

Cues Signaling Gender Segregation and Gender Inclusion in Public Spaces Affect Adolescents' Binary Conceptualization of Gender and Attitudes Toward Transgender and Nonbinary People

TRACI K. GILLIG
Washington State University, USA

SONIA JAWAID SHAIKH
University of Amsterdam, The Netherlands

LEILA BIGHASH
University of Arizona, USA

Gender segregation of public facilities (e.g., restrooms) is communicated via cues such as language and imagery on facility signage. While people are exposed to these cues regularly, little research examines how they influence adolescents' gender-related attitudes and social behaviors. In this preregistered online experiment, we tested differential impact of exposure to gender-segregated and all-gender facilities cues in a school environment on the attitudes and peer selection of 319 adolescents (aged 12–17 years) from a nationally representative sample. Exposure to gender-segregated facilities cues positively predicted binary conceptualization of gender and did not predict gender-congruent peer selection. Adolescents' prior exposure to all-gender facilities in everyday life was associated with more positive attitudes toward transgender and nonbinary people and increased comfort with all-gender facilities. Results indicate effects of gendered facilities cues on adolescents' gender-based socialization. Social and theoretical implications are discussed.

Keywords: adolescents, gender, transgender, lesbian, gay, bisexual, queer, attitudes, visual cues, visual communication

States such as California and Illinois and cities such as Seattle in the United States have mandated that single-occupancy public restrooms be designated all-gender (Leins, 2019). Likewise, educational and community entities such as the University of California, Berkeley, and the West Lafayette Parks Department in Indiana have built all-gender restrooms and locker rooms in new recreational facilities (Kozub, 2018; Lake, 2019). At the same time, some state and local governments have attempted to prevent people from

Traci K. Gillig: traci.gillig@wsu.edu

Sonia Jawaid Shaikh: s.j.shaikh@uva.nl

Leila Bighash: lbighash@arizona.edu

Date submitted: 2022-01-13

Copyright © 2023 (Traci K. Gillig, Sonia Jawaid Shaikh, and Leila Bighash). Licensed under the Creative Commons Attribution Non-commercial No Derivatives (by-nc-nd). Available at <http://ijoc.org>.

freely using facilities aligning with their gender identity (Brooks, 2021). With little federal guidance pertaining to gender segregation in public spaces, gender-based access to public facilities varies notably across state and local lines in the United States.

Fights for restroom access are not new. In 2016, the North Carolina legislature passed a bill barring people from using restrooms aligning with their gender identity (Avery, 2020). The policy sought to prevent transgender and nonbinary (TNB) individuals (i.e., people whose gender identities may not align with their birth sex; American Psychological Association, 2015a, 2015b) from using their preferred facilities. A nationwide backlash ensued, with major companies nixing plans for expansion in the state and national sports organizations relocating their tournaments. One year later, the North Carolina legislature effectively repealed the bill. Well before TNB people had to advocate for access to public facilities, women themselves were fighting for access.

The existence of gender-segregated public facilities in fact emerged from 19th-century social and political conflicts as women increasingly ventured out of the home (traditionally their domain) into the public space (the domain of men; Kogan, 2007). Policy makers responded to the increasing gender integration of public spaces by dividing "home-like" facilities, such as restrooms, into men's and women's spaces. In 1887, Massachusetts adopted the first law mandating workplace restrooms be separated by sex (Act of March 24, 1887). Nearly all U.S. states passed similar legislation by 1920 (Kober, 1921). Today, more than 100 years later, such facilities are still pervasive (Davis, 2020; Sanders & Stryker, 2016).

The continued existence of gender-segregated public facilities is curious considering shifting perspectives on gender in the West, which now emphasize the existence of gender beyond a male-female binary (Hyde, Bigler, Joel, Tate, & van Anders 2019; Moñtanez, 2017). Likewise, more similarities than differences exist between genders on psychological variables (Hyde, 2005). Aligning with the evolving scientific understanding of gender, a cultural shift has occurred. In mainstream media, 2014 marked a "transgender tipping point" where transgender media personae achieved never-before-seen visibility, and a *TIME* magazine cover featuring transgender activist and actress Laverne Cox commemorated the milestone (Steinmetz, 2014). Since then, TNB visibility has remained broadly elevated and has increased in youth-focused media (Italie, 2019). On social media platforms, young people explore, articulate, and discuss new gender labels (e.g., genderfluid, agender; Szulc, 2020). In politics, TNB candidates had record wins in 2020 (e.g., Sarah McBride of Delaware became the first openly transgender U.S. state senator; McDaniel & Garcia, 2020), and the U.S. Senate confirmed the first openly transgender federal official, Assistant Secretary for Health Dr. Rachel Levine (Wamsley, 2021). In education, 11 U.S. states have required that sexual education classes include representation of lesbian, gay, bisexual, transgender, queer (LGBTQ) and related identities or do not provide information that discriminates against LGBTQ people (Hubbard, 2021). Heightened visibility of TNB people has contributed to young people being more familiar and comfortable with TNB identities—and more likely to identify as TNB (Geiger & Graf, 2019). A 2021 study found that 9% of high school students in Pittsburgh identified as TNB (Kidd et al., 2021). Other research has estimated that 2% of youth in the United States are transgender (Johns et al., 2019). A large survey of LGBTQ youth found that one-quarter identify as nonbinary (The Trevor Project, 2021). Nationwide, nearly three-quarters of young adults aged 18 to 29 years are familiar with nonbinary pronouns such as "they/them" (Geiger & Graf, 2019).

However, many adolescents may receive conflicting messages about gender. For example, seeing a TNB TV character may prompt a child to understand gender as being nonbinary, but this understanding may be counteracted by seeing separate spaces for boys and girls at school. Schools are one of the most important institutions to shape young people's socialization and identity development (Brint, Contreras, & Matthews, 2001; Chandra-Mouli, Plesons, & Amin, 2018). With this knowledge, might it be that the presence of gender-segregated spaces marked by gendered language and imagery in locations such as schools shape adolescents' gender-related attitudes and peer relationships? This research question guides our study, which examines the impact of all-gender, compared with gender-segregated, restrooms and locker rooms on adolescents' gender-related attitudes and social behaviors in a school setting.

In this preregistered study, we examine a nationally representative sample of adolescents from the United States to understand the relationship between cues signaling gender segregation in public spaces and attitudes towards gender. Our focus is on adolescents (aged 12–17) because adolescence is when most individuals experience the onset of puberty and grow into sexual maturity (Kar, Choudry, & Singh, 2015). Adolescents may develop a more nuanced understanding of their gender identity and form deeper peer relationships, and they are attuned to gender-related messages communicated by family, peers, media, and institutions such as school (Kågesten et al., 2016). Adolescents who are exposed to contexts in which people are sorted based on a certain trait (e.g., gender) show increased categorization and stereotyping on that basis (Bigler & Liben, 2006). Gender-related experiences during adolescence may shape decisions and judgments across the lifespan. Thus, it is important to understand how environmental cues affect adolescents' conceptualization of gender and their formation of peer relationships.

In the following section, we present our theoretical rationale based on social constructionism and homophily, which guides our hypotheses. We then describe our methods and results. We conclude by discussing our study's implications for policy and research.

