all measures (the PPVT-IV was the longest measure), the family needed to leave the testing session early (the PPVT-IV was typically administered last), or the PPVT-IV materials were not available at the time of testing. Two transgender participants chose not to complete the explicit peer or objects measures at all, 1 transgender participant and 1 sibling did not complete all peer-preference items, and 1 control participant and 1 sibling did not complete all object-preference items. One transgender participant's parents requested that the participant not be asked the explicit gender-identity question. These participants were dropped on those particular measures but were included for all other measures, hence the sample-size differences across analyses. Two siblings were dropped completely because they completed no IAT and PPVT-IV measures and, in one case, did not complete one of the explicit measures—which made their participation of no added value. All other participants completed all measures.

Some participants completed additional measures for the purposes of a pilot study. Although such measures would typically be done with another group of participants, access to this sample is very limited, so all participants were run in the primary measures, and other measures were sometimes run as pilot measures on the same participants. From the beginning of the study, however, the measures reported here were identified as those of central interest and therefore were given highest priority when we had limits on children's time (e.g., when we needed to include multiple families within the span of a 2-hr support-group meeting). Pilot measures were added and subtracted as time allowed and as it became clear that they could or could not be understood by participants. Some of these items will be adapted for use in follow-up studies, including longitudinal studies of these participants, once wording issues are resolved.

Results

The crucial question was whether transgender children would show (a) a confused pattern of results, as indicated by inconsistency across measures or null effects on measures; (b) a pattern indicating that they actually knew their identity but were merely pretending on explicit measures, as indicated by natal-sex-responding on implicit measures and expressed-gender-responding on explicit measures; or (c) a pattern that mirrored the responses of other children sharing their gender identity on all measures. When the transgender children's responses were considered in light of their natal sex, their responses differed significantly from those of the

