Gender Essentialism and the Mental Representation of Transgender Women and Men

A Multimethod Investigation of Stereotype Content

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Abstract

The growing visibility of transgender women and men in the US challenges a dominant cultural model of gender in which dichotomous sex assigned at birth gives rise to dichotomous gender identity in adulthood. How are these groups – verbally marked as atypical relative to their cisgender counterparts – stereotyped? Moreover, how do gender essentialist beliefs predict the content of such stereotypes? Across four studies with diverse methods of stereotype measurement, we assessed characteristics that cisgender people associate with transgender women and men, comparing these to their stereotypes of cisgender women and men. In our final study, we directly assessed how cisgender people mentally position transgender groups relative to cisgender groups. Across these studies, transgender categories were characterized in less positive ways than cisgender ones, and there was as a lower level of consensus about transgender than cisgender stereotypes. On average, transgender groups were de-gendered relative to cisgender groups, such that transgender women and men were not strongly differentiated on traditionally-gendered stereotype dimensions. Finally, we showed that participants higher in gender essentialism (relative to participants lower in gender essentialism) evaluated cisgender groups more positively and were more likely to stereotype transgender groups based on their sex assigned at birth.

Keywords: Stereotypes, Gender Identity, Gender Diversity, Psychological Essentialism, Transgender

Highlights

- Traditional gender stereotypes are not used to differentiate transgender women and men.
- Cisgender stereotypes were more consensual than transgender stereotypes.
- Gender essentialism predicted stereotyping transgender groups by their sex assigned at birth.

1. Introduction

While 14% of the US lives in poverty, 29% of transgender people do (James et al., 2016). Ninety percent of transgender people report mistreatment on the job; 49% have been refused healthcare; 19% have experienced domestic violence (Grant et al., 2011). For transgender people who are also marginalized in other ways, the numbers are even starker (Grant et al., 2011; James et al., 2016). Research on transprejudice (e.g., Green, 2014; Kanamori et al., 2020; Winter et al., 2009) has begun to address these disparities, but transprejudice tells only part of the story; we must also consider the behavioral and dispositional expectations that are applied to transgender people. A cognitive analysis of lay people's mental representations of transgender groups can potentially help elucidate the roots of these disparities and to identify avenues for their amelioration.

The attributes associated with a particular social category – the *descriptive content* of the stereotype applied to that group within a given culture – structure our everyday experiences (Bodenhausen et al., 2012; Macrae & Bodenhausen, 2000; Schneider, 2005). Alongside positive or negative attitudes towards social groups (i.e., outgroup derogation and ingroup favoritism), the descriptive content of cultural stereotypes affects how people are treated and influences interpretations of group-level disparities (Bodenhausen et al., 1998; Cundiff & Vescio, 2016). Social stereotypes often entail specific expectations about the *communio*n and *agency* of group members (Cuddy et al., 2008), and these dimensions provide fundamental coordinates for describing many social groups (e.g., Abele et al., 2016). In the case of gender, women are reliably perceived as having more communal traits and men are reliably perceived as having more agentic traits (e.g., Sczesny et al., 2019), though gender differentiation with respect to agency has diminished over time (Eagly et al., 2020). In this project, we investigate the content

of stereotypes applied to transgender women and men, with a particular focus on whether and how broader stereotypes about women and men are applied to these groups.

1.1 The Binary Model of Gender

In Western societies today, a strong cultural model of binary gender holds that all infants are female or male at birth and will grow up identifying (respectively) as women or men while taking on societal roles considered appropriate to their group (Hyde et al., 2019; Morgenroth & Ryan, 2018). This cultural model persists despite the reality that biological sex is not dichotomous (Aydin et al., 2019), gender roles and stereotypes change over time (Brewster & Padavic, 2000; Eagly et al., 2020), women and men have more in common than not (Joel et al., 2014, 2015), and many cultures throughout history and today do not have strictly binary gender systems (e.g., Hijra of India, Winkte of the Lakota, Fa'afafine of the Samoa, Muxe of Oaxaca, Māhū of Hawaii). Despite this substantive evidence of the model's inadequacy, it has provided the conventional basis for conceptualizing women and men in the US and many other Westernized cultures.

The increasing visibility of transgender groups in recent decades challenges this cultural model (Davidson, 2007; Morgenroth et al., 2020). Out of the broader transgender umbrella, two highly visible groups are *transgender women* - people who identify as women but were assigned male at birth - and *transgender men* - people who identify as men but were assigned female at birth (Mocarski et al., 2019; Steinmetz, 2014). While people in these groups identify as women or men and may adopt societal roles considered appropriate to that gender group, the relationship between their sex assigned at birth and their gender identity is atypical according to the cultural model; they are unconventional. While judgments of typicality can vary by individual experience (e.g., Bang et al., 2007), we focus on typicality as defined relative to the dominant cultural

model. Typicality matters because atypical individuals are less likely to be stereotyped as having group-typical qualities (Craig & Bodenhausen, 2018; Lammers et al., 2009; Murphy, 2002; Murphy & Ross, 2005).

Subgroups can be considered more or less typical of a superordinate group, with atypicality often communicated by verbal marking (Brekhus, 1998; Greenberg, 1969). For example, a male person who is a nurse may often be referred to as a “male nurse,” whereas a female person who is a nurse is likely to just be referred to as a “nurse,” reflecting the perceived atypicality of the male nurse subgroup relative to the female nurse subgroup. While women and men who are transgender are generally referred to using the “transgender” marker, their cisgender counterparts are rarely marked in terms of this subgroup membership. This marking of transgender – but not cisgender – groups denotes transgender people as atypical. Alongside a history of medical pathologization, this marking means both that transgender groups are likely to be viewed as *unusual* or *deviant* (Gazzola & Morrison, 2014; Howansky et al., 2019; Reed et al., 2015; Winter et al., 2009), and traditional gender stereotypes may not be applied to them.

1.2 Responses to Atypicality

Prejudice is one well-established reaction to groups that disrupt cultural expectations (e.g., Sears, 1988; Stephan & Stephan, 2000), and there is substantial evidence of anti-transgender prejudice (e.g., Fitzgerald, 2018; Morgenroth et al., 2020; Winter et al., 2009). Beyond such global evaluative reactions, the question of particular interest in the current research is how transgender groups are stereotyped. Given their perceived atypicality, transgender women and men are unlikely to be straightforwardly stereotyped based on their gender identity. We consider three alternate patterns that could characterize the gender-related stereotypes applied to transgender groups (see Table 1).

The first possibility is that cisgender perceivers may fall back on the culturally dominant either/or binary model of gender, assuming that if a person is not a typical instance of the “women” category, then they must belong in the “men” category (and vice versa). In effect, this involves stereotyping transgender individuals in terms of their sex assigned at birth (e.g., stereotyping transgender women as masculine). A second logical possibility – *bi-gendering* – would involve ascribing to transgender people stereotype content associated with both women and men (e.g., stereotyping transgender women as both feminine and masculine). This androgynous pattern of stereotype content could emerge if cisgender perceivers view the transgender groups as representing an intersection of woman-ness and man-ness. A final possibility is that transgender groups will be *de-gendered*, meaning that their perceived lack of fit to conventional gender categories will result in a reluctance to ascribe any gendered qualities to them (e.g., stereotyping transgender women as neither feminine nor masculine). Both bi-gendering and de-gendering imply that transgender women and men will be perceived to be similar in their gendered qualities (cf. Howansky et al., 2019, 2020; Mao et al., 2019; Wittlin et al., 2018), but they differ in expecting the common profile applied to transgender groups to be either relatively androgynous or relatively neutral in gendered content. These different ways in which transgender women and men might be gender stereotyped suggest that stereotypes of transgender groups will show less consensus than those of cisgender groups.

De-gendering may be the most likely overall pattern of gender stereotyping of transgender groups among cisgender social perceivers. Being atypical of both their gender identity group (i.e., women or men) and their sex assigned at birth group (people who were defined as male or female as newborns), transgender women and men cannot be easily shoehorned into conventional understandings of gender, and as a result, cisgender perceivers

may view them with considerable uncertainty and a lack of any clear inferences about their gendered qualities. Both de-gendering transgender people and stereotyping them according to their sex assigned at birth could have noteworthy sequelae, because the failure to acknowledge key qualities that inform and shape someone's sense of identity (i.e., identity denial) is a well-documented psychological risk factor. Indeed, identity denial appears in scale measures of transprejudice (e.g., "transgender men are not really men"; Billard, 2018), is a common microaggression against transgender people (Nadal, 2019; Nadal et al., 2012), and predicts negative mental health outcomes (Testa et al., 2015).

Table 1.

Possible Patterns of Gender Stereotyping about Transgender Groups

Stereotyping Pattern	Empirical Prediction
Stereotyping Based on Gender Identity	Transgender women and men will be perceived in clearly differentiated ways, with transgender women stereotyped similarly to cisgender women, and transgender men stereotyped similarly to cisgender men.
Stereotyping Based on Sex Assigned at Birth	Transgender women and men will be perceived in clearly differentiated ways, with transgender women stereotyped similarly to cisgender men, and transgender men stereotyped similarly to cisgender women.
Bi-Gendering	Transgender women and men will be perceived in a relatively undifferentiated way, with both groups stereotyped as having an androgynous pattern of features associated with both cisgender women and cisgender men.
De-Gendering	Transgender women and men will be perceived in an undifferentiated way, with both groups having a pattern lacking in features associated with cisgender women or cisgender men.

1.3 Ontological Beliefs Guiding Gender Stereotypes

Although the de-gendering of transgender groups may be commonplace, there are likely to be individual differences in how people reason about the gendered qualities of these groups. Existing work on gender stereotypes indicates that beliefs about the ontology of gender, such as

psychological essentialism, can dictate stereotype content (Haslam et al., 2000; Hirschfeld, 1995; Medin, 1989). When a category is essentialized, laypeople believe that members of a category are the same at some fundamental level, and that this fundamental sameness (or shared essence) produces the features associated with the category (Gelman, 2003). There is a sizeable body of evidence suggesting that gender groups are highly essentialized in Western societies (e.g., Fuss, 1989; Haslam et al., 2000; Prentice & Miller, 2006; Rothbart & Taylor, 1992; Smiler & Gelman, 2008; Swigger & Meyer, 2019); in accordance with the dominant cultural model, many believe that women are fundamentally the same, and different from men. Gender is often essentialized based on natural kind beliefs, which center the perceived immutability, stability, and shared features of a given group; these are beliefs about what gender *is*, and *from where* gender emerges (Coley et al., 2019; Haslam et al., 2000).