Theoretical Background

Gender(ed) Cues: Effects on Gender-Related Attitudes

Social constructionism as a theoretical perspective argues that people make meaning of the world in coordination with others (Berger & Luckmann, 1966). In the gender context, social constructionism suggests that a person's understanding of what characteristics, qualities, and behaviors are associated with various genders is influenced by the messages that person receives from sources such as peers, media, and institutions. In other words, gender is a stratification system (Risman, 2004) created through social processes (or structures; Rice, 2021) which, in turn, influence how individuals perceive themselves, their environment, and other people (Giddens, 1984). As Kågesten and colleagues (2016) stated, "In every cultural setting across time and place individuals are socialized overtly and covertly from birth to conform to rules for how to 'be' girls and boys" (p. 2). Before children have emerged from the womb, parents may host "gender reveal parties" to announce their unborn child's sex (Garcia-Navarro, 2019). Gender reveals may then guide the products people buy for the child, such as toys and clothing, which are often marketed as either for boys or girls (Powers, 2019). These products can then, in turn, influence children's attitudes.

Through the lens of social constructionism, gender-segregated and all-gender physical spaces communicate distinct and opposing messages about gender. Their signage reflects what is “normal” in a community (Halonen & Laihonon, 2019). On the one hand, gender-segregated facilities are typically depicted with two signs—a pictogram of a person labeled “male” and a pictogram of a person wearing a dress, labeled “female”—communicating the existence and validity of only these two sexes/genders and the necessity of separating individuals along these lines. In contrast, all-gender facilities depicted using non-gendered symbols, such as a toilet, and the label “all-gender” direct all individuals into one inclusive space and do not communicate a binary conceptualization of gender.

Therefore, cues such as facilities signage are a communicative mechanism that indicates the co-construction of gender among people in a society. Our first set of hypotheses address this by examining how all-gender, compared with gender-segregated, facilities signage influences adolescents’ gender-related perceptions. First, because of the all-gender signage’s inclusive communicative signal (Chaney & Sanchez, 2018), we predicted the following:

H1a: Adolescents exposed to all-gender signage will be more likely to report a nonbinary conceptualization of gender.

H1b: Adolescents exposed to all-gender signage will be more likely to have positive attitudes toward TNB people.

H1c: Adolescents exposed to all-gender signage will be more likely to recognize peers’ TNB identities.

Because many facilities have not adopted all-gender accommodations, we put forth the following hypothesis:

H1d: Adolescents exposed to all-gender facilities will be less comfortable with the facilities.

Adolescents are not exposed to facilities signage only within the confines of our experiment. Thus, we predicted the following:

H2a: Cumulative exposure to all-gender facilities in everyday life will be associated with a nonbinary conceptualization of gender.

H2b: Cumulative exposure to all-gender facilities in everyday life will be associated with more positive attitudes toward TNB people.

H2c: Cumulative exposure to all-gender facilities in everyday life will be associated with more recognition of peers’ TNB identities.

H2d: Cumulative exposure to all-gender facilities in everyday life will be associated with more comfort with scenario facilities.

H3: Adolescents' cumulative and immediate experience will interact, such that for participants encountering all-gender facilities in the scenario, more prior exposure to all-gender facilities will be associated with more comfort with scenario facilities.

Gender(ed) Cues: Effects on Social Relationships

Social network scholarship examines how communication and relationships among social actors (e.g., individuals, groups) impact individual-level outcomes and outcomes in the whole system (or network) in which social actors are embedded (Borgatti, Brass, & Halgin, 2014). Homophily is the individual tendency to develop social ties with "similar others" (i.e., others with whom one shares a salient identity; see McPherson, Smith-Lovin, & Cook, 2001 for a review). This occurs in contexts including friendships and can be driven by many individual characteristics—external (e.g., social categories) and internal (e.g., attitudes; McPherson et al., 2001).

Among adolescents, gender plays a key role in identity development and how social relationships are formed and maintained (McPherson et al., 2001). Evidence from meta-analyses has found the magnitude of gender homophily among youth to be quite large (Hyde, 2005), increasing across young ages (i.e., from ages four and a half to six and a half; Maccoby & Jacklin, 1987), becoming the strongest among adolescents up to grade 3, then modestly decreasing (i.e., from grade 3 to 12; Shrum, Cheek, & Hunter, 1988). Diamond and Dubé (2002) found predominantly same-gender peer networks and best friends among young people aged 15 to 24. Whether this is based on youths' preferences (i.e., "choice homophily"; McPherson & Smith-Lovin, 1987) or structures and groups within which youth are embedded (i.e., "induced homophily"; McPherson & Smith-Lovin, 1987) is an ongoing research question. Recent research has suggested gender homophily among young people may be influenced more so by structural constraints, like living spaces, rather than an inherent preference for same-gender friends (Gillig & Bighash, 2019).

While spaces and structures themselves may drive friendship formation (induced homophily) by making it more likely that those people interact, we seek to understand if the messages that spaces and signage communicate also influence friendship formation. Gender-segregated physical spaces prime social identities resting on a binary conceptualization of gender. This, in turn, can drive individual preferences toward same-gender others (gender-based choice homophily; Tajfel & Turner, 1979).

Aligning with the demonstrated tendency toward homophily and the influence of environmental cues, we hypothesized that participants exposed to inclusive all-gender, compared with gender-segregated, facilities in a school scenario will be less likely to perceive a divide between genders and to sort based on that perception. To be more specific, we posit the following:

H4a: Adolescents exposed to inclusive all-gender, compared with gender-segregated, facilities in a school scenario will be more likely to choose proximity to gender-incongruent peers in a school cafeteria setting.

H4b: Adolescents exposed to inclusive all-gender, compared with gender-segregated, facilities in a school scenario will be more likely to choose proximity to gender-incongruent peers in a school hallway setting.

Method

Participants

We recruited adolescents from the United States through Qualtrics Online Panels. The sample age group (12–17 years old) was selected based on the U.S. Centers for Disease Control and Prevention's (2020) categorization of Young Teens (ages 12–14 years) and Teens (ages 15–17 years). An a priori power analysis was conducted using G*Power (Faul, Erdfelder, Buchner, & Lang, 2009). Detecting a small effect (0.25) at a power of 0.95, with an analysis of covariance including one covariate (numerator $df = 2$), called for 251 participants. We recruited 330 participants to account for dropouts, speeders, and incomprehensible responses. After accounting for these, we used a final sample of 319. Study design and materials were preregistered through Open Science Framework (OSF; 2020) on August 6, 2020: https://osf.io/k9nyv/?view_only=f929521a80f54bfc87fdacd3934a9b04. Data collection began subsequently on August 6, 2020, closing on August 11, 2020.

Most participants were cisgender males ($n = 175$, 54.9%), followed by cisgender females ($n = 139$, 43.6%) and transgender males ($n = 3$, 0.9%). Most adolescents ($n = 295$, 92.9%) described themselves as straight/heterosexual, followed by bisexual/pansexual ($n = 12$, 3.8%), unsure/questioning ($n = 7$, 2.2%), and gay/lesbian ($n = 5$, 1.6%). Most were White (non-Hispanic) ($n = 247$, 77.4%), followed by multiracial ($n = 19$, 6.0%) and Black ($n = 19$, 6.0%), Latinx ($n = 17$, 5.3%), and Asian/Pacific Islander ($n = 13$, 4.1%). Ages ranged from 12 to 17 years ($M = 14.26$, $SD = 1.72$). No significant demographic differences were found between experimental conditions; see Table 1.

Table 1. Sociodemographic Characteristics and Outcomes by Experimental Condition (N = 319).