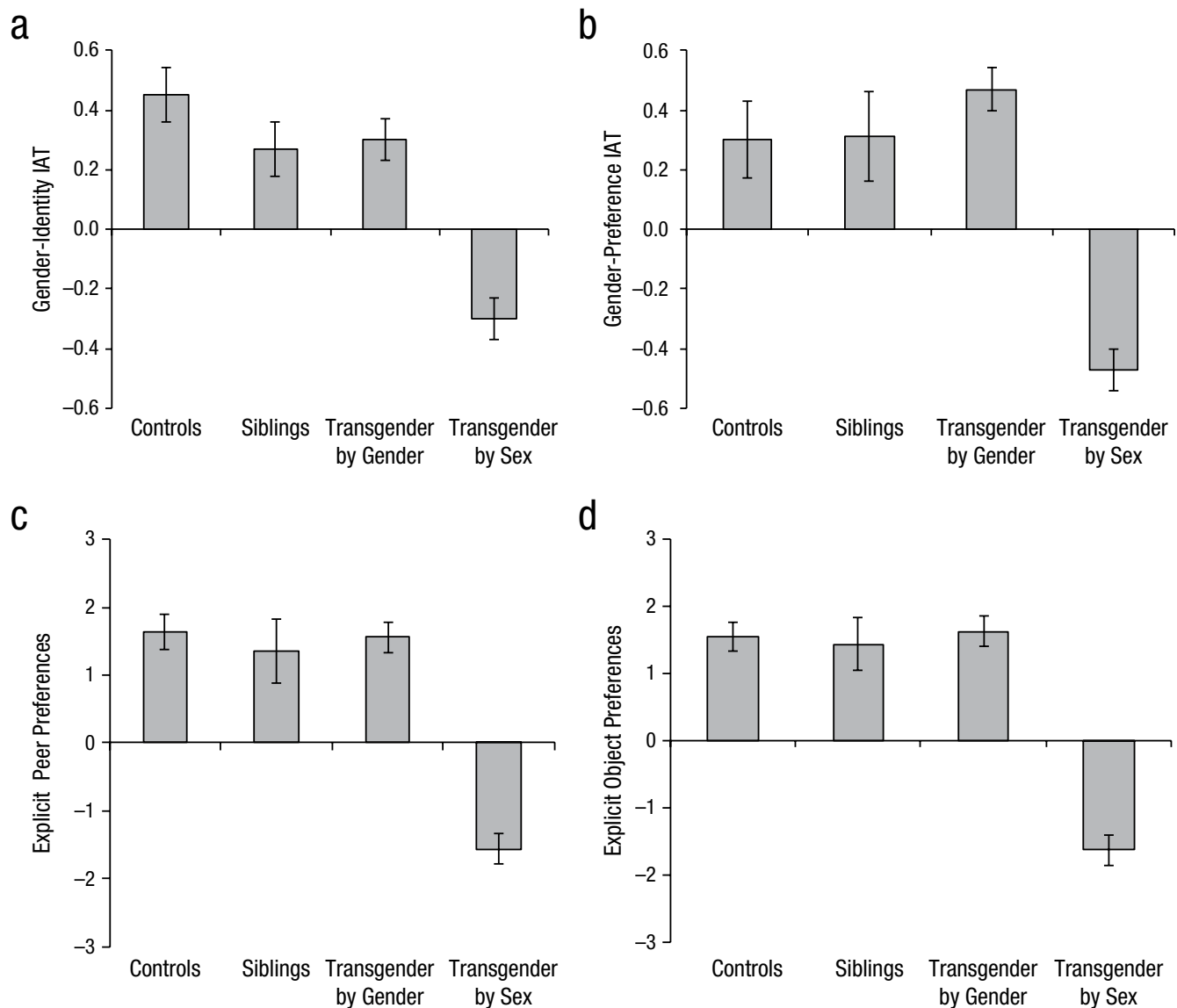


Fig. 1. Results of the (a) gender-identity Implicit Association Test (IAT), (b) gender-preference IAT, (c) assessment of explicit peer preferences, and (d) assessment of explicit object preferences. For each measure, mean scores are shown separately for transgender participants (coded both for their expressed gender and for their natal sex), control participants, and transgender participants' siblings. Means above zero indicate preferences for the same sex or gender, and means below zero indicate preferences for the opposite sex or gender. See the text for further details on scoring. Error bars indicate standard errors of the mean.

two control groups on all measures ($ps < .002$; see Fig. 1). In contrast, when transgender children's responses were evaluated in terms of their expressed gender, their response patterns did not differ significantly from those of the two control groups on any measure ($ps > .20$).

Gender-preference IAT

Gender-preference IAT D scores at the group level were compared with 0 using a one-sample t test, which can determine whether members of the group on average

show a significant preference for their own gender (as evidenced by a statistically significant positive value) or a preference for the other gender (as evidenced by a statistically significant negative value). Comparisons between groups were conducted using a paired-samples t test, along with a measure of effect size, Cohen's d . Transgender children showed a significant implicit preference for their expressed gender ($D = 0.47$), $t(31) = 7.81$, $p < .001$; control participants showed a significant implicit preference for their natal sex ($D = 0.35$), $t(31) = 3.45$, $p = .002$; and the smaller sibling group showed a marginally

significant preference for their natal sex ($D = 0.31$), $t(17) = 2.08$, $p = .053$. When considered in light of their expressed gender, transgender participants did not significantly differ from control participants, $t(31) = 1.14$, $p = .262$, $d = 0.20$, or their siblings, $t(17) = 1.162$, $p = .261$, $d = 0.27$. When considered in terms of their natal sex, transgender participants differed from both control participants, $t(31) = 6.14$, $p < .001$, $d = 1.08$, and their siblings, $t(17) = 3.96$, $p = .001$, $d = 0.92$.

Gender-identity IAT

The statistical procedure used for the gender-identity IAT was identical to that used for the gender-preference IAT. All three groups of participants showed significant implicit gender-identity effects: Transgender children implicitly identified with their expressed gender ($D = 0.30$), $t(29) = 3.89$, $p = .001$; control participants implicitly identified with their natal sex ($D = 0.40$), $t(30) = 4.97$, $p < .001$; and siblings identified with their natal sex ($D = 0.26$), $t(16) = 3.10$, $p = .007$. When considered in terms of their expressed gender, transgender children did not differ from gender-matched control participants on the gender-identity IAT, $t(29) = 1.24$, $p = .227$, $d = 0.22$, nor did they differ from their siblings, $t(16) = 0.07$, $p = .948$, $d = 0.02$. When considered in terms of their natal sex, transgender children differed from both control participants, $t(29) = 6.75$, $p < .001$, $d = 1.23$, and siblings, $t(16) = 4.30$, $p = .001$, $d = 1.06$.

Explicit gender peer preferences

To examine explicit gender peer preference, we compared the means of each participant group with chance (0) via a one-sample t test, whereas differences between groups were compared via paired-samples t tests. Transgender participants showed a significant tendency to favor peers of their expressed gender ($M = 1.59$), $t(28) = 7.06$, $p < .001$, $d = 1.31$, as did control participants ($M = 1.69$), $t(31) = 7.60$, $p < .001$, $d = 1.34$, and siblings ($M = 1.41$), $t(16) = 3.68$, $p = .002$, $d = 0.89$. When considered according to their expressed gender, transgender children did not differ from control participants on their peer preferences, $t(28) = 0.20$, $p = .842$, $d = 0.04$, nor did they differ from their siblings, $t(14) = 0.39$, $p = .700$, $d = 0.11$. In contrast, when considered according to their natal sex, transgender children differed from both control participants, $t(28) = 10.94$, $p < .001$, $d = 2.04$, and siblings, $t(14) = 4.84$, $p < .001$, $d = 1.25$.