In the US, individual differences in gender essentialism predict sexism (Lee et al., 2020; Smiler & Gelman, 2008), acceptance of existing gender disparities (Lee et al., 2020), association of gender norms with the self (Coleman & Hong, 2008; Smiler & Gelman, 2008), preference for traditionally gendered others (Swigger & Meyer, 2019; Tinsley et al., 2015), and transprejudice (Axt et al., 2021; Norton & Herek, 2013; Prusaczyk & Hodson, 2020; Rad et al., 2019; Tee & Hegarty, 2006; Wilton et al., 2019). As such, these beliefs may play a noteworthy role in moderating how people ascribe stereotypes to transgender groups.

1.4 The Current Project

We conducted five studies with cisgender participants living in the US. In the first four studies, we used three diverse methods (Study 1a & 1b: explicit scale-ratings, Study 2: spontaneous verbal stereotype generation, Study 3: implicit mental images) to assess the descriptive content of stereotypes held about transgender women and men, and to examine how

gender essentialism predicted that content. In all cases, we evaluated stereotypes about transgender groups relative to stereotypes about cisgender women and men. We assessed gender-linked stereotype dimensions (i.e., agency, communion, masculinity, and femininity, Studies 1a, 1b, 2, and 3), gender-linked interests (i.e., interests in things and people, Study 1b), perceptions of unusualness (Study 2), and overall stereotype valence (Study 2), interpreting our results in terms of the different ways gender stereotypes may be applied to transgender groups. We also examined whether mental representations of transgender groups were more variable than those of cisgender groups, and the extent to which essentialist beliefs predicted stereotype content. By using convergent methods across studies, we were further able to tease apart how the means of gathering stereotype content influences the information provided by our participants.

In Study 4, we looked at participants' overall model of gender by asking them to judge similarities and differences among the four gender groups. We examined what participants consider a strong or weak basis for gender group similarity and whether this is predicted by gender essentialist beliefs. This study provided insight into the results of the other studies by probing how participants situate transgender groups alongside cisgender groups. Study materials, de-identified data, and analysis scripts for the work described in this paper are available in an anonymized format, along with preregistrations for Study 1b and 2, at the links in Table 2 (in order to include anonymized links for the review process, we have here included one to each subsection of the project. These links will eventually all be replaced with a single link to the overall project module on OSF). All participants completed an informed consent process before beginning their study participation, in compliance with the (institution omitted for masked review) IRB.

Table 2.

Links to Anonymized Materials and Preregistrations for the Purposes of Review

Study	Link to Materials	Link to Preregistration
1a	https://osf.io/m8kjj/?view_only=c35c1223b42c43b9942d21f85eec10cd	N/A
1b	https://osf.io/j7r3w/?view_only=e7dc9da5f0354947a01c5ffd780ca7f3	https://osf.io/dkr6u/?view_only=4536b3192b594a24bd8e46722924a1ab
2	https://osf.io/8w4vs/?view_only=da8afa2b3c0e42149a0f9b8009439a83	N/A
3	https://osf.io/c8vbk/?view_only=8615e126783046ec98bc093e58c678f0	Original: https://osf.io/qw9eh/?view_only=d3ba4f8e85fc4659986feac70ab0ad9a Amendment: https://osf.io/q74sw/?view_only=92418c6fda0b4d428473f00b53e9f0f9
4	https://osf.io/g7y4x/?view_only=8b12413a5f2d4c33b48a0292a845e36d	N/A

2. Study 1a: Rating Stereotype Content

In this study, we assessed agency and communion attributions made by cisgender participants about transgender and cisgender women and men. These commonly-gendered stereotype dimensions provide a clear test for whether and how such stereotypes are extended to transgender groups and whether essentialist beliefs predicts such content.

2.1 Methods

2.1.1 Participants

We recruited 160 Amazon Mechanical Turk participants, with a final sample of 125 (47.20% cisgender women, 52.80% cisgender men; $M_{\text{age}} = 35.36$ years, $SD_{\text{age}} = 11.27$; 91.20% heterosexual; 75.20% White, 10.40% Asian, 8.80% Black, 5.60% Hispanic, 0.80% Other). We excluded data from 35 participants: 7 did not complete the study, 27 were not within the US, and 1 was not cisgender (retained 78.13% of participants; analysis including these participants shows the same pattern of effects).

2.1.2 Materials and Procedures

All participants completed an online survey ($M_{\text{duration}} = 11.31$ minutes, $SD_{\text{duration}} = 14.80$), starting with agency and communion ratings. Participants saw the name and short definition of a gender group (see Table 3) and rated that group on 20 different positively-valenced adjectives associated with warmth or competence from $-2/Not\ At\ All$ to $2/Very$ (agency example traits: capable, self-confident, good under pressure; communion example traits: caring, trustworthy, fair; Abele et al., 2016). Participants completed the scale for each of the four gender groups in a random order, and item order was randomized (because each participant answered each scale four times, we assessed scale reliability across target group with the R_{KF} metric; agency $R_{KF} = 0.97$, communion $R_{KF} = 0.98$; Revelle & Wilt, 2019).

Table 3.

Definitions of Gender Groups Shown to Participants Across All Studies

Group ¹	Definition
Transgender Women	People who were born biologically male and currently identify as women.
Transgender Men	People who were born biologically female and currently identify as men.
Cisgender Women	People who were born biologically female and currently identify as women.
Cisgender Men	People who were born biologically male and currently identify as men.

Participants then reported their familiarity with the gender groups in (a) personal encounters and (b) media stories ($0/Never$, $1/Rarely$, $2/Occasionally$, $3/Often$; 96.00% of participants reported having at least some media exposure to transgender groups), and filled out a

¹ In Studies 1a & 2, we used the terms “women” and “men” in the stimulus materials rather than “cisgender women” and “cisgender men” for ease of comprehension of the participants. This choice of words has an exclusionary implication (i.e., that transgender women are not part of the superordinate category women), and we therefore adjusted this language in Studies 1b, 3 & 4. Participants in Study 1a also completed the ratings for a Non-Binary gender group. These results are presented in Appendix C.

5-item measure of the natural kind facet of gender essentialist beliefs² (Haslam et al., 2000, 2006; sample item: “Some categories are more natural than others, whereas others are more artificial. What do you think gender is like?”; scale 1-9; $\alpha = 0.81$). Participants also replied to the abbreviated need for closure scale (Roets & Van Hiel, 2011; this 15-item scale is of sufficient length to rely on the ω index of reliability, which has several advantages over α ; $\omega_h = 0.83$; McNeish, 2018). All scales were aggregated using mean response.

Finally, participants reported demographic information including gender, age, racial identification, sexual orientation, and political ideology (two questions: “I strongly endorse many aspects of conservative [liberal] political ideology,” 7-point Likert scale). Liberalism and conservatism correlated strongly, $r(122) = -0.82, p < 0.0001$, so they were averaged into a single score in which higher values indicate liberalism and lower values indicate conservatism.

2.2 Stereotype Consensus: Scale Variance

We assessed whether stereotypes about cisgender groups were more consensual across participants than stereotypes about transgender groups using a 2-sided F -test for equivalence of variance on participants’ agency and communion ratings. For both scales, ratings of transgender groups had significantly more variance than ratings of cisgender groups (agency: $\sigma^2_{cis} = 0.429$, $\sigma^2_{trans} = 0.597$, $F(249, 249) = 0.719, p = 0.009$; communion: $\sigma^2_{cis} = 0.491$, $\sigma^2_{trans} = 0.713$, $F(249, 249) = 0.688, p = 0.003$). Stereotypes of transgender groups vary meaningfully across individuals, so it will be important to look at the impact of individual differences on mental representations of transgender groups.

² In all studies, participants also answered the 4-question entitativity subscale of this measure; this subscale was not statistically reliable, but all supplementary results associated with this measure are available in the public analysis scripts.

2.3 Results

Across studies, we adopted a multi-level modeling approach to analyze within-participant designs (Bates et al., 2015; R Core Team, 2018; Raudenbush & Bryk, 2002; Revelle, 2019) with a random intercept of participant. We examined fixed main effects for gender (comparing ratings of women and men, whether transgender or cisgender), markedness (comparing ratings of cisgender and transgender people, whether women or men), and the interaction of these two factors. We interpreted the interaction as the degree to which the gender effect depends on whether the groups are transgender or cisgender. Our follow-up analyses evaluated whether the gender effects were similar comparing transgender women with transgender men and cisgender women with cisgender men (results for the other simple effect tests, comparing transgender women with cisgender women and transgender men with cisgender men, are included in Appendix D). Statistical significance was evaluated only for fixed effects, using Satterthwaite's method (Kuznetsova et al., 2017). All reported means are estimated marginal means accounting for our within-participants designs. All analyses were conducted in R, and are publicly accessible on the OSF (Link to be added; during the review process, all links can be seen in Table 2). All robustness checks referenced in this paper are included in the analysis scripts.

2.3.1 *Stereotype Content*

Cisgender groups were rated as more agentic and more communal than transgender groups (agency: $t(372) = 10.649, p < 0.0001$; communion: $t(372) = 2.492, p = 0.01$). There was also an overall gender effect for both ratings: women were rated less agentic and more communal than men (agency: $t(372) = 3.822, p = 0.0002$; communion: $t(372) = -6.548, p < 0.0001$). However, these gender effects were qualified by interactions with markedness (agency: $t(372) = 3.446, p = 0.0006$; communion: $t(372) = -5.775, p < 0.0001$). Though mean agency and

communion ratings of cisgender women and cisgender men were different, transgender women and men were not differentiated on these dimensions (see Figure 1³). Looking at mean ratings of each group (see Table 4), we can see that this lack of differentiation represents de-gendering rather than bi-gendering.

Table 4.

Estimated Marginal Means of Scale Ratings of Gender Groups.

Rating	Transgender Women	Transgender Men	Cisgender Women	Cisgender Men
Communion	0.700 [0.07]	0.666 [0.07]	1.056 [0.07]	0.525 [0.07]
Agency	0.493 [0.06]	0.508 [0.06]	0.768 [0.06]	1.044 [0.06]

Note: Standard errors are indicated in brackets below the respective means, in scale units. Total possible range is from -2 (Not at All) to 2 (Very)

Figure 1. The extent to which communion and agency were attributed more to women or men depends on whether the groups are cisgender or transgender. While cisgender women were attributed more communion and less agency than cisgender men (gray violin plots), transgender

³ While our statistical testing is done using multi-level linear models, we visualize our effects using violin plots of gender differentiation based on markedness. Displayed values are calculated in a three-step process as documented in our publicly-available analysis scripts. First, to account for the repeated-measures nature of the data, we calculate residual values for each rating of each gender group from a minimal model. Second, we calculate two difference scores per participant by subtracting the participant's rating of transgender women from their rating of transgender men, and their rating of cisgender women from their rating of cisgender men. The distributions of these participant-level difference scores are displayed in the violin plots. Third, model-based estimated effect sizes are calculated and displayed as black points. These steps are conducted for each rating type (e.g., in Figure 3, the calculations are done separately for Communion and Agency).

women and men were not differentiated (turquoise violin plots). Note: The black point in each violin plot is the gender effect size based on markedness for that rating. Total potential range is from -4 (very associated with women, not at all associated with men) to 4 (very associated with men, not at all associated with women).

2.3.2 Gender Essentialist Beliefs

To analyze the unique effect of gender essentialist beliefs, we controlled for several individual differences known to predict attitudes towards transgender groups: group familiarity, need for closure, gender, and sexual orientation (Gerhardstein & Anderson, 2010; Morgenroth et al., 2020; Tebbe & Moradi, 2012; Whyman, 2019; Worthen, 2016). We also controlled for political ideology, which correlated with essentialism ($r(123) = -0.34, p < 0.001$; Norton & Herek, 2013; Prusaczyk & Hodson, 2020; Stern & Rule, 2018; Tadlock et al., 2017). In Studies 1a-3, familiarity is controlled for with fixed effects at level 1, while need for closure, gender, sexual orientation, and ideology are controlled for as level-2 fixed effects and cross-level fixed effect interactions between the individual difference and the gender group effects (participant-level factors were centered for use in analyses). Across all studies, not including control variables produces similar and somewhat stronger patterns of results.

Participants higher in essentialism showed greater gaps between cisgender and transgender groups on ratings of agency ($t(356) = 4.908, p < 0.0001$) and communion ($t(356) = 2.332, p = 0.02$) than those lower in essentialism. Essentialism did not interact with the gender effects or the degree to which the gender effects depended on markedness ($ps > 0.4$). On average across the sample, cisgender groups were rated more positively on both characteristics; for participants who strongly endorsed gender essentialism, this gap was bigger (see Figure 2).

Figure 2. As essentialism increased, participants rated cisgender groups (black lines) more positively, relative to transgender groups (turquoise lines). Note: Lines are model-based estimated marginal means, shading reflects standard error. Total possible range for ratings was from -2 (Not at All) to 2 (Very).

2.4 Discussion

Study 1a revealed three noteworthy things about how stereotypes are applied to transgender groups. First, participants had more consensual stereotypes of cisgender than transgender groups. Further, these participants did not extend traditionally gendered stereotypes to include transgender women and men; they differentiated cisgender women and men on agency and communion, but they did not differentiate transgender women and men on these characteristics. This lack of differentiation was due to de-gendering (rating transgender women and men relatively neutrally in terms of both agency and communion) rather than bi-gendering (rating transgender women and men highly on both agency and communion). Finally, gender essentialism predicted relatively more favorable ratings of cisgender women and men, but not more gender-typical differentiation between these groups. This is surprising in the context of prior literature showing that gender essentialism is connected to stronger endorsement of traditional gender stereotypes about cisgender groups; from that, we would have expected essentialism to predict (for example) rating cisgender women as more-communal and cisgender men as less-communal. The tendency to rate both cisgender groups as more communal and more

agentic as essentialism increased likely resulted from our exclusive reliance on positive, socially desirable traits to assess these dimensions. As such the measure can reflect general evaluative tendencies, and it may be that high-essentialism respondents were using the scale to express more favorable impressions of cisgender relative to transgender groups. That is, in this context, gender essentialism simply predicted allocating more positive traits to groups that fit into the gender binary, in contrast with those who do not. We replicate this (Study 1b) before examining explicit ratings about less socially desirable gender stereotype content (Study 1b) as well as more spontaneous and open-ended forms of gender stereotyping (Study 2 and 3).

3. Study 1b: Rating Stereotype Content and Gendered Interests

We conducted a preregistered replication of our Study 1a scale-based agency and communion findings, while also assessing the attribution of gendered interests (interests in things and interests in people, Lippa, 1998; Su et al., 2009). This gendered pattern of interests maps onto well-documented gender-based vocational stereotypes, such as viewing engineering as a domain for men and elementary education as a domain for women (e.g., Matheus & Quinn, 2017; White & White, 2006). In contrast to possessing traits like being capable and caring, which reflect generally socially desirable qualities, having more specific interests in engineering or elementary education should be less evaluatively laden. As such, explicit ratings of these interests are likely to involve gendered perceptions that are less confounded with social desirability. We further incorporated a comprehension check assessing whether participants remembered the gender definitions after they completed their ratings.

3.1 Methods

3.1.1 Participants

We recruited 200 participants from Amazon Mechanical Turk, with a final sample of 196 participants (38.78% cisgender women, 61.22% cisgender men; $M_{\text{age}} = 37.8$ years, $SD_{\text{age}} = 11.09$; 85.20% heterosexual; 81.12% White, 13.77% Black, 6.12% Hispanic, 4.59% Asian, 1.02% Native American, 0.51% Middle Eastern). We excluded data from 4 participants: 1 was not within the US, and 3 were not cisgender (retained 98% of participants; analysis including these participants shows the same pattern of effects).

3.1.2 Materials and Procedures

All participants completed an online survey ($M_{\text{duration}} = 13.58$ minutes, $SD_{\text{duration}} = 8$), starting with the same agency and communion ratings as Study 1a (agency $R_{\text{kF}} = 0.95$, communion $R_{\text{kF}} = 0.97$). After completing agency and communion ratings for each group, participants estimated how much members of each gender group would have a series of gender-typical interests ($-2/Not\ at\ All\ Interested$ to $2/Very\ Interested$). To measure this, we created a 10-item measure based on the vocational interests literature, with five items measuring interest in thing-focused activities (science, mathematics, conducting research, machines, and working outdoors), and five items measuring interest in people-focused activities (community service, caretaking, teaching, counseling others, and teamwork). Participants completed the scale for each of the four gender groups in a random order, and item order was randomized. Each scale exhibited good reliability (interest in things $R_{\text{kF}} = 0.89$, interest in people $R_{\text{kF}} = 0.86$). Group definitions were visible as participants completed the group ratings.

Participants then completed a 4-question multiple-choice comprehension check to see whether they correctly remembered the group definitions. Finally, participants completed the

same measures of familiarity (96.90% of participants reported at least some media exposure to transgender groups), gender essentialist beliefs ($\alpha = 0.76$), need for closure ($\omega_h = 0.76$), and demographics as in Study 1a (conservatism and liberalism correlated $r(135) = -0.57, p < 0.0001$).

3.2 Stereotype Consensus

3.2.1 Group Definition Test

Just over half of participants (55.10%) got all comprehension check questions correct. However, participants were 3.15 times more likely to make errors defining transgender than cisgender groups (this difference is significant in a multi-level binomial model with group predicting definition accuracy, $z = 7.953, p < 0.0001$), once again suggesting that representations of cisgender groups were more consensually shared across participants than those of transgender groups. Data from the 88 participants who did not get all questions correct are excluded from the reported analyses; final $N = 108$ (54% of initially recruited participants retained for further analysis; notably, however, robustness checks of our analyses which included all participants showed the same pattern of effects and are in our publicly-available analysis scripts).

3.2.2 Scale Variance

We assessed whether there was greater consensus about cisgender stereotypes than transgender stereotypes using a 2-sided F -test for equivalence of variance on participants' agency, communion, interest in people, and interest in things ratings. Ratings of transgender groups had significantly more variance than ratings of cisgender groups on agency, communion, and interest in people (agency: $\sigma^2_{\text{cis}} = 0.327, \sigma^2_{\text{trans}} = 0.569, F(215, 215) = 0.575, p < 0.0001$; communion: $\sigma^2_{\text{cis}} = 0.453, \sigma^2_{\text{trans}} = 0.729, F(215, 215) = 0.622, p = 0.0005$; interests in people:

$\sigma^2_{\text{cis}} = 0.401$, $\sigma^2_{\text{trans}} = 0.542$; $F(215, 215) = 0.740$, $p = 0.03$). This effect did not appear for interest in things ($\sigma^2_{\text{cis}} = 0.547$, $\sigma^2_{\text{trans}} = 0.619$; $p = 0.37$).

3.3 Results

For Study 1b, we use the same analytic approach and model structure as Study 1a. Our analysis preregistration was submitted prior to gathering any data (see Appendix B).

3.3.1 Stereotype Content

Cisgender groups were rated as more agentic than transgender groups ($t(321) = 7.442$, $p < 0.0001$), but not more communal ($p = 0.95$). There was also an overall gender effect for both ratings: women were rated less agentic and more communal than men (agency: $t(321) = 3.788$, $p = 0.0002$; communion: $t(321) = -4.907$, $p < 0.0001$). However, these gender effects were qualified by interactions with markedness (agency: $t(321) = 2.441$, $p = 0.02$; communion: $t(321) = -4.608$, $p < 0.0001$). Though mean agency and communion ratings of cisgender women and men differed, transgender women and men were not differentiated on these dimensions (see Figure 3). As in Study 1a, this represents a pattern of de-gendering rather than bi-gendering (see Table 5).

Cisgender groups were rated as more interested in things-focused activities than transgender groups ($t(321) = 3.821$, $p = 0.0002$), but cisgender and transgender groups were not differentiated on interest in people-focused activities ($p = 0.46$). There was an overall gender effect for both ratings: women were rated as less interested in thing-focused activities and more interested in people-focused activities than men (things: $t(321) = 11.901$, $p < 0.0001$; people: $t(321) = -13.50$, $p < 0.0001$). However, these gender effects were qualified by interactions with markedness (things: $t(321) = 6.641$, $p < 0.0001$; people: $t(321) = -10.25$, $p < 0.0001$). Though mean ratings for cisgender women and men differed strongly, transgender women and men were

not meaningfully differentiated on these dimensions (see Figure 3). Once again, we see a pattern of de-gendering (see Table 5).

Figure 3. The extent to which communion, interests in people, agency, and interests in things were attributed more to women or men depended on whether the groups were cisgender or transgender. While cisgender women were attributed more communion, more interest in people, less agency, and less interest in things than cisgender men (gray violin plots), transgender women and men were not differentiated (turquoise violin plots). Note: The black point in each violin plot is the gender effect size based on markedness for that rating. Total potential range is from -4 (very associated with women, not at all associated with men) to 4 (very associated with men, not at all associated with women).

Table 5.

Estimated Marginal Means of Scale Ratings of Gender Groups.

Rating	Transgender Women	Transgender Men	Cisgender Women	Cisgender Men
Communion	0.718 [0.07]	0.702 [0.07]	0.956 [0.07]	0.459 [0.07]
Interest in People	0.662 [0.07]	0.498 [0.07]	1.141 [0.07]	-0.056 [0.07]
Agency	0.467 [0.06]	0.523 [0.06]	0.675 [0.06]	0.934 [0.06]
Interest in Things	0.154 [0.07]	0.454 [0.07]	-0.007 [0.07]	1.052 [0.07]

Note: Standard errors are indicated in brackets below the respective means, in scale units. Total possible range is from -2 (Not at All) to 2 (Very).

3.3.2 Gender Essentialist Beliefs

As in Study 1a, we controlled for individual differences known to predict attitudes towards transgender groups: group familiarity, need for closure, gender, sexual orientation, and political ideology (which correlated with essentialism, $r(106) = -0.5, p < 0.001$). Replicating our results from Study 1a, participants higher in essentialism showed greater gaps between cisgender and transgender groups on ratings of agency and communion (agency: $t(301) = 4.675, p < 0.0001$; communion: $t(301) = 4.655, p < 0.0001$) than those lower in essentialism (see Figure 4). Essentialism did not interact with the gender effects or the degree to which the gender effects depended on the groups being transgender or cisgender ($ps > 0.25$).

Figure 4. As essentialism increased, participants rated cisgender groups (black lines) more positively, relative to transgender groups (turquoise lines). Note: Lines are model-based estimated marginal means, shading reflects standard error. Total possible range for ratings was from -2 (Not at All) to 2 (Very).

Participants higher in essentialism showed greater differentiation between cisgender and transgender groups on ratings of interest in things ($t(302) = 2.851, p = 0.005$) and interest in people ($t(302) = 2.597, p = 0.01$) than those lower in essentialism. For interest in things (but not interest in people, $ps > 0.16$), essentialism also marginally influenced the gender effect ($t(300) = 1.669, p = 0.096$), and significantly interacted with the extent to which gender differences relied

on markedness ($t(300) = 2.776, p = 0.006$). For interest in things, gender essentialism predicted greater gender-traditional differentiation in interests for cisgender groups, and lower ratings overall for transgender groups; for interest in people, the pattern is similar but weaker (see Figure 5).

Figure 5. Participants higher in essentialism endorsed more traditionally-gendered stereotypes of cisgender women (gray solid line) and cisgender men (gray dotted line), differentiating the two groups more than people lower in gender essentialist belief. In contrast, gender essentialist beliefs predicts rating both transgender women (turquoise solid line) and transgender men (turquoise dotted line) closer to the mean on both attributes. This pattern is stronger for interest in things than interest in people. Note: Lines are model-based estimated marginal means, shading reflects standard error. Total possible range for ratings was from -2 (Not at All) to 2 (Very).

3.4 Discussion

Study 1b replicated and extended our findings in Study 1a about how cisgender people stereotype transgender groups on explicit measures of traditionally-gendered attributes.

Participants again had more consensual stereotypes of cisgender than transgender groups, and participants again differentiated transgender women and men far less than they differentiated cisgender women and men in a pattern that showed de-gendering rather than bi-gendering.

The effects of essentialist beliefs differed between the trait ratings and the interests attributed to the gender groups. This difference likely reflects differences in the extent to which these two kinds of ratings are evaluatively laden – there is more social desirability inherent in

being friendly and self-confident than in being interested in machines and caretaking. For ratings of agency and communion, we replicated our Study 1a pattern: as gender essentialism increased, participants rated cisgender groups more positively relative to transgender groups. We again interpret this to mean that, as essentialism increases, participants used the scale as an overall index of their relatively positive attitudes towards groups that fit within the binary cultural model.

For ratings of gendered interests, we saw a different pattern: essentialist beliefs predicted rating cisgender groups in more gender-typical ways (e.g., women less interested in thing-focused activities, men more interested in them), and rating transgender groups in more neutral terms. The ratings of cisgender groups' interests in people and things accords with the gender essentialism literature, suggesting that the lower social desirability of this scale leaves space for gendered attribution of traits that are more independent of global evaluative biases.

Together, these two explicit stereotyping measures paint a picture of *othering*, where essentialism predicted excluding transgender groups from gendered content overall. When that content was not strongly socially desirable, essentialism predicted making only weak inferences about transgender groups; when it was socially desirable, essentialism predicted attributing more positive characteristics to cisgender than transgender groups. In both cases, transgender women and men remain relatively undifferentiated regardless of participant essentialism. In Studies 2 and 3 we examine whether these patterns generalize when using methods of stereotype assessment that do not rely on explicit rating scales.

4. Study 2: Spontaneous Verbal Stereotypes

Study 2 builds on Studies 1a and 1b in three distinct ways. First, to access more spontaneous stereotype content, we asked participants to generate five-adjective descriptions of

gender groups. This open-ended approach allows participants to describe the groups flexibly, in whatever terms they find meaningful. Given the lack of external constraints in this method of assessment, it provides a particularly diagnostic window on the issue of stereotype consensus; it lets us determine whether the most salient characteristics that are spontaneously associated with gender groups tend to be consensually shared.

Second, the design of Studies 1a and 1b may have encouraged comparison between transgender and cisgender groups, potentially enhancing differentiation on this basis. In Study 2, we therefore randomly assign participants to generate stereotypes about either cisgender or transgender groups. Finally, we evaluated the participant-generated content in terms of a wider array of stereotype dimensions: valence as an index of overall attitude, masculinity and femininity as indices of gendered content, and commonality as an index of the perceived typicality of different gender groups.

4.1 Methods

4.1.1 Participants

We recruited 200 Amazon Mechanical Turk participants, with a final sample of 137 participants (44.53% cisgender women, 55.47% cisgender men; $M_{\text{age}} = 35.32$, $SD_{\text{age}} = 10.68$; 87.59% heterosexual; 79.56% White, 8.03% Black, 7.30% Hispanic, 6.57% Asian, 1.46% Native American, 0.73% Middle Eastern). We excluded data from 63 participants: 58 were outside of the US, 2 were not cisgender, and 3 failed to complete the group-description task (retained 68.50% of participants; analysis including the 42 of these excluded participants whose definitions were normed showed the same pattern of effects).

4.1.2 Materials and Procedures

Participants were randomly assigned to complete a group description task for either the cisgender or transgender groups (76 assigned to cisgender condition, 61 assigned to transgender condition; conditions did not differ significantly in age, political ideology, or need for closure, all p s > 0.4; $M_{\text{duration}} = 8.71$ minutes, $SD_{\text{duration}} = 6.85$). For each gender group (defined as in Study 1a, see Table 3), participants were asked to list the first five adjectives that came to mind for the group (Niemann et al., 1994; groups were presented in random order; this approach was also used by Howansky, Wilton, and colleagues, 2019). After generating five-adjective descriptions for both groups, participants completed the same measures of familiarity (96.72% of participants describing transgender groups reported having at least some media exposure to transgender groups), gender essentialist beliefs ($\alpha = 0.83$), need for closure ($\alpha = 0.79$), and demographics as in Study 1a (conservatism and liberalism correlated $r(135) = -0.84$, $p < 0.0001$).

4.2 Stereotype Consensus: Word Frequency

We assessed the cultural consensus of a stereotype by counting when different participants used the exact same words in their five-adjective descriptions. Adjectives describing cisgender groups were 2.15 times more likely to re-appear across participants than adjectives describing transgender groups (this difference is significant in a multi-level binomial model with gender group predicting repetition across participants, $z = 4.174$, $p < 0.0001$; see Table 6). Thus, we again saw that transgender stereotypes were less consensual than cisgender stereotypes across the sample, with more stereotype content variation by person.

Table 6.

Most Frequent Adjectives Generated for Each Gender Group

Transgender Women	Transgender Men	Cisgender Women	Cisgender Men
Confused 18.03%	Confused 16.39%	Caring 26.32%	Strong 67.11%
Brave 16.39%	Strong 14.75%	Feminine 22.37%	Masculine 30.26%
Feminine 14.75%	Brave 13.11%	Strong 21.05%	Aggressive 17.11%
Strong 13.11%	Masculine/Strange/Weird 11.48%	Soft 17.11%	Tall 17.11%

Note: We list the most frequent adjectives associated with each gender group by proportion of participants who included that word in their description of that group. Words applied to cisgender groups were significantly more likely to be repeated by multiple participants.

4.3 Norming

Focusing on the combined content of all five adjectives offered as a group description (given that the meaning of particular traits can change depending on the other traits they cooccur with; Asch, 1946; Zanna & Hamilton, 1977), we had the descriptions normed by new participants from the same population. Each participant rated 40 descriptions. For each description, they were asked to think of somebody described as having the set of attributes contained in a five-adjective description. They then rated the valence (*1/Extremely Negative* to *7/Extremely Positive*), masculinity (*1/Not At All* to *7/Extremely*) and femininity (*1/Not At All* to *7/Extremely*) of this person. Participants also judged typical the description was (percentage of people living in America who fit the description, *0-100*; for more information, including participant demographics, see Appendix A).

4.4 Results

For Study 2, we use an analytic approach similar to Studies 1a and 1b, including the same fixed effects. We also include a random intercept for description-norming participant.

4.4.1 *Stereotype Valence*

We first consider the valence of descriptions generated for each gender group, looking to see if cisgender groups were overall described more positively than transgender groups, whether the tendency to evaluate women more favorably than men (Eagly & Mladinic, 1994) obtained for both cisgender and transgender groups, and whether essentialism played a role in this pattern.

We saw an overall pattern of transprejudice: participants generated more positive descriptions of cisgender than transgender groups ($t(135) = 5.677, p < 0.0001$). Though descriptions of transgender groups were, on average, neutral in valence ($M_{\text{transwomen}} = 4.08 [0.15], M_{\text{transmen}} = 3.98 [0.15]$), we interpret this as transprejudice when contrasted with the, on average, positive descriptions of cisgender groups ($M_{\text{ciswomen}} = 5.50 [0.13], M_{\text{cismen}} = 4.77 [0.13]$), consistent with research indicating that this sort of relative devaluation constitutes a consequential and common form of social discrimination (Brewer, 1999; Weisel & Böhm, 2015). Women were also described more positively than men ($t(12317) = 18.349, p < 0.0001$). However, the gender effect interacted with markedness ($t(12318) = 14.184, p < 0.0001$), such that cisgender women were described substantially more positively than cisgender men, but descriptions of transgender women and men were less evaluatively differentiated.

As in Studies 1a and 1b, we controlled for participant familiarity with the group, need for closure, gender, and sexual orientation when looking at the effect of gender essentialism. We also controlled for political ideology, which correlated with essentialism ($r(135) = -0.40, p < 0.001$). Essentialism predicted a bigger gap in description valence between cisgender and transgender groups ($t(125) = 2.869, p = 0.005$) and a smaller gap between women and men ($t(12323) = -9.981, p < 0.0001$). Finally, it predicted the degree to which the gender effect relied on markedness ($t(12336) = -10.568, p < 0.0001$). Altogether, essentialism predicted less-positive

descriptions of transgender groups and more-positive descriptions of cisgender men (see Figure 6).

Figure 6. Essentialism predicted less-positive descriptions of transgender groups (turquoise lines) and more-positive descriptions of cisgender men (gray dotted line). Note: lines are model-based estimated marginal means, shading reflects standard error. The total possible range for description valence is 1 (Extremely Negative) to 7 (Extremely Positive).

4.4.2 Stereotype Content

When analyzing the masculinity and femininity of group descriptions, we controlled for description valence in order to assess the uniquely gendered content of the description (valence predicts both femininity $t(5886) = 31.939, p < 0.0001$, and masculinity $t(9223) = -3.240, p = 0.001$). Participants generated more-feminine and less-masculine descriptions of women than men (feminine: $t(12308) = 63.368, p < 0.0001$; masculine: $t(12315) = -61.672, p < 0.0001$). However, the gender effects interacted significantly with markedness, such that cisgender groups were more differentiated than transgender groups (feminine: $t(12299) = 44.884, p < 0.0001$; masculine: $t(12308) = -48.598, p < 0.0001$; see Figure 7), as transgender groups were again de-gendered (see Table 7).

Figure 7. Whether descriptions of women and men differed on femininity and masculinity depended on whether the groups were cisgender or transgender. Cisgender women were described in more feminine and less masculine terms than cisgender men (gray violin plots), while transgender women and men were less differentiated (turquoise violin plots). Note: The black point in each violin plot is the gender effect size based on markedness for that rating. Valence is controlled for in these analyses. Total potential range is from -6 (strongly present in descriptions of women and not at all in descriptions of men) to 6 (strongly present in descriptions of men and not at all in descriptions of women).

Table 7.

Estimated Marginal Means of Ratings of Verbal Descriptions of Gender Groups.

Rating	Transgender Women	Transgender Men	Cisgender Women	Cisgender Men
Masculinity	3.56 [0.08]	3.92 [0.08]	2.75 [0.07]	5.63 [0.07]
Femininity	4.20 [0.07]	3.72 [0.07]	5.36 [0.07]	2.60 [0.07]

Note: Valence is controlled for in the estimated marginal means for femininity and masculinity. Standard error is indicated in brackets below the mean, in scale units. Total possible range is from 1 (Not At All) to 7 (Extremely)

4.4.3 Gender Essentialist Beliefs Predicting Gendered Stereotype Content

As in our prior analyses, we looked at the effect of gender essentialism while controlling for participant familiarity with the group, need for closure, gender, sexual orientation, and political ideology. Here, we also controlled for description valence, in order to examine how gender essentialism predicts uniquely feminine and uniquely masculine gender stereotyping over

and above global evaluative biases. Essentialism did not predict differentiation of cisgender from transgender groups on masculinity or femininity ($ps > 0.095$), or the overall size of the gender effect ($ps > 0.4$). Essentialism did predict the degree to which the gender effect (i.e., women more feminine, men more masculine) depended on group markedness (feminine: $t(12343) = 14.746, p < 0.0001$, masculine: $t(12341) = -17.837, p < 0.0001$). As essentialism increased, participants rated cisgender groups in more traditionally-gendered ways. Essentialism also predicted different patterns of applying gender stereotypes to transgender groups; while participants low in essentialism stereotyped transgender groups roughly in accordance with their gender identity (e.g., transgender women more-feminine and less-masculine than transgender men), participants high in essentialism stereotyped transgender groups roughly in accordance with their sex assigned at birth (e.g., transgender women less-feminine and more-masculine than transgender men ; see Figure 8).

Figure 8. As essentialism increased, participants described cisgender groups (black lines) in a more traditionally gendered manner; cisgender women (black solid lines) are described in more-feminine and less-masculine terms, while cisgender men (black dotted lines) are described in less-feminine and more-masculine terms. In contrast, as essentialism increased, participants described transgender groups (turquoise lines) more in terms of their sex assigned at birth. This effect is such that those low in essentialist beliefs stereotyped transgender women (turquoise solid lines) as more-feminine and less-masculine than transgender men (turquoise dotted lines), while those high in essentialist beliefs did the reverse. Note: Lines are model-based estimated

marginal means, shading reflects standard error. The total possible range for description ratings was from 1 (Not At All) to 7 (Extremely).

4.4.4 Stereotype Atypicality

Given that transgender groups are de-gendered, they are likely to be described in ways that seem atypical of the cisgender majority as a whole. Indeed, descriptions of cisgender groups were estimated to apply to more people in America than descriptions of transgender groups ($t(135) = 6.595$, $p < 0.0001$; $M_{\text{transwomen}} = 30.43$ [1.19], $M_{\text{transmen}} = 29.50$ [1.19], $M_{\text{ciswomen}} = 38.83$ [1.13], $M_{\text{cismen}} = 35.42$ [1.13]). This markedness effect was marginally larger among participants higher in essentialism ($t(127) = 1.797$, $p = 0.075$; controlling for familiarity, need for closure, gender, sexual orientation, and political ideology as in prior analyses).

4.5 Discussion

As in Studies 1a and 1b, we saw higher stereotype consensus about cisgender than transgender groups, suggesting that transgender stereotypes vary more between individuals. Also as in Studies 1a and 1b, cisgender groups were differentiated in ways that accord with the existing gender stereotype literature, while transgender groups showed this pattern to a lesser degree. Across all participants, we again saw a pattern of de-gendering. We also replicated our Study 1b finding that gender essentialism predicted more gender-typical stereotyping of cisgender groups. Unlike in Studies 1a and 1b, we saw gender essentialism predicting specific patterns of differentiation between transgender women and men on this implicit stereotype content measure. While participants low in gender essentialism stereotyped transgender groups in line with their gender identity (e.g., stereotyping transgender women as more feminine than transgender men), participants high in gender essentialism stereotyped transgender groups in line with their sex assigned at birth (see Figure 8).

Beyond masculinity and femininity, we investigated a novel stereotype dimension, typicality. Study 2 participants generated descriptions of transgender groups that were more unusual than those generated for cisgender groups; this tendency was marginally larger among those higher in gender essentialist belief. Finally, we added to the literature documenting transprejudice and its connections to essentialist beliefs. Though transgender groups were not on average stereotyped very negatively, we can see that they were stereotyped less favorably, compared to cisgender groups, reflecting a tendency of our cisgender participants to perceive their ingroup in relatively more favorable ways (e.g., Brewer, 1999). In addition, essentialist beliefs predicted less-positive attitudes towards transgender groups.

5. Study 3: Mental Images

Study 3 builds on the prior studies in two ways. First, we gather gender group stereotypes using the reverse correlation task (Dotsch & Todorov, 2012) to see a participants' implicit mental image of the group. This technique has been used to study mental images of a variety of groups, including ones defined by race (Hinzman & Maddox, 2017), socioeconomic status (Brown-Iannuzzi et al., 2017), and emotional expression (Jack et al., 2012). This method of capturing stereotype content complements Studies 1a, 1b, and 2, as it is both more implicit and more visual than our prior measures. These mental images are then evaluated in terms of their gendered content (i.e., masculinity, femininity) as well as gender-linked stereotype dimensions (e.g., warmth, competence). Second, we test the generality of our findings by switching from Amazon Mechanical Turk participants to undergraduate research participants.

5.1 Methods

5.1.1 Participants

We recruited 183 participants through Northwestern University's psychology participant pool, with a final N of 114 (44.74% cisgender men, 55.26% cisgender women; $M_{\text{age}} = 19.11$, $SD_{\text{age}} = 0.94$; 78.07% heterosexual; 58.77% White, 27.19% Asian, 15.79% Hispanic, 9.65% Black, 5.26% Middle Eastern, 0.88% Pacific Islander). We excluded data from 69 participants: 11 did not complete the study, 3 were not cisgender, and 55 failed an attention check (retained 62.30% of participants; stereotypes of excluded participants were not normed, but consensus analysis in section 5.3 is similar if excluded participants are retained). Exclusions did not differ by condition ($\chi^2(5) = 2.988$, $p > 0.7$).

5.1.2 Materials and Procedures

All participants completed the reverse correlation task (Dotsch & Todorov, 2012) for two of the four gender groups (the gender groups were randomly assigned, and defined as in the previous studies). In this task, participants repeatedly chose between pairs of fuzzy face images generated from the same base face (see Figure 9). We created a new race-and-gender neutral base face by visually averaging (Riederer, 2019) the 10 most race- and gender-typical faces of Asian, Black, Hispanic, and White women and men in the Chicago Face Database (Ma et al., 2015). In one image of a pair, a random noise pattern has been added to the base face; in the other, the same random noise pattern has been removed. The participant chooses which of the faces in the pair looks more like the target group (e.g., "Who looks more like a transgender man?"). The participant makes this binary choice between 350 face-pairs; their choices are then aggregated into a final face which contains their individual mental image of the group in question (Brinkman et al., 2017). To allow for assessment of individual differences and avoid

inflating Type I error (Cone et al., 2020), we rely on mental images as defined by the choices of individual participants rather than aggregating mental images across the choices of all participants.

Figure 9. Task design for Study 3 reverse correlation task; the example shows the condition for responding to questions about the cisgender men group.

After completing the two reverse correlation tasks, participants reported their gender essentialist beliefs ($\alpha = 0.72$), need for closure ($\omega_h = 0.57$), and group familiarity as in Studies 1a, 1b, and 2 (93.86% of participants reported having at least some media exposure to transgender groups). Participants also reported their demographics (conservatism and liberalism correlated $r(112) = -0.58, p < 0.0001$), and there was an attention check embedded in the demographics section ($M_{\text{duration}} = 32.06$ minutes, $SD_{\text{duration}} = 7.77$).

5.2 Stereotype Consensus: Trial-Level Agreement

To measure whether stereotypes of cisgender groups were more consensually shared across the sample than those of transgender groups, we conducted an exploratory analysis looking at the trial-level agreement across participants about which of the paired images in a trial looks more like a certain group. This is a novel use of trial-level data from the reverse correlation task: if cisgender stereotypes are more consensual than transgender stereotypes, we would expect more trial-level agreement. Across the 350 trials, participants were 1.15 times more likely to choose with the majority for cisgender than transgender groups (this difference is significant in a multi-level binomial model where group predicts likelihood of choosing with the majority on specific trials, $z = 8.261$, $p < 0.0001$; trial-level choice agreement in sample, with 50% as the lower bound: Transgender women = 55.37%, Transgender men = 56.42%, Cisgender women = 59.96%, Cisgender men = 58.90%).

5.3 Norming

As in Study 2, we recruited people from the same general population as our participants to norm the stereotype content – in this case, each participant's aggregated faces for each of two gender groups about which they did the reverse correlation task. Norming participants rated the masculinity, femininity, warmth, trustworthiness, capability, and assertiveness of 30 faces on a *1/Not At All* to *7/Completely* scale (for more information, including norming participant demographics, see Appendix A).

5.4 Results

For Study 3, our preregistered analysis used the same fixed effect structure as Study 2, with a random intercept for face-generating participant and for norming participant (this

preregistration was submitted after gathering data from the main study participants, but before their data had been accessed or norming data had been gathered; see Appendix B).

5.4.1 *Stereotype Content*

For five of the stereotypically gendered ratings (feminine, warm, trustworthy, masculine, and assertive), ratings did not differ overall between transgender and cisgender and mental images (all $ps > 0.1$) and did differ significantly between women and men (all $ps < 0.0001$). However, the gender effect depended significantly on markedness (all $ps < 0.0001$, see Table 8 for estimated marginal means, Table 9 for all statistical tests, and Figure 10 for box plot graph). Among mental images of cisgender groups, we saw traditional patterns: women were pictured as substantially more-feminine, warmer, more trustworthy, less-masculine, and less assertive than men. Among mental images of transgender groups, these effects were smaller and reversed: women were pictured as less-feminine, less warm, less trustworthy, more-masculine, and more assertive than men (all $ps < 0.01$). As in prior studies, mean ratings of transgender groups show a pattern of de-gendering rather than bi-gendering.

Table 8.

Estimated Marginal Means of Ratings of Mental Images of Gender Groups.

	Transgender Women	Transgender Men	Cisgender Women	Cisgender Men
Feminine	3.58 [0.07]	3.81 [0.08]	4.73 [0.07]	2.69 [0.07]
Warm	3.50 [0.06]	3.74 [0.07]	4.04 [0.07]	3.26 [0.07]
Trustworthy	3.79 [0.06]	3.92 [0.06]	4.23 [0.06]	3.56 [0.06]
Masculine	4.21 [0.07]	3.99 [0.07]	3.02 [0.07]	5.06 [0.07]
Assertive	4.25 [0.06]	4.07 [0.06]	3.95 [0.06]	4.42 [0.06]
Capable	4.35 [0.06]	4.46 [0.06]	4.62 [0.06]	4.41 [0.06]

Note: Standard error is indicated in brackets below the mean, in scale units. Total possible range is from 1 (Not At All) to 7 (Completely).

Capability ratings showed a slightly different pattern: there was no overall gender effect ($t(2127) = 1.674, p = 0.094$), but there was a markedness effect wherein cisgender groups were judged more capable than transgender groups. As with the other ratings, the gender effect strongly depended on markedness ($t(1856) = 5.300, p < 0.0001$). Participants pictured cisgender women as *more* capable than cisgender men, and transgender women as less capable than transgender men (see Figure 10). Though this is counter to traditional non-agentic stereotyping of women, it is in line with recent work showing that women have been stereotyped as increasingly competent (but not increasingly assertive) over time (Eagly et al., 2020).

Figure 10. For five traditionally gendered ratings (femininity, warmth, trustworthiness, masculinity, and assertiveness) we saw traditional gender effects for mental images of cisgender groups (gray violin plots), but a small and reversed effect for mental images of transgender groups (turquoise violin plots). For “capable” ratings, mental images of cisgender women were

rated as more capable than cisgender men (bottom gray violin plot), and we still see opposite effects among transgender groups (bottom turquoise violin plot). Note: The black point in each violin plot is the gender effect size based on markedness for that rating. The total possible range is from -6 (completely present in mental images of women and not at all present in mental images of men) to 6 (completely present in mental images of men and not at all present in mental images of women).

Table 9.

Interactions of the Gender and Markedness Effects

Rating	Gender and Markedness Effect Interaction	Cisgender Women and Men	Transgender Women and Men
Masculine	$t(5042) = -26.217$	$t(1343) = -24.809$	$t(1965) = 3.549$ $p = 0.0004$
Feminine	$t(5185) = 26.310$	$t(1414) = 24.495$	$t(2061) = -2.748$ $p = 0.006$
Warm	$t(5091) = 14.554$	$t(998) = 11.867$	$t(1550) = -4.497$
Trustworthy	$t(3807) = 11.569$	$t(686) = 10.537$	$t(918) = -2.550$ $p = 0.01$
Assertive	$t(2434) = -9.283$	$t(562) = -7.357$	$t(449) = 4.180$
Capable	$t(1856) = 5.300$	$t(364) = 4.759$	$t(404) = -1.769$ $p = 0.08$

Note: For six traditionally gendered ratings, the gender effect was strongly dependent on markedness. Unless stated, all $ps < 0.0001$.

5.4.2 Gender Essentialist Beliefs

To look at the unique effect of gender essentialist beliefs on stereotype content, we again controlled for participant familiarity with the group, need for closure, gender, sexual orientation, and political ideology (correlated with essentialism ($r(112) = -0.56, p < 0.0001$). Essentialism predicted the degree to which the gender effect interacted with markedness for ratings of masculinity, femininity, warmth, and trustworthiness. Participants higher in essentialism mentally represented cisgender categories in more traditionally stereotypically ways (e.g., women even more feminine than men), relative to those lower in essentialism. We also saw, as in Study 2, participants high in essentialism stereotyped transgender groups based on sex assigned at birth more than participants low in essentialism (see Figure 11 for sample graphs; feminine:

$t(3759) = 2.724, p = 0.006$; warm: $t(3672) = 2.758, p = 0.01$; trustworthy: $t(2349) = 2.554, p = 0.01$; masculine: $t(3751) = -3.830, p = 0.0001$). This pattern did not occur for ratings of capability or assertiveness ($ps > 0.17$).

Figure 11. Those low in essentialism stereotyped women (solid lines) as more-feminine and less-masculine than men (dashed lines), regardless of whether the men and women were cisgender or transgender. Those high in essentialism show this pattern for mental images of cisgender groups (black lines), but the reverse for mental images of transgender groups (turquoise lines). Note: lines are model-based estimated marginal means, shading reflects standard error. The total possible mental image ratings range from 1 (Not At All) to 7 (Completely)

5.5 Discussion

This study incorporates new methodology to provide convergent evidence with our results from Studies 1a, 1b, and 2. Once again, we saw that transgender stereotypes were less consensual than cisgender ones, and that traditional gender stereotypes were applied to cisgender women and men but not transgender women and men. This pattern again reflected overall de-gendering of transgender groups. Unlike Studies 1a, 1b, and 2, we found an average *reversal* of traditional gender stereotypes when comparing the transgender groups. This could be an effect of the more-implicit measure, or the population being studied. It also suggests that researchers should be cautious when relying on population-level estimates of stereotypes of subgroups socially marked as atypical.

Within that lack of consensus, gender-essentialist beliefs again predicted important differences in mental representations of transgender groups. Using an implicit measure we again saw that essentialism predicted both more-traditionally-gendered stereotypes of cisgender groups and a change in the pattern of attributing gender stereotypes to transgender groups, similar to the open-ended description data in Study 2. This pattern appeared across masculinity, femininity, warmth, and trustworthiness. On these dimensions of stereotype content, participants higher in essentialism generated mental images of transgender people that were more aligned with their sex assigned at birth. In Study 4, we assess whether essentialism predicts willingness to judge gender group similarity based on sex assigned at birth.

It is also worth noting that ratings of capability and assertiveness were not predicted by gender essentialist beliefs. Though this is counter to our initial expectations, it is interpretable in light of the historical shift away from differentiating women and men based on competence (Eagly et al., 2020). Essentialist beliefs apply most strongly to attributes that are centrally connected to a category or concept (Medin & Ortony, 1989). If competence no longer strongly differentiates stereotypes of women and men in society, this attribute may be less closely linked to either category concept, and thus less subject to the influence of gender essentialist beliefs. Some evidence for this can be seen in the relationships between different rating types. As we would expect, femininity was moderately predictive of warmth and trustworthiness (warm: estimate = 0.21, $t(761) = 8.050$, $p < 0.0001$; trustworthy: estimate = 0.19, $t(725) = 7.740$, $p < 0.0001$), and negatively predictive of masculinity (estimate = -0.47 , $t(5788) = -40.953$, $p < 0.0001$). However, masculinity predicted assertiveness and capability to a lesser degree (assertiveness: estimate = 0.12, $t(795) = 4.326$, $p < 0.0001$; capability: estimate = -0.07 , $t(751) =$

$-2.960, p = 0.003$). Thus, conceptions of assertiveness and capability are apparently less strongly linked to current understandings of gender, compared to warmth and trustworthiness.

6. Study 4: Similarity and Dissimilarity of Gender Groups

In Study 4, we directly examine how people understand the relatedness of transgender and cisgender groups. There are three salient bases for judging the gender groups as similar: *shared gender identity*, *shared sex assigned at birth*, and *shared markedness*. These three possibilities suggest three models of hierarchical categories (Goldstone, 1994): are cisgender and transgender women mentally represented as members of the superordinate category women, and thus similar? Are cisgender women and transgender men mentally represented as members of the superordinate category assigned-female-at-birth, and thus similar? Are transgender women and transgender men mentally represented as part of the superordinate category transgender people, and thus similar? In Study 4, we investigate these possibilities by directly asking participants to judge the similarity and difference between gender groups.

6.1 Methods

6.1.1 Participants

We recruited 196 Amazon Mechanical Turk participants, with a final N of 136 participants (58.82% cisgender men, 41.12% cisgender women; $M_{\text{age}} = 35.59$, $SD_{\text{age}} = 10.39$; 88.24% heterosexual; 74.26% White, 13.24% Black, 8.82% Hispanic, 7.35% Asian, 3.68% Native American, 0.74% Middle Eastern, 0.74% Other). We excluded data from 60 people: 23 failed an attention check, 31 were outside of the US, and 6 were not cisgender (retained 69.39% of participants; analysis including these participants shows the same pattern of effects).

6.1.2 Material and Methods

All participants completed an online survey ($M_{\text{duration}} = 14.57$ minutes, $SD_{\text{duration}} = 13.97$ minutes). Participants were told they would be answering questions about gender groups and saw short definitions of the four gender groups (Table 3). Participants then completed two counterbalanced blocks of questions, in which the group definitions were not visible. In one block they judged the similarity between each possible pair of gender groups (e.g., “How similar are transgender men and transgender women?”) on a scale from *1/Completely Different* to *7/Completely the Same*; in the other block they judged the difference (e.g., “How different are transgender men and transgender women?”, from *1/Completely the Same* to *7/Completely Different*). Each possible pair was presented in both orders (i.e., participants responded to both “How similar are transgender men and transgender women?” and “How similar are transgender women and transgender men?”), for a total of 24 questions. Asking participants to evaluate all possible comparisons in terms of similarity and difference in both orders of term presentation led to highly reliable ratings of each comparison ($R_{\text{kF}} = 0.95$). In analyses, difference judgements were reverse-scored to be on the same scale as the similarity ratings.

After completing similarity and difference ratings, participants completed the same group-definition check as in Study 1b. They then completed an attention check, and reported group familiarity (94.07% of participants reported having at least some media exposure to transgender groups), gender essentialism ($\alpha = 0.84$), and their demographics as in Studies 1a-3 (liberalism and conservatism correlated strongly, $r(134) = -0.72$, $p < 0.0001$).

6.2 Stereotype Consensus: Group Definition Check

Most participants (76.47%) got all comprehension check questions correct. However, participants were 6.09 times more likely to make errors in defining emergent transgender than

established cisgender groups (this difference is significant in a multi-level binomial model with group predicting definition accuracy, $z = 3.686$, $p = 0.0002$), once again suggesting that representations of cisgender groups were more crystallized than those of transgender groups. We cannot interpret and therefore exclude data from 32 participants who did not get all questions correct; final $N = 104$ (retained 53.06% of initial participants; analysis including these participants shows the same pattern of effects).

6.3 Results

In our within-participant design, each participant generated 24 interrelated ratings. We include random intercepts for participant and rating type (similarity or difference). When looking at transgender and cisgender labels, we include a fixed effect contrasting judged similarity of transgender groups with judged similarity of cisgender groups. When looking at reliance on shared gender identity or shared sex assigned at birth, we include a fixed effect contrasting these two types of comparisons.

6.3.1 Transgender and Cisgender Labels

In Studies 1a through 3, participants on average held more similar stereotypes of transgender than cisgender groups, suggesting that the transgender label may be an especially strong basis for defining similarity. This effect also appears in Study 4: transgender groups were judged to be more similar than cisgender groups ($t(723) = 2.974$, $p = 0.003$; $M_{\text{transgender}} = 3.43$ [0.13], $M_{\text{cisgender}} = 3.19$ [0.13]). This pattern further underscores the idea that *transgender* is a more strongly marked superordinate category than *cisgender*.

6.3.2 Gender Essentialist Beliefs

Prior work demonstrates that bases for judging similarity can change across contexts. For example, gender identity is seen as the most important determiner of who shares a gender when

considering people waiting at a bus stop, but sex assigned at birth seems to take precedence when considering people taking part in athletic competitions (Westbrook & Schilt, 2014). One specific possibility raised by the preceding studies is that individuals who are high in gender essentialism will generally rely on shared sex assigned at birth, while those low in gender essentialism will tend to rely on shared gender identity (see Figure 8, Figure 11).

To assess the unique effect of gender essentialist beliefs on weighting of shared sex assigned at birth and shared gender identity as bases of similarity, we controlled for participant gender, sexual orientation, and political ideology (correlated with essentialism, $r(102) = -0.51$, $p < 0.0001$). We also controlled for participants' differential familiarity with the two compared gender groups (calculated as a difference score in their rated familiarity between the two groups). Gender, sexual orientation, and ideology were controlled for as level-2 fixed effects and as cross-level interactions with the comparison. Difference in familiarity is controlled for as a level-1 fixed effect.

Gender essentialist beliefs did predict differential reliance on shared gender identity and shared sex assigned at birth ($t(1511) = -7.505$, $p < 0.0001$; see Figure 12). More specifically, as essentialism increased, participants judged groups that share gender identity as *less* similar, with no change in judged similarity based on sex assigned at birth. There was also a main effect whereby those lower in gender essentialist beliefs generally evaluated groups as more similar ($t(97) = -2.518$, $p = 0.01$).

Figure 12. Those low in essentialism relied more on shared gender identity than shared sex assigned at birth when evaluating gender group similarity. Participants higher in gender essentialist beliefs did not weight either source of similarity highly. Note: lines are model-based estimated marginal means, shading reflects standard error. Total possible range of similarity is from 1 (Completely Different) to 7 (Completely the Same).

6.4 Discussion

In Study 4, we saw that the transgender groups were judged to be more similar to one another than the cisgender groups, suggesting that the overall lack of stereotype differentiation between these groups in Studies 1a-3 is, at least in part, due to reliance on a superordinate transgender category. Also in Study 4, participants high in gender essentialist beliefs considered sex assigned at birth *just as good* as shared gender identity in determining group similarity, while those low in gender essentialist beliefs relied more on shared gender identity in making these judgments. Participants low in gender essentialist beliefs also considered all groups more similar, suggesting that they include transgender groups in their superordinate categories of *women* and *men*, while those high in gender essentialist beliefs do not.

7. General Discussion

As this article is being written, a record-breaking rash of anti-transgender legislation is being taken up across the country (Ronan, 2021). The rights of transgender adults and youth are

front and center in the cultural conversation, as different legislative bodies are making rules about where and when the identities of transgender children and adults will be denied, erased, accommodated, or accepted. In this sociopolitical context, we hope to offer some insight into how the cisgender majority mentally represents transgender people, and in particular how transgender people are incorporated into or distinguished from the binary model of gender that currently dominates Western cultures. Mapping out ideas commonly held about transgender people is a step along the way to changing those ideas.

Across four studies, we saw clear evidence that cisgender individuals stereotyped women and men differently based on whether they were cisgender or transgender. Consistent with existing literature, we documented a general evaluative preference for cisgender groups, which was greater among those higher in gender essentialist beliefs (Studies 1a, 1b, and 2). Moreover, we showed that gender-linked dimensions of stereotype content (masculinity, femininity, agency, and communion) did not reliably or robustly differentiate mental representations of transgender women and men (Studies 1a-3). Finally, we showed that transgender groups were stereotyped as more unusual or deviant than cisgender groups (Study 2), and that transgender groups were considered more similar to each other than cisgender groups (Study 4), suggesting that these women and men are lumped together even as cisgender women and men are contrasted with each other. On average, cisgender participants de-gendered transgender groups, strongly differentiating cisgender women and men while not distinguishing transgender women and men.

There was also less consensus about stereotypes of transgender groups. Across diverse measures of stereotype consensus, we consistently saw less within-sample agreement about the content of transgender stereotypes than cisgender stereotypes. In the context of this lack of consensual cultural stereotypes, gender essentialist beliefs served as an influential indicator of

the descriptive content of participants' stereotypes. Perceivers high in essentialist beliefs made weaker deliberative inferences about transgender groups (Study 1b), evaluated them less positively than cisgender groups (Studies 1a, 1b, 2), stereotyped them less in terms of their gender identity (Studies 2-4), and judged them less similar to cisgender groups overall (Study 4). Thus, essentialism predicted not only judgmental negativity towards transgender groups, but also uncertainty, identity-denying stereotypes, and greater de-gendering.

7.1 Atypical with Respect to What?

All psychological research is situated in the time, place, and culture of its participants: this limitation can be a weakness for universal generalization, but a strength in understanding how a particular cultural model works (Nzinga et al., 2018). We sought to understand how transgender people are stereotyped alongside cisgender people, given that transgender people's experiences undermine a basic assumption of the currently dominant Western model of gender: that people assigned female and male at birth will grow up to identify as (respectively) women and men. That is, transgender women and men are marked as atypical *in relation to* this model. Further work using experimental techniques could explore the relative influence of markedness, numerical minority status, and changes in societal awareness on stereotypes of transgender people.

It is also worth asking whether the increasing visibility of transgender groups, especially groups that identify neither women nor as men – e.g., non-binary, genderqueer, and agender people – decreases the meaning and strength of the binary gender system as a whole (Callis, 2014; Morgenroth & Ryan, 2020). It is also possible that this would induce threat among those who strongly identify within the existing system, increasing rather than decreasing that system's cultural utility (Morgenroth et al., 2020). While we could expect the overall negative attitudes

towards transgender people shown in our work and elsewhere to be extended to these groups, it is less clear how gendered stereotype content would be applied, particularly among people low in gender essentialism. Future work should consider how people's personal investment in a social category system is connected their stereotyping of groups verbally marked as atypical in that system.

7.2 Nonconsensual Stereotypes

Stereotypes have been conceptualized and studied in terms of both the general beliefs individuals hold about social groups, as well as the culturally consensual representations of groups (Gardner, 1994). These perspectives are mutually informative, since individuals vary in the extent to which they accept and reinforce widely shared cultural stereotypes (Arendt, 2013; Kohne et al., 2020; Lyons & Kashima, 2003; Payne et al., 2019) or contest them (Rogers & Way, 2018). In the present context, we found clear evidence of individual-level variability in the stereotyping of gender groups, but overall, transgender groups were generally marked by perceived atypicality and de-gendering. Cultural stereotypes matter because they affect how people are treated. Despite activism from the trans* community (e.g., Goldberg et al., 2020; Shapiro, 2004), and some attention from civil rights offices (e.g., Lhamon, 2019), transgender people are generally treated poorly in America today (e.g., Grant et al., 2011; James et al., 2016; Reisner et al., 2014; Wirtz et al., 2020).

The current research especially highlights identity denial as an aversive experience that may frequently confront transgender people (e.g., McLemore, 2015, 2018; Wilton et al., 2019). The de-gendering of transgender groups that we consistently observed can be viewed as a failure to acknowledge and accept fundamental aspects of identity held by members of these groups. This pattern could reflect uncertainty, given the relative lack of consensus about transgender

stereotypes, or it could be caused by animosity towards people who disrupt social conventions. In the former case, one hopeful implication is the possibility that greater contact and familiarity with transgender groups may, by itself, be sufficient to induce the formation of stereotypes that correspond more closely with the identities of group members. In the latter case, where the observed stereotyping patterns are rooted in animosity toward individuals who seem deviant in light of the dominant cultural model, the prospects for stereotype change may be more daunting. Stereotype change processes within the context of such a powerful and pervasive framework as the gender binary model represent an important avenue for future investigation.

The between-person variability in stereotypes applied to transgender women and men is, in itself, likely to have implications for transgender people. Knowing the gendered cultural expectations one faces can provide tools to predict when one might face social censure (e.g., backlash effects against agentic women; Rudman, 1998) and modest men (Moss-Racusin et al., 2010). If those expectations – and the potential discrimination resulting from them – are unpredictable, cisgender people’s uncertainty would introduce an element of capriciousness and volatility into transgender people’s everyday experiences. Exploring the experiences of members of salient social groups about which there is low stereotype consensus would increase our understanding of the multifaceted role stereotypes play in society.

7.3 Disrupting Essentialism

The more someone views gender as a natural kind—an inflexible and historically consistent system of categories—the more likely they are to conceptualize transgender groups as deviant and atypical. These gender essentialists attribute positive traits to cisgender categories, and although they avoid explicitly rating transgender groups in gendered terms, their more spontaneous characterizations of these groups apply conventional stereotypes associated with

transgender people's sex assigned at birth. In contrast, people who generally do not endorse natural kind beliefs about gender focus on gender identities in their stereotypes of gender groups. In this view, transgender women are very similar to cisgender women (for example, both are described as friendly). These perspectives are not merely of theoretical interest: they can have real effects for transgender individuals. While the similarity-by-identity view is directly affirming of transgender individuals, the transgender-is-different view suggests rejection of transgender people from a pre-existing understanding of gender as well as identity denial. For people high in gender essentialism, stereotype change may require more than simply increasing contact and familiarity (which they may tend to avoid in any case), because it would require the acknowledgement that factors such as sex assigned at birth, genitalia, and chromosomal patterns do not determine psychological identity.

Though the pattern of results is fairly clear across studies, these studies are not mechanistic; they do not explain how essentialist belief might produce such outcomes. We see two interrelated possibilities for the process. In both cases, someone encounters evidence (e.g., a transgender person or even the idea of transgender people) that runs against what is considered "natural" in the binary model of gender – that people assigned female at birth grow into women, and people assigned male at birth grow into men. One possibility is that this interrupts their gender-based inductive generalization (e.g., Rehder & Hastie, 2004). If the assumed causal relationship between sex assigned at birth and gender identity (or gender expression) is removed, this disorders the rest of the features expected to typify group members – is a feature one expects to associate with women linked to identifying as a woman, or to having female physical features at birth? Across levels of essentialist belief, this could lead to overall weaker inferences about transgender than cisgender people. Those strongly committed to the ontological assumption that

natal sex produces gender (i.e., those high in gender essentialism) continue to link group-traits to that supposed causal prior, stereotyping transgender groups based more on natal sex than gender identity. The second possibility complements the first. The disruption of one's assumptions about gender may produce uncertainty and arousal (e.g., Mandler, 1992). To the extent one is invested in those assumptions, this can provoke a desire to defend them (Proulx et al., 2012), potentially by viewing assumption-disrupters as confused, misguided, or otherwise unworthy of consideration (as in, for example, research showing that transgender people are stereotyped as mentally ill; Reed et al., 2015). In both cases, the endorsement of essentialist belief matters because it represents commitment to the maintenance and perpetuation of existing ideas about gender. As essentialism is a cognitive pattern that appears across an array of social dimensions, similar processes may arise when individuals (or groups) violate essentialist assumptions about the origin of group-linked features. This would be particularly interesting in social domains where the nominal origin of group-linked features is vague or heterogeneous. Does disrupting the causal assumptions of essentialized domains like social class or religion produce the same effects?

However, endorsement of essentialism, even gender essentialism, is not bimodal. Across our five studies, it was approximately normally distributed (Study 1a: skew = -0.38 , kurtosis = -0.06 ; Study 1b: skew = 0.08 , kurtosis = -0.43 ; Study 2: skew = 0.10 , kurtosis = -1.01 ; Study 3: skew = 0.10 , kurtosis = -0.45 ; Study 4: skew = 0.09 , kurtosis = -0.82). This pattern suggests that a neat partitioning of cisgender people into "gender essentialists" and "non-gender essentialists" is insufficient; those at the middle of the scale may hold multiple conflicting beliefs, no beliefs at all, or a multi-causal understanding of the origin of gender. Further work should focus on these

possibilities, examining closely the causal theories people have about gender groups and how those are related to treatment of gender minorities.

8. Conclusion

The present research advances the existing literature on mental representation of social categories by addressing how people understand and think about groups that challenge dominant cultural models of a given domain. We study this issue in the specific context of a binary model of gender that is dominant in Western societies. We move beyond prejudice against such groups to consider how and when transgender groups are included in traditional stereotypes of gender, and how this process is guided by one's lay theory of gender. This work contributes to ongoing conversations about the role of social groups in society, and the ways in which individual cognition is mutually constructive with cultural systems of knowing.

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Appendix A

Norming Processes

Study 2

We recruited 530 norming participants from Amazon Mechanical Turk, all of whom affirmed having lived in the US for the last ten or more years. We excluded data from 115 participants: 79 reported they had not been paying attention, 35 failed the attention check, and one took almost three days to complete the survey (after exclusions, $M_{\text{duration}} = 24.62$ minutes, $SD_{\text{duration}} = 19.88$). This left us with a sample of 415 norming participants (58.55% women, 41.20% men, 0.24% other gender; $M_{\text{age}} = 35.15$, $SD_{\text{age}} = 10.61$; 85.78% heterosexual; 66.27% White, 10.12% Asian, 9.63% Black, 5.06% Hispanic, 3.13% Native American, 0.48% Other; 78.30% of participants retained; analysis including these participants yields similar results).

Norming participants completed ratings for 40 descriptions, randomly selected from those generated by the study participants (each description was normed by 28 to 64 norming participants). Norming participants did not receive any information about the social group for which the description was generated. For each five-adjective description, they were asked to think of somebody described as having those attributes. They then rated the valence (*1/Extremely Negative* to *7/Extremely Positive*), masculinity (*1/Not At All* to *7/Extremely*) and femininity (*1/Not At All* to *7/Extremely*) of a person who fit the five-adjective description. Participants also judged how broadly applicable the description was (percentage of people living in America who fit the description, *0-100*). Participants reported their demographics as in Study 1 and completed an attention check. Finally, participants were asked whether they had completed the survey carefully and accurately. To encourage participants to reply honestly to this question, we reminded them that their response would not affect their compensation.

Study 3

We recruited 250 participants to rate the mental images. We excluded data from 46 participants according to our preregistration: 4 did not complete the study and 42 had no variability in one or more of the norming ratings. This leaves us with a final N of 204 (54.19% women, 45.32% men, 0.49% other gender; $M_{\text{age}} = 18.80$, $SD_{\text{age}} = 0.94$; 83.33% heterosexual; 53.43% White, 35.29% Asian, 12.25% Hispanic, 8.82% Black, 1.96% Middle Eastern, 0.49% Pacific Islander, 0.49% Native American; 81.60% of participants retained; analysis including these participants yields similar results).

Norming participants completed blocks of ratings in a random order, where each block had 30 faces randomly selected from all faces generated by study participants. The first ten norming participants completed only 20 faces per block. Each block included two ratings about each face: masculinity and femininity, warmth and trustworthiness, or capability and assertiveness. Norming participants also completed unusual and strange ratings, see Appendix B. Norming participants did not receive any information about the gender group of the face they were rating. Norming participants then reported their demographics with an embedded attention check, and were debriefed about the origin of the face-images. All reverse correlation faces were rated by 18-34 norming participants.

Appendix B

Deviations from Preregistration

Study 1b

Prior to gathering any data for Study 1b, we preregistered our hypotheses and analysis plan. As we conducted our analyses, we made several principled deviations from our initial plan, described here:

- (1) Definition-accuracy test. Our initial intent of including the definition-accuracy test in study 1b was to exclude participants who failed it, and do a robustness check to see whether including participants who did not get all test questions correct altered our pattern of results. Along with these, we include a comparison of test accuracy by category (3.2.1 Group Definition Test) to be consistent with Study 4 (6.2 Stereotype Consensus: Group Definition Check).
- (2) Follow-up tests. Study 1b was conducted after Studies 2-4, and we initially expected gender essentialist beliefs to predict transgender stereotypes in the same manner that it did for Studies 2 & 3 (i.e., with a crossover effect). However, the data actually show essentialism generally predicting more-negative ratings of both transgender groups. As this is consistent with our understanding of the explicit measure from Study 1a, we interpret the data as described in the manuscript.

Study 3

Prior to gathering norming data and conducting analysis on study 3, we preregistered our hypotheses and analysis plan. As we conducted our analyses, we made several principled deviations from our initial plan, described here:

- (1) Collapsing scales. In the paper, we have relied on summary variables for ideology and need for closure, even though we did not meet our preregistered thresholds for using indices instead of individual questions. We do this because the indices reach field-standard thresholds for reliability (if not our very ambitious preregistered thresholds), because the results are substantively the same when looking at particular questions instead of the full scale, and to be consistent with the other studies in the paper.
- (2) Behavioral Conformity. We included two norming ratings—intended to be the inverse of our idiosyncrasy measure in Study 2 – *unusual* and *strange*. However, the pattern of results differed from our expectations: mental images of transgender women and cisgender men were judged as more unusual and stranger than transgender men and cisgender women. This made us wonder if norming participants were making aesthetic rather than behavioral judgements. To assess this, we submitted an amendment to our preregistration and recruited a second set of 131 norming participants. We excluded data from 12 participants according to our preregistration (1 did not complete the study and 11 had no variance in one or more of the norming ratings), for a final N of 119 (57.14% women, 42.02% men, 0.88% other gender; $M_{\text{age}} = 19.51$, $SD_{\text{age}} = 1.06$; 76.47% heterosexual; 57.98% White, 29.41% Asian, 18.49% Hispanic, 8.40% Black, 4.20% Middle Eastern, 0.84% Pacific Islander, 0.84% Native American. 1.68% Not Listed; 90.84% of participants retained; analysis including these participants yields similar results). These participants rated the faces on attractiveness, ugliness, behavioral conformity, and behavioral deviance. After these blocks, participants also guessed at the race, gender, and sexual orientation of the faces – these data are for

exploratory analysis and not included in this manuscript. Each participant rated 40 faces on each attribute, and each rating was completed by 11-32 participants. To examine the overlap of these ratings with our unusual and strange ratings from the main norming, we calculated the mean rating of each type for each mental image ($N = 228$). All six ratings are highly correlated (mean $r(225) = 0.69$, all $ps < 0.0001$), and form a single highly reliable measure ($\alpha = 0.91$). An exploratory factor analysis further supported this, with a first factor explaining 63% of the variance and all ratings loading 0.73 or higher on this factor. We interpret this to mean that all six ratings are primarily based on aesthetic judgments of the mental images, and that asking participants to rate the behavioral conformity of reverse correlation images generated by single participants was too complex. We therefore omit the behavioral conformity ratings from the main paper.

Appendix C

Study 1a Non-Binary Gender Group Data

In the main paper, we do not include analysis of responses about the non-binary gender group. This is for consistency with the other studies in the paper, and because non-binary people are (as yet) a less well-known group than transgender women or transgender men. In Study 1a, non-binary people were defined as “individuals who identify neither as men nor as women,” and 40.9% of participants reported having no personal experience at all with non-binary people. Participants reported fewer personal encounters ($t(496) = 2.558$, $p = 0.01$) and less media exposure ($t(496) = 10.280$, $p < 0.0001$) to the non-binary group than the transgender groups. The non-binary group was rated lower in agency ($t(496) = 2.139$, $p = 0.03$) and communion ($t(496) = 2.286$, $p = 0.02$) than the transgender groups. Gender essentialist beliefs did not predict any change in the rated agency or communion of the non-binary group ($ps > 0.5$); as in Study 1a, this is assessed controlling for political ideology