	Gender-Segregated (<i>n</i> = 172)	All-Gender (<i>n</i> = 147)	χ^2/t	<i>p</i> -Value	<i>d/V</i>
Age	14.20(1.81)	14.32(1.61)	-0.60	.55	.070
Gender identity			3.27	.51	.10
Cisgender male	57.0% (<i>n</i> = 98)	52.4% (<i>n</i> = 77)			
Cisgender female	42.4% (<i>n</i> = 73)	44.9% (<i>n</i> = 66)			
Transgender male	0.58% (<i>n</i> = 1)	1.36% (<i>n</i> = 2)			
Bigender		0.68% (<i>n</i> = 1)			
Unsure/Questioning		0.68% (<i>n</i> = 1)			
Sex			0.92	.34	.054
Male	56.3% (<i>n</i> = 97)	51.0% (<i>n</i> = 75)			
Female	43.6% (<i>n</i> = 75)	49.0% (<i>n</i> = 72)			
Sexual orientation			3.33	.34	.10
Straight/heterosexual	91.9% (<i>n</i> = 158)	93.2% (<i>n</i> = 137)			
Gay/lesbian	1.16% (<i>n</i> = 2)	2.04% (<i>n</i> = 3)			
Bisexual/pansexual	3.49% (<i>n</i> = 6)	4.08% (<i>n</i> = 6)			
Unsure/Questioning	3.49% (<i>n</i> = 6)	0.68% (<i>n</i> = 1)			
Race/ethnicity			8.34	.14	.16
White (non-Hispanic)	79.1% (<i>n</i> = 136)	75.5% (<i>n</i> = 111)			
Black	2.91% (<i>n</i> = 5)	9.52% (<i>n</i> = 14)			
Multiracial	6.40% (<i>n</i> = 11)	5.44% (<i>n</i> = 8)			
Latino/a/x	4.65% (<i>n</i> = 8)	6.12% (<i>n</i> = 9)			
Asian/Pac Islander	5.23% (<i>n</i> = 9)	2.72% (<i>n</i> = 4)			
Other	1.74% (<i>n</i> = 3)	0.68% (<i>n</i> = 1)			
Religiosity			0.58	.45	.043
Religious	79.7% (<i>n</i> = 137)	83.0% (<i>n</i> = 122)			
Not religious	20.3% (<i>n</i> = 35)	17.0% (<i>n</i> = 25)			
Family SES	6.64(2.11)	6.70(2.22)	-0.25	.80	.028
All-gender facilities (EDL)	2.17(1.07)	2.14(1.07)	0.21	.83	.023
TNB media exposure			2.26	.69	.084
Never	9.30% (<i>n</i> = 16)	6.80% (<i>n</i> = 10)			
Rarely	26.7% (<i>n</i> = 46)	24.5% (<i>n</i> = 36)			
Sometimes	43.0% (<i>n</i> = 74)	41.5% (<i>n</i> = 61)			
Often	14.0% (<i>n</i> = 24)	17.0% (<i>n</i> = 25)			
Constantly	6.98% (<i>n</i> = 12)	18.4% (<i>n</i> = 27)			

TNB social contacts	2.33(4.29)	1.56(2.67)	1.93	.06	.22
Facilities comfort	5.35(1.04)	3.85(1.57)	10.14***	<.001	1.13
Perceived cis peer count	3.45(.759)	3.33(.877)	1.32	.187	.146
Conceptualization of gender	4.87(1.69)	4.88(1.69)	-0.085	.932	.0059
Attitudes toward TNB people	4.04(1.50)	4.11(1.45)	-.434	.665	.047
Perceived gender congruence in cafeteria			0.051	.822	.822
Yes	59.3% (<i>n</i> = 102)	60.5% (<i>n</i> = 89)			
No	40.7% (<i>n</i> = 70)	39.6% (<i>n</i> = 58)			
Cafeteria rationale			0.066	.797	.014
Peer-focused	68.0% (<i>n</i> = 117)	66.7% (<i>n</i> = 98)			
Not peer-focused	32.0% (<i>n</i> = 55)	33.3% (<i>n</i> = 49)			
Relationship intent			7.54	.110	.154
Friendship	83.1% (<i>n</i> = 143)	83.7% (<i>n</i> = 123)			
Romantic	5.81% (<i>n</i> = 10)	1.36% (<i>n</i> = 2)			
Multiple types	6.40% (<i>n</i> = 11)	10.9% (<i>n</i> = 16)			
No relationship	4.65% (<i>n</i> = 8)	3.40% (<i>n</i> = 5)			
Other		.68% (<i>n</i> = 1)			
Perceived gender congruence in hallway			0.053	.818	.818
Yes	62.8% (<i>n</i> = 108)	61.9% (<i>n</i> = 91)			
No	36.6% (<i>n</i> = 63)	38.1% (<i>n</i> = 56)			

Note. **p* < .05, ***p* < .01, ****p* < .001.

EDL: everyday life; SES: socioeconomic status.

Procedure

Pilot Study

We ran pilot tests (*n* = 15) to test the comprehension of our materials. Qualtrics Panels recruited participants (aged 12–17) in three waves. The first pilot test (*n* = 5) indicated participant confusion about the definition of transgender. So, we created a two-step approach to assess peer gender identity, first capturing the perceived gender expression of each student (i.e., whether their appearances were more masculine, feminine, or something else; American Psychological Association, 2014), then assessing

perceived sex. We ran two additional pilot tests, finalizing the items. Pilot participants were not included in the final data set.

Main Study

Participants received a Web link to access the study and were randomly assigned to between-subjects experimental conditions (gender-segregated vs. all-gender facilities). We used an interactive narrative scenario for our experiment. Participants read a story "Just Another School Day" and were asked to imagine they were the main character living out a day at school. The story began with a computer-illustrated representation of a school entrance (see Figure 1), followed by a classroom.



Figure 1. First scenario image: School entrance.

The story progressed such that participants asked to leave class and access the (all-gender/gender-segregated) restroom, returned to class, went to the (all-gender/gender-segregated) locker rooms for physical education, played dodgeball, chose a cafeteria seat next to peers who appear to have various gender expressions, chose a lunch meal, decided whether to use the (all-gender/gender-segregated) restroom before leaving school, and looked for a peer in the hallway to walk with to the bus. Then, participants were asked about their perceptions regarding the story's students and facilities, gender-related attitudes, prior exposure to all-gender facilities, and demographics.

At three points in the story, participants were shown facilities, either all-gender or gender-segregated, depending on random assignment to the experimental condition. The gender-segregated restrooms image showed wall signage reading "restrooms" and two doors. The left door had an adjacent wall sign showing the word "women," the traditional female pictogram (i.e., person in a dress), and the pictogram for accessibility (i.e., person in a wheelchair; U.S. Department of Transportation [USDOT], 2009). The right door had a wall sign that showing word "men" and the male and accessibility pictograms (see Figure 2).



Figure 2. Image of gender-segregated restrooms in the study scenario.

The USDOT Manual for Uniform Traffic Control Devices referenced for scenario design does not include a sign for all-gender restrooms. Thus, all-gender restroom facilities were represented by two doors with signs reading “all gender” and depicting the accessibility pictogram. After encountering the restrooms in the story, participants saw locker rooms with layout and signage mirroring the restrooms but with the label “locker rooms.” All restroom and locker room images were designed to represent communal facilities (e.g., no locks on entrance doors). The placement of all signage aligned with requirements of the Americans with Disabilities Act for realism (U.S. Department of Justice, 2010). All-gender facilities included two doors to minimize differences between experimental conditions aside from the signage and to align with how all-gender facilities may appear if updated from existing gender-segregated facilities. See Figure 3.



Figure 3. Image of all-gender restrooms in the study scenario.

In the story, participants also encountered four students they could sit next to in the cafeteria and walk with to the bus. This allowed us to analyze hypotheses H4a and H4b pertaining to choosing proximity to gender-congruent peers. To depict various gender identities while minimizing the opportunity for variables not pertaining to gender (e.g., race/ethnicity, style, self-expression) to influence participant’s decision-making, two simple cartoon-style face/shoulder designs were created. The designs aligned with research findings pertaining to the face/shoulder structure and sizing that people perceive to be characteristic of males and females (Hughes & Gallup, 2003; Mitteroecker, Windhager, Müller, & Schaefer, 2015). The “biological male” image depicted a wider face, squarer jaw, thinner lips, smaller eyes, thicker eyebrows, and wider shoulders, compared with the “biological female.” Similarly, two gender expression options were

designed to align with traditional Western gender expressions. Short hair corresponded with masculine expression and long, styled hair with feminine expression. Finally, four students were created, with the following combinations: Male face/shoulders × masculine hair (apparent cisgender male), female face/shoulders × feminine hair (apparent cisgender female), male face/shoulders × feminine hair (apparent transgender female), and female face/shoulders × masculine hair (apparent transgender male). Participants tended to perceive the cisgender students as intended: 302 of 319 participants (94.7%) identified the apparent cisgender female (A), and 313 participants (98.1%) identified the apparent cisgender male (B). A total of 59 participants (18.5%) identified the apparent transgender female (C), and 47 participants (14.7%) identified the apparent transgender male (D). Note, participants' identification of the students' genders as intended was not necessary for our congruence analyses, and differences in perceptions of students' genders based on exposure to gendered facilities signage were predicted (H1c, H2c). See Figure 4 for student images and the online appendix (OSF) for participants' complete perceptions of student demographics.

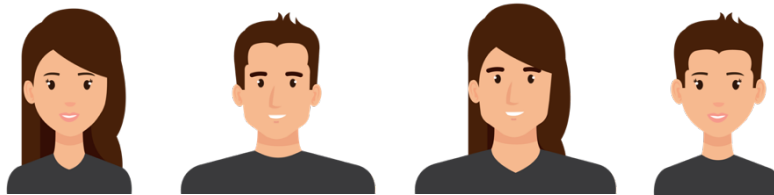


Figure 4. Students in the scenario (Students A, B, C, and D, respectively).

The Institutional Review Board of Washington State University approved the procedure. The complete survey is accessible at the previously provided OSF link.

Measures

Participants completed questionnaires that were identical across experimental conditions, except for piped text in one question that referred to either "men's and women's" or "all-gender" restrooms and locker rooms, depending on the condition.

Gender-Related Cognitions

To assess participants' binary conceptualization of gender (dependent variable [DV] for H1a, H2a), a definition of gender identity was presented, followed by three items on a 7-point Likert scale, ranging from 1 = *Strongly disagree* to 7 = *Strongly agree*. Higher scores corresponded with a nonbinary conceptualization. Items included: "Gender identities other than male and female are valid" and "Gender identity may exist on a spectrum. This means that people can identify as male or female or somewhere in between." Principal components analysis (PCA) with Varimax rotation showed items loaded on one factor. Reliability was high (Cronbach's $\alpha = .91$).

To assess attitudes toward transgender people (part of the DV for H1b and H2b), a definition of transgender was provided, followed by seven items adapted from Billard's (2018) attitudes toward

transgender men and attitudes toward transgender women scales. Participants rated statements on a 7-point Likert scale (1 = *Strongly disagree* to 7 = *Strongly agree*). Higher scores corresponded with more positive attitudes. Items included: "Transgender people are unable to accept who they really are" (reversed) and "Transgender people are denying their DNA" (reversed). PCA with Varimax rotation showed items loaded on one factor. Reliability was high ($\alpha = .91$).

To assess attitudes toward nonbinary people (part of the DV for H1b, H1c), a definition of nonbinary was provided, followed by seven adapted items from Billard (2018). Items were again assessed on a 7-point Likert scale, with higher scores representing more positive attitudes. Items included: "Nonbinary people seem absolutely normal to me." PCA with Varimax rotation showed items loaded on two factors explaining a cumulative 81.7% of the variance (one factor represented the reversed item). Reliability was high ($\alpha = .91$).

Perceived peer gender expression was assessed for each of the four students. Participants were shown each student's image and the question: "This student's appearance looks most like which of the following?" Response options were Male, Female, and Something else, please explain. Perceived peer sex was captured by showing each student's image and the question: "If you could make a guess, do you think this student was born as a male, female, or something else?" Response options were Male, Female, and Something else, please explain. These two variables allowed us to create indices related to how many cisgender (compared with TNB) peers they perceived and the gender congruence between themselves and their chosen close-proximity peers. See the Indices subsection in this article.

Social Behaviors

Cafeteria seat selection was captured by showing an image of a round cafeteria table, around which the four students were seated. Between each pair of students were two empty seats, making for eight open seats around the table, all identical in appearance. Participants were asked to click on the seat that they would like to sit at for lunch. Then, an open-ended question prompted participants to write why or how they chose the seat (cafeteria seat rationale). Participants also selected the type of relationship they wanted to develop (if any) with the student closest to their seat (relationship intention): Friendship, romantic, sexual, other (please describe), no relationship. Participants could select all that applied. Responses were recoded to Friendship, Romantic, Other, Multiple types, and No relationship.

Peer selection in the hallway was also assessed. Participants were told they were walking toward the school exit and were prompted: "As you get closer to the exit, you look for a classmate to walk with you to the bus. Which classmate do you look for?" Response options were four images, one for each student in the narrative. Participants could select one student. These choices, along with the peer gender expression and sex variables described above allowed us to create the gender congruence between participants and their chosen close-proximity peers. See the Indices subsection.

Facilities Comfort and Prior Exposure

To measure comfort with the scenario facilities (DV for H1d and H2d), eight items were presented on a 7-point Likert scale (1 = *Strongly disagree* to 7 = *Strongly agree*), with higher scores representing greater comfort with the restrooms and locker rooms in the narrative. Items included, "In my real life, I would feel comfortable using restrooms like those in the story" and "I felt offended by the locker room options" (reversed).

To understand all-gender restroom exposure in everyday life (EDL; part of the independent variable for H3—see Indices subsection), participants were asked, "How often do you see all-gender restrooms in your everyday life?" Response options were Never (1), Rarely (2), Sometimes (3), Often (4), Constantly (5). All-gender locker room exposure in EDL was captured with a similar question.

Indices

Several of the above measures were used to generate new measures used in the analyses, as follows. Participants' responses to items assessing perceived gender expression and sex were examined in combination to determine perceived peer gender identity. Identification of cisgender peers in the story was a count score ranging from 0 to 4 (perceived cisgender peer count in Table 1).

Perceived gender congruence in the cafeteria (DV for H4a) and hallway (DV for H4b) variables were created by examining participants' peer selection in tandem with perceived peer gender. Each participant was assigned either a score of 0, indicating their selection of proximity to a gender-incongruent peer (i.e., a cisgender male participant selecting proximity to a perceived cisgender female student) or a score of 1, indicating proximity to a gender-congruent peer.

Participants' attitudes toward transgender people and nonbinary people (DV for H1b and H2b) were averaged to generate one attitudes toward TNB people score. Counts for TNB social contacts were summed to create one TNB contacts score.

Scores for all-gender restrooms and locker room exposure in EDL were averaged to create one score ranging from 1 (no exposure) to 5 (constant exposure; all-gender facilities exposure in EDL). For peer selection in the cafeteria, open-ended written responses referencing the students (e.g., "I don't want to sit next to guys") were coded as 1 = peer-focused. Responses not referencing the students (e.g., "I don't know I just picked one") were coded as 0 = not peer-focused (cafeteria focus).

Covariates: Exposure to TNB People

Exposure to transgender people in the media (Gillig, Rosenthal, Murphy, & Folb, 2018) and in daily life (i.e., in person; Norton & Herek, 2013) are associated with attitudes toward transgender people. Thus, we captured the two variables to include as covariates.

Prior exposure to TNB media personae was assessed with the question, "In the media (e.g., TV, film, social media, books), how often do you see people or characters who are transgender, nonbinary, or another gender identity other than male or female?" Response options were Never (1), Rarely (2), Sometimes (3), Often (4), and Constantly (5) and were dichotomized for ease of interpretation. The dichotomous variable was coded Never or Rarely (0; $n = 108$, 33.9%), Sometimes, Often, or Constantly (1; $n = 211$, 66.2%).

Participants' TNB social contacts were captured with the prompt asking them to type the number of people they personally know (other than themselves) who identify as transgender or nonbinary. One box was provided for transgender contacts and one for nonbinary contacts.

Demographics

Participants were asked about their gender identity, sex assigned on their birth certificate, sexual/romantic orientation, race/ethnicity, religiosity, and family socioeconomic status (SES). All demographic variables were categorical, except for family SES (i.e., participants were shown an image of a ladder with 10 rungs (1 = lowest rung/SES, 10 = highest rung/SES) and prompted to select the rung best representing their family's position, aligning with the MacArthur Scale of Subjective Social Status—Youth Version; Goodman et al., 2001). Participants' responses to two items, assessing their gender and sex, were examined in combination to create the final participant gender identity variable. For example, participants who selected their sense of their own gender as Male and their sex as Male were coded as Cisgender Male. Participants who wrote in a gender identity such as bigender were coded based on their written description.

Results

Gender-Related Attitudes and Perceptions

Preliminary analyses were conducted to ensure DVs met the assumptions of multivariate analysis of covariance (MANCOVA). To test H1-H3, a MANCOVA was conducted, with conceptualization of gender (1-7, higher scores correspond with nonbinary conceptualization, $M = 4.88$, $SD = 1.69$), attitudes toward TNB people (1-7, higher scores correspond with more positive attitudes, $M = 4.08$, $SD = 1.47$), perceived peer gender identities (count of cisgender peers, 1-4, $M = 3.39$, $SD = .82$), and facilities comfort (1-7, higher scores correspond with more comfort, $M = 4.66$, $SD = 1.51$) as DVs. The independent variables (IVs) were exposure to all-gender, compared with gender-segregated, scenario facilities signage, which were coded as 1 ($n = 142$) and 0 ($n = 172$), respectively, and degree of prior exposure to all-gender facilities ($M = 2.26$, $SD = 1.11$). Covariates included participant gender identity (TNB or cisgender; 0 = TNB, $n = 5$; 1 = cisgender, $n = 314$), sex (0 = male, $n = 172$; 1 = female, $n = 147$), sexual/romantic orientation (0 = heterosexual, $n = 295$; 1 = not heterosexual, $n = 24$), race/ethnicity (0 = White, $n = 247$; 1 = person of color, $n = 72$), religiosity (0 = religious, $n = 259$; 1 = not religious, $n = 60$), family SES ($M = 6.67$, $SD = 2.16$), prior exposure to TNB media personae (0 = never/rarely, $n = 108$; 1 = sometimes/often/constantly, $n = 211$), and TNB social contacts ($M = 1.97$, $SD = 3.65$).

Levene's test for homogeneity of variance was significant for conceptualization of gender, $F(17, 300) = 1.97, p = .013$. It was nonsignificant for attitudes toward TNB people, perceived peer gender, and facilities comfort (for complete nonsignificant results, contact the corresponding author). MANCOVA is robust against violations of the assumption of homogeneity of variances when group sizes are approximately equal, as they were here (Nimon, 2012).

The effect of exposure to all-gender, compared with gender-segregated, school scenario facilities signage on conceptualization of gender (H1a) was significant, $F(1, 317) = 5.59, p = .019$, and $\eta^2 = .019$. Participants exposed to all-gender facilities were more likely to have a nonbinary conceptualization of gender ($M = 4.11, SD = 1.45$), compared with participants exposed to gender-segregated facilities ($M = 4.04, SD = 1.50$), when controlling for the covariates. Gender (i.e., TNB or cisgender), sex, race/ethnicity, and prior exposure to TNB media personae were nonsignificant. Orientation was significant, $F(1, 317) = 4.48, p = .035$, and $\eta^2 = .015$, as were religiosity, $F(1, 317) = 5.27, p = .022$, and $\eta^2 = .018$, family SES, $F(1, 317) = 9.37, p = .002$, and $\eta^2 = .031$, and TNB social contacts, $F(1, 317) = 6.18, p = .014$, and $\eta^2 = .021$.

The effect of exposure to all-gender, compared with gender-segregated, scenario facilities signage on attitudes toward TNB people (H1b) was nonsignificant, $F(1, 317) = .13, p = .72$, and $\eta^2 < .001$, when controlling for the following nonsignificant factors: Gender, sex, orientation, race/ethnicity, exposure to TNB media personae, and TNB contacts. The effects of religiosity, $F(1, 317) = 19.10, p < .001$, and $\eta^2 = .061$, and SES were significant, $F(1, 317) = 15.09, p < .001$, and $\eta^2 = .006$.

The effect of exposure to all-gender, compared with gender-segregated, signage on recognition of peers' TNB identities (H1c) was nonsignificant, $F(1, 317) = .42, p = .52$, and $\eta^2 = .001$, when controlling for participant gender, sex, orientation, race/ethnicity, religiosity, SES, prior exposure to TNB media personae, and TNB social contacts (all nonsignificant).

The effect of exposure to all-gender, compared with gender-segregated, scenario signage on facilities comfort (H1d) was significant, $F(1, 317) = 11.47, p = .001$, and $\eta^2 = .038$. Participants who encountered all-gender facilities were less comfortable ($M = 3.85, SD = 1.57$) than participants who encountered gender-segregated facilities ($M = 5.35, SD = 1.04$). Gender was a significant covariate, $F(1, 317) = 3.94, p = .048$, and $\eta^2 = .013$. Sex was significant, $F(1, 317) = 6.25, p = .013$, and $\eta^2 = .021$. Race/ethnicity was significant, $F(1, 317) = 4.61, p = .033$, and $\eta^2 = .016$. Orientation, religiosity, SES, prior exposure to TNB media personae, and TNB contacts were nonsignificant.

Exposure to All-Gender Facilities in EDL

Our second hypothesis predicted prior exposure to all-gender facilities in EDL would be associated with perceptions. Results from the MANCOVA showed the effect of prior exposure on conceptualization of gender (H2a) was nonsignificant, $F(8, 317) = 1.83, p = .072$, and $\eta^2 = .048$. The effect of prior all-gender facilities exposure on attitudes toward TNB people (H2b) was significant, $F(8, 317) = 3.49, p = .001$, and $\eta^2 = .087$, such that more exposure corresponded with more positive attitudes. The effect of prior exposure on recognition of peers' TNB identities (H2c) was nonsignificant, $F(8, 317) = 1.10, p = .36$, and $\eta^2 = .029$. Prior exposure's effect on comfort with scenario facilities (H2d) was significant, $F(8, 317) = 2.11, p = .035$,

and $\eta^2 = .055$, such that more exposure corresponded with more comfort with facilities (all-gender or gender-segregated).

Our third hypothesis predicted an interaction between scenario facilities exposure and prior all-gender facilities exposure affecting the outcome facilities comfort. An interaction was found, $F(1, 317) = 8.37$, $p < .001$, and $\eta^2 = .19$. For participants encountering all-gender scenario facilities, more prior exposure to all-gender facilities was associated with more comfort with scenario facilities. Participants in the all-gender condition who had the most prior exposure to all-gender facilities (i.e., encountered all-gender restrooms and locker rooms "constantly") reported comfort with the all-gender scenario facilities ($M = 5.25$, $SD = .50$) comparable with the average facilities comfort with men's and women's facilities reported by participants seeing gender-segregated scenario facilities ($M = 5.35$, $SD = 1.04$).

Behaviors

Hypothesis 4 (H4) predicted participants exposed to all-gender facilities would be more likely to choose to be closer to perceived gender-incongruent peers in the school scenario. To assess H4a, a binomial logistic regression testing the effects of scenario facilities signage (IV) on perceived gender congruence in the cafeteria (0 = incongruent, $n = 128$; 1 = congruent, $n = 191$; DV) was conducted, controlling for participant gender, sex, orientation, race/ethnicity, religiosity, SES, TNB contacts, and TNB media personae exposure, (see H1-H3), as well as cafeteria focus (0 = not peer-focused, $n = 104$; 1 = peer-focused, $n = 215$), relationship intention (1 = friendship, $n = 266$; 2 = romantic, $n = 12$; 3 = other, $n = 1$; 4 = no relationship, $n = 13$; 5 = multiple types, $n = 27$), perceived age difference in the cafeteria ($M = 1.06$, $SD = 1.51$), and perceived race congruence in the cafeteria (0 = incongruence, $n = 94$; 1 = congruence, $n = 225$).

Preliminary analyses found variables met assumptions of logistic regression. The model fit the data, $X^2(6, N = 319) = 61.46$, Nagelkerke $R^2 = .24$, $p < .001$.

The effect of scenario facilities signage on perceived gender congruence in the cafeteria (H4a) was nonsignificant, $b = -.021$, $p = .94$. Of the covariates, participant gender (TNB or cisgender), sexual/romantic orientation, race/ethnicity, religiosity, SES, TNB media personae, cafeteria focus, relationship intent, and perceived race congruence were not significant. Sex ($b = 1.64$, $p < .001$) and perceived age difference ($b = -.20$, $p = .021$) were significant, and TNB social contacts was approaching significance, $b = -.07$, $p = .054$.

To examine H4b, a binomial logistic regression testing the effects of scenario facilities exposure (IV) on perceived gender congruence in the hallway (0 = incongruent, $n = 119$; 1 = congruent, $n = 199$; DV) was conducted, controlling for participant gender, sex, orientation, race/ethnicity, religiosity, SES, TNB contacts, and TNB media personae exposure (see H4) as well as perceived age difference in the hallway ($M = 0.97$, $SD = 1.37$), and perceived race congruence - hallway (0 = incongruent, $n = 92$; 1 = congruent, $n = 227$). The model fit the data, $X^2(5, N = 319) = 50.83$, Nagelkerke $R^2 = .20$, $p < .001$.

The effect of scenario facilities exposure on perceived gender congruence in the hallway (H4b) was nonsignificant, $b = -.12$, $p = .64$. The covariates participant gender, orientation, race/ethnicity, religiosity, SES, TNB media personae exposure, perceived age difference, and perceived race congruence were nonsignificant. Sex was associated with perceived gender congruence, $b = 1.64$, $p < .001$. TNB social contacts was also significant, $b = -.081$, $p = .026$.

Discussion

This study is among the first to empirically test the impact of communication cues signaling gender at gender-segregated and all-gender public facilities on the gender-related attitudes and social behaviors of a nationally representative sample of adolescents from the United States. The results reveal that such cues influence the attitudes of adolescents. We found strong evidence that adolescents exposed to all-gender facilities signage, compared with gender-segregated signage, in a virtual school setting were more likely to conceptualize gender as existing beyond a male-female binary. We also examined the potential long-term effects of facilities cues on adolescents and found adolescents reporting greater exposure to all-gender facilities in their everyday lives were more comfortable with all-gender facilities and had more positive attitudes toward TNB people. Finally, we found that facilities exposure in the experimental school setting did not influence relationship development in the short term. In the following, we discuss implications.

The first key finding is that facilities signage has a short-term effect on adolescents' understanding of gender, such that all-gender signage causes adolescents to conceptualize gender as existing beyond the male-female binary. In contrast, gender-segregated signage caused a tendency to conceptualize gender as binary (male or female). This provides evidence for the impact of the ubiquitous gendered facilities cues in the physical environment on adolescents' understanding of gender, particularly the existence and validity of genders other than male and female.

A second notable finding pertains to the potential long-term impact of gendered facilities signage. Prior exposure to all-gender facilities in EDL was not associated with binary conceptualization of gender, but it was associated with more positive attitudes toward TNB people. Thus, adolescents' conceptualizations of gender may be influenced in the short-term by gender cues in the environment, while their attitudes toward TNB people may change incrementally with repeated exposure to gender cues.

Analyses examining facilities comfort found that participants encountering the traditional gender-segregated facilities in the scenario tended to be more comfortable. However, for participants encountering all-gender scenario facilities, the more prior exposure they had to all-gender facilities, the more comfortable they were with the school scenario's all-gender facilities. This indicates the initial discomfort may be primarily due to the novelty of all-gender facilities. As individuals become more accustomed to such facilities, they will likely become more comfortable with them.

Results from the examination of the potential behavioral impact of gendered facilities signage shows that scenario signage had no significant immediate impact on adolescents' seeking of gender-congruent peers in school cafeteria and hallway settings. However, the significant negative association between TNB social contacts and perceived gender congruence in the hallway ($b = -.081$, $p = .026$) and

the negative association approaching significance in the cafeteria setting ($b = -.07, p = .054$) indicate that personally knowing more TNB people may make adolescents more inclined to socialize with peers of genders other than their own. Because the data for these two analyses indicate correlation but cannot prove causation, the case may also be that a tendency to associate with gender-incongruent peers caused some adolescents to know more TNB people. These findings indicate that youths' choices regarding which peers to engage with at school are complex and influenced by factors beyond gender cues in the environment.

We also found all-gender facilities did not influence adolescents' recognition of peers' TNB identities. Thus, while all-gender signage may make adolescents more aware of the existence of genders other than male and female (H1a), this awareness may not cause youths to perceive peers' TNB identities in the short term (H1c, H2c).

In examining the potential long-term impact of gendered facilities cues, we found no significant association between prior exposure to all-gender facilities and binary conceptualization of gender. This could be the case for a few reasons. It is possible all-gender facilities have an immediate impact on adolescents' cognitions about gender—an effect that tapers off as youths become more accustomed to the signage and perhaps pay less attention to it. Another possibility is participants' prior exposure to all-gender facilities, as assessed in this study conducted during the early COVID-19 pandemic, is not fully representative of their typical exposure. Some of the facilities youths might normally visit may have closed due to the pandemic. More research is needed to understand the potential long-term impact of all-gender signage.

Beyond our hypotheses, we found the covariate prior exposure to TNB media personae did not have a significant association with adolescents' binary conceptualization of gender or attitudes toward TNB people. This contrasts with prior research and theorizing and suggests other sources of information about TNB identities may be more influential for adolescents today, compared with the TNB personae they encounter in the media they choose—or are permitted—to access. Of note, adolescents reported relatively low exposure to TNB media personae. The plurality (42.3%) saw TNB media personae “sometimes,” followed by 25.7% seeing them “rarely” and only 8.46% seeing them “constantly.” This suggests that much youth-focused media content still lacks gender diversity.

Limitations and Future Research Directions

Some limitations should be noted. First, by the nature of interactive scenario-based experiments, experimental exposure was limited and short-term, thus a conservative measure of how gendered facilities signage may influence socialization. While we tested hypotheses related to exposure in EDL, the causal relation between the variables cannot be ascertained with our data. Future experimental studies should explore whether repeated exposure to all-gender signage may influence perceptions and behaviors. Additionally, student images were designed to align with evidence-based tendencies for physical differences between biological males and females as well as traditional binary gender expressions. This does not capture the myriad of ways in which people of various genders present themselves. Furthermore, participants may not have identified any peers from the study images as TNB; thus, their social behaviors related to peers who openly identify as TNB were not captured. Future work may benefit from testing similar hypothesis in a scenario in which adolescents are told the genders of peers in the narrative. Finally, our exposure to TNB

media personae covariate holistically captured participants' exposure across a variety of media. Separate items assessing exposure on individual channels would provide a more nuanced understanding of media exposure and effects.

Conclusion

Gender-segregated spaces in schools and other public settings have become the latest legal and sociopolitical battleground for gender equality in the United States (Allsup, 2020). As Massey (1994) notes, "Social change and spatial change are integral to each other" (p. 23). Our study suggests the potential for all-gender school facilities to influence gender socialization, increase adolescents' awareness of genders beyond the male-female binary in the short term, and improve adolescents' attitudes toward TNB people in the long term. Chandra-Mouli and colleagues (2018) argue, "Interventions to address gender socialization must be integrated into large-scale platforms (for example, health and educational systems)" (p. 240). The current study suggests that the addition of all-gender facilities signage itself into previously gender-segregated spaces may be viewed as an intervention influencing youths' gender socialization. However, given geographic differences in how single-occupancy public facilities are categorized and the emergence of multi-occupancy gender-inclusive facilities in some locations, adolescents could develop notable differences in opinions about gender, depending on the laws in their locality. Thus, continued research should seek to elucidate the implications of gender segregation and gender inclusion cues in youth environments.

References

- Act of March 24, 1887, Ch. 103, § 2, 1887 Mass ACTS, 668–669 (1887); see text of statute, *supra*note 51.
- Allsup, M. (2020, August 7). Florida school's transgender bathroom rule unconstitutional. *Bloomberg Law*. Retrieved from <https://news.bloomberglaw.com/us-law-week/florida-schools-transgender-bathroom-rule-unconstitutional>
- American Psychological Association. (2014). *Transgender people, gender identity, and gender expression*. Retrieved from <https://www.apa.org/topics/lgbt/transgender>
- American Psychological Association. (2015a). *Definitions related to sexual orientation and gender diversity in APA documents*. Retrieved from <https://www.apa.org/pi/lgbt/resources/sexuality-definitions.pdf>
- American Psychological Association. (2015b). Guidelines for psychological practice with transgender and gender nonconforming people. *American Psychologist*, 70(9), 832–864. doi:10.1037/a0039906
- Avery, D. (2020, December 8). LGBTQ rights fight reignited 4 years after N.C.'s "bathroom bill" controversy. *NBC News*. Retrieved from <https://www.nbcnews.com/feature/nbc-out/lgbtq-rights-fight-reignited-4-years-after-n-c-s-n1250390>

- Berger, P. L., & Luckmann, T. (1966). *The social construction of reality: A treatise in the sociology of knowledge*. New York, NY: Penguin Books.
- Bigler, R. S., & Liben, L. S. (2006). A developmental intergroup theory of social stereotypes and prejudice. In R. Kail (Ed.), *Advances in child development and behavior* (pp. 39–89). Amsterdam, The Netherlands: Elsevier. doi:10.1016/S0065-2407(06)80004-2
- Billard, T. J. (2018). Attitudes toward transgender men and women: Development and validation of a new measure. *Frontiers in Psychology, 9*(387), 1–11. doi:10.3389/fpsyg.2018.00387
- Borgatti, S. P., Brass, D. J., & Halgin, D. S. (2014). Social network research: Confusions, criticisms, and controversies. In D. J. Brass, G. Labianca, A. Mehra, D. S. Halgin, & S. P. Borgatti (Eds.), *Contemporary perspectives on organizational social networks* (pp. 1–29). Bingley, UK: Emerald Group.
- Brint, S., Contreras, M. F., & Matthews, M. T. (2001). Socialization messages in primary schools: An organizational analysis. *Sociology of Education, 74*(3), 157–180. doi:10.2307/2673273
- Brooks, L. (2021, May 30). How Tennessee's transgender business bathroom bill poses a major health risk. *Forbes*. Retrieved from <https://www.forbes.com/sites/lakenbrooks/2021/05/30/how-tennessees-transgender-business-bathroom-bill-poses-a-major-health-risk/?sh=4749aead3572>
- Chandra-Mouli, V., Plesons, M., & Amin, A. (2018). Addressing harmful and unequal gender norms in early adolescence. *Nature Human Behaviour, 2*(4), 239–240. doi:10.1038/s41562-018-0318-3
- Chaney, K. E., & Sanchez, D. T. (2018). Gender-inclusive bathrooms signal fairness across identity dimensions. *Social Psychological and Personality Science, 9*(2), 245–253. doi:10.1177/1948550617737601
- Davis, A. K. (2020). *Bathroom battlegrounds: How public restrooms shape the gender order*. Oakland: University of California Press.
- Diamond, L. M., & Dubé, E. M. (2002). Friendship and attachment among heterosexual and sexual-minority youths: Does the gender of your friend matter? *Journal of Youth and Adolescence, 31*(2), 155–166. doi:10.1023/A:1014026111486
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G* Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*(4), 1149–1160. doi:10.3758/BRM.41.4.1149
- Garcia-Navarro, L. (2019, July 28). Woman who popularized gender reveal parties says her views on gender have changed. *NPR*. Retrieved from <https://www.kunc.org/2019-07-28/woman-who-popularized-gender-reveal-parties-says-her-views-on-gender-have-changed>

- Geiger, A. W., & Graf, N. (2019, September 5). About one-in-five U.S. adults know someone who goes by a gender-neutral pronoun. *Pew Research Center*. Retrieved from <https://www.pewresearch.org/fact-tank/2019/09/05/gender-neutral-pronouns/>
- Giddens, A. (1984.) *The constitution of society: Outline of the theory of structuration*. Oakland: University of California Press.
- Gillig, T. K., & Bighash, L. (2019). Gendered spaces, gendered friendship networks? Exploring the organizing patterns of LGBTQ youth. *International Journal of Communication*, 13, 4895–4916.
- Gillig, T. K., Rosenthal, E. L., Murphy, S. T., & Folb, K. (2018). More than a media moment: The influence of televised storylines on viewers' attitudes toward transgender people and policies. *Sex Roles*, 78(7–8), 515–527. doi:10.1007/s11199-017-0816-1
- Goodman, E., Adler, N. E., Kawachi, I., Frazier, A. L., Huang, B., & Colditz, G. A. (2001). Adolescents' perceptions of social status: Development and evaluation of a new indicator. *Pediatrics*, 108(2), e31–e31. doi:10.1542/peds.108.2.e31
- Halonen, M., & Laihonen, P. (2019). From “no dogs here!” to “beware of the dog!”: Restricting dog signs as a reflection of social norms. *Visual Communication*, 0(0), 1–26. doi:10.1177/1470357219887525
- Hubbard, K. (2021, May 26). Few states require LGBTQ-inclusive sex education, report finds. *U.S. News*. Retrieved from <https://www.usnews.com/news/best-states/articles/2021-05-26/few-states-require-lgbtq-inclusive-sex-education>
- Hughes, S. M., & Gallup Jr., G. G. (2003). Sex differences in morphological predictors of sexual behavior: Shoulder to hip and waist to hip ratios. *Evolution and Human Behavior*, 24(3), 173–178. doi:10.1016/S1090-5138(02)00149-6
- Hyde, J. S. (2005). The gender similarities hypothesis. *American Psychologist*, 60(6), 581–592. doi:10.1037/0003-066X.60.6.581
- Hyde, J. S., Bigler, R. S., Joel, D., Tate, C. C., & van Anders, S. M. (2019). The future of sex and gender in psychology: Five challenges to the gender binary. *American Psychologist*, 74(2), 171–193. doi:10.1037/amp0000307
- Italie, L. (2019, July 31). LGBTQ representation in children's TV is growing: “We're talking about the love of a family.” *USA Today*. Retrieved from <https://www.usatoday.com/story/life/parenting/2019/07/31/lgbtq-representation-growing-childrens-television/1875892001/>

- Johns, M. M., Lowry, R., Andrzejewski, J., Barrios, L. C., Demissie, Z., McManus, T., . . . Underwood, J. M. (2019). Transgender identity and experiences of violence victimization, substance use, suicide risk, and sexual risk behaviors among high school students—19 states and large urban school districts, 2017. *Morbidity and Mortality Weekly Report*, *68*(3), 67–71. doi:10.15585/mmwr.mm6803a3
- Kågesten, A., Gibbs, S., Blum, R. W., Moreau, C., Chandra-Mouli, V., Herbert, A., & Amin, A. (2016). Understanding factors that shape gender attitudes in early adolescence globally: A mixed-methods systematic review. *PLoS One*, *11*(6), 1–36. doi:10.1371/journal.pone.0157805
- Kar, S. K., Choudhury, A., & Singh, A. P. (2015). Understanding normal development of adolescent sexuality: A bumpy ride. *Journal of Human Reproductive Sciences*, *8*(2), 70–74. doi:10.4103/0974-1208.158594
- Kidd, K. M., Sequeira, G. M., Douglas, C., Paglisotti, T., Inwards-Breland, D. J., Miller, E., & Coulter, R. W. (2021). Prevalence of gender-diverse youth in an urban school district. *Pediatrics*, *147*(6), 1. doi:10.1542/peds.2020-049823
- Kober, G. M. (1921). History of industrial hygiene and its effects on public health. In P. M. Ravenal (Ed.), *A half century of public health* (pp. 361–377). Charleston, SC: Nabu.
- Kogan, T. S. (2007). Sex-separation in public restrooms: Law, architecture, and gender. *Michigan Journal of Gender & Law*, *14*(1), 3–57.
- Kozub, S. (2018, September 28). Berkeley opens universal locker room. *NBC News*. Retrieved from <https://www.nbcnews.com/feature/nbc-out/berkeley-opens-universal-locker-room-trans-students-those-seeking-privacy-n914901>
- Lake, K. (2019, January 8). Universal bathrooms coming to the new West Lafayette recreation center. *WLFI*. Retrieved from <https://www.wlfi.com/content/news/Universal-bathrooms-coming-to-the-new-West-Lafayette-recreation-center-504055171.html>
- Leins, C. (2019, July 29). Illinois passes gender-neutral bathroom bill. *U.S. News and World Report*. Retrieved from <https://www.usnews.com/news/best-states/articles/2019-07-29/illinois-passes-bill-requiring-single-bathrooms-to-be-gender-neutral>
- Maccoby, E., & Jacklin, C. N. (1987). Gender segregation in childhood. *Advances in Child Development and Behavior*, *20*, 239–287. doi:10.1016/S0065-2407(08)60404-8
- Massey, D. (1994). *Space, place and gender*. Minneapolis: University of Minnesota Press.

- McDaniel, P., & Garica, D. (2020, November 9). Trans and nonbinary candidates set record wins in red and blue states. *NPR*. Retrieved from <https://www.npr.org/2020/11/09/931819214/trans-and-nonbinary-candidates-set-record-wins-in-red-and-blue-states>
- McPherson, J. M., & Smith-Lovin, L. (1987). Homophily in voluntary organizations: Status distance and the composition of face-to-face groups. *American Sociological Review*, *52*(3) 370–379. doi:10.2307/2095356
- McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a feather: Homophily in social networks. *Annual Review of Sociology*, *27*(1), 415–444. doi:10.1146/annurev.soc.27.1.415
- Mitteroecker, P., Windhager, S., Müller, G. B., & Schaefer, K. (2015). The morphometrics of “masculinity” in human faces. *PLoS One*, *10*(2), e0118374. doi:10.1371/journal.pone.0118374
- Moñtanez, A. (2017, September 1). Beyond XX and XY. *Scientific American*. Retrieved from https://www.scientificamerican.com/magazine/sa/2017/09-01/?WT.ac=SA_SA_CurrentIssue
- Nimon, K. F. (2012). Statistical assumptions of substantive analyses across the general linear model: A mini-review. *Frontiers in Psychology*, *3*, 322. doi:10.3389/fpsyg.2012.00322
- Norton, A. T., & Herek, G. M. (2013). Heterosexuals’ attitudes toward transgender people: Findings from a national probability sample of US adults. *Sex Roles*, *68*(11–12), 738–753. doi:10.1007/s11199-011-0110-6
- Open Science Framework. (2020). *OSF Home*. Retrieved from <https://osf.io/dashboard>
- Powers, K. (2019). Shattering gendered marketing. *American Marketing Association*. Retrieved from https://www.ama.org/marketing-news/shattering-gendered-marketing/?MessageRunDetailID=710525660&PostID=7863675&utm_medium=email&utm_source=rasa_io
- Rice, R. M. (2021). Feminist theory and interorganizational collaboration: An ethnographic study of gendered tension management. *Communication Monographs*, *88*(4), 1–19. doi:10.1080/03637751.2021.1931703
- Risman, B. J. (2004). Gender as a social structure: Theory wrestling with activism. *Gender & Society*, *18*(4), 429–450. doi:10.1423/88040
- Sanders, J., & Stryker, S. (2016). Stalled: Gender-neutral public bathrooms. *South Atlantic Quarterly*, *115*(4), 779–788. doi:10.1215/00382876-3656191
- Shrum, W., Cheek, N. H., & Hunter, S. M. (1988). Friendship in school: Gender and racial homophily. *Sociology of Education*, *61*(4), 227–239. doi:10.2307/2112441

- Steinmetz, K. (2014, May 29). The transgender tipping point. *TIME*. Retrieved from <http://time.com/magazine/us/135460/june-9th-2014-vol-183-no-22-u-s/>
- Szulc, L. (2020). Digital gender disidentifications: Beyond the subversion versus hegemony dichotomy and toward everyday gender practices. *International Journal of Communication*, 14, 5436–5454.
- Tajfel, H., & Turner, J. C. (1979). An integrative theory of intergroup conflict. In H. Tajfel (Ed.), *The social psychology of intergroup relations* (pp. 33–47). Monterey, CA: Brooks/Cole.
- The Trevor Project. (2021). The Trevor Project research brief: Diversity of nonbinary youth. Retrieved from <https://www.thetrevorproject.org/research-briefs/diversity-of-nonbinary-youth/>
- U.S. Centers for Disease Control and Prevention. (2020, March 6). *Positive parenting tips*. Retrieved from <https://www.cdc.gov/ncbddd/childdevelopment/positiveparenting/index.html>
- U.S. Department of Justice. (2010). *2010 ADA standards for accessible design*. Retrieved from https://www.ada.gov/2010ADASTandards_index.htm
- U.S. Department of Transportation. (2009). *Manual for uniform traffic control devices*. Retrieved from https://mutcd.fhwa.dot.gov/htm/2009/part2/fig2m_06_longdesc.htm
- Wamsley, L. (2021, March 24). Rachel Levine makes history as 1st openly trans federal official confirmed by senate. *NPR*. Retrieved from <https://www.npr.org/2021/03/24/980788146/senate-confirms-rachel-levine-a-transgender-woman-as-assistant-health-secretary>