Explicit object preferences

The statistical procedure used to assess explicit preferences for objects was identical to that used for explicit

gender peer preference. Transgender children preferred objects endorsed by children of their expressed gender ($M = 1.60$), $t(29) = 7.54$, $p < .001$, $d = 1.38$. Similarly, control participants ($M = 1.48$), $t(30) = 7.79$, $p < .001$, $d = 1.39$, and siblings ($M = 1.59$), $t(16) = 4.77$, $p < .001$, $d = 1.16$, preferred objects endorsed by members of their natal sex. When considered according to their expressed gender, transgender children did not differ significantly from control participants, $t(28) = 0.317$, $p = .754$, $d = 0.06$, or their siblings, $t(14) = 0.000$, $p = 1.00$, $d = 0.0$. When considered according to their natal sex, transgender children differed significantly from both control participants, $t(28) = 11.50$, $p < .001$, $d = 2.13$, and their siblings, $t(14) = 5.45$, $p < .001$, $d = 1.41$.

Explicit gender identity

In all groups, the majority of participants—81% of control participants ($n = 26$ of 32), 87% of transgender participants ($n = 27$ of 31), and 94% of siblings ($n = 17$ of 18)—indicated that their explicit internal gender identity corresponded to their sex (for control participants) or expressed their gender (for transgender participants). A minority of children chose “neither,” “both,” “it changes over time,” or “I don’t know” in response to questions about their internal gender identity. Six control children said either “both” ($n = 3$) or “I don’t know” ($n = 3$), and 1 sibling said “I don’t know.” In addition, 4 transgender children said “both” ($n = 1$), gave a response that corresponded to their natal sex ($n = 2$), or responded “I don’t know” ($n = 1$). Responses that aligned with participants’ gender were given a score of 1; any other answer was given a 0. Differences between groups were then analyzed using a McNemar test, which indicated that transgender children’s perceptions did not differ significantly from those of control participants, $p = .727$, or siblings, $p = .625$. If participants were recoded such that 1 indicated their natal sex and 0 was any other response, transgender children’s preferences then differed significantly from those of both control participants, $p < .001$, and siblings, $p < .001$.

Discussion

On both more-controllable self-report measures and less-controllable implicit measures, our group of transgender children showed a clear indication that they thought of themselves in terms of their expressed gender. Their responses were indistinguishable from those of the two cisgender control groups, when matched by gender identity. They showed a clear preference for peers and objects endorsed by peers who shared their expressed gender, an explicit and implicit identity that aligned with their expressed gender, and a strong implicit preference for

their expressed gender. While future studies are always needed, our results support the notion that transgender children are not confused, delayed, showing gender-atypical responding, pretending, or oppositional—they instead show responses entirely typical and expected for children with their gender identity.

Limitations and future directions

The participants in this study are transgender children who are allowed to live everyday life congruent with their gender identity. The primary identity-relevant tension they are experiencing is likely between their natal sex and their gender expression rather than the combination of this tension and the tension between how they see themselves and how other people see them or society sees them on a daily basis. It is unclear whether these findings would then generalize to transgender children who do not receive support from their families, those who do not live according to their identified gender in all aspects of their daily life, or those who identify themselves as neither female nor male, or as both, in everyday life (e.g., rejecting male or female pronouns for themselves and choosing gender-neutral names; Ehrensaft, 2011). All of the participants tested here identified and lived life as one gender at the time of assessment, choosing names consistent with that gender and preferring those pronouns as well. Future studies along the spectrum of childhood transgender experiences will be needed to clarify how generalizable these findings are to children who have different degrees of identified gender expression or to those with different life experiences.

A second remaining question is how these results in childhood might relate to persistence of transgender identity later in life (e.g., Drummond, Bradley, Peterson-Badali, & Zucker, 2008; Green, 1987; Wallien & Cohen-Kettenis, 2008). If these measures—for example, the degree of one's implicit gender identity in childhood—are shown to be predictive of transgender experience in adolescence and adulthood, they may be useful to parents and clinicians, in combination with clinician evaluations, in deciding about early hormonal and medical interventions that can help transgender youths develop bodies that match their expressed gender. Given that other research has shown the utility of the IAT in predicting clinically relevant outcomes (Nock & Banaji, 2007; Nock et al., 2010; Teachman, Smith-Janik, & Saporito, 2007), the possibility that early gender cognition, and in particular, implicit measures of gender cognition, could be useful in predicting later-life identity (and perhaps informing medical decisions related to identity) remains a provocative possibility, though one that would need substantially more testing before the IAT could be used in this way.

Conclusion

In summary, our findings refute the assumption that transgender children are simply confused by the questions at hand, delayed, pretending, or being oppositional. Instead, transgender children show responses that look largely indistinguishable from those of cisgender children, who match transgender children's gender expression on both more- and less-controllable measures. Further, and addressing the broader concern about transgender individuals' mere existence raised at the outset of this article, the data reported here should serve as evidence that transgender children do indeed exist and that their identity is a deeply held one.

Author Contributions

All three authors designed the measures and wrote the manuscript. K. R. Olson led data collection and analysis.

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Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

Notes

1. We avoid using common colloquial phrases such as “born as a boy” because they suggest that transgender identities are not innate (an unresolved scientific question) and are thus offensive to some individuals.
2. We use the term “opposite” for clarity but acknowledge that gender is not binary.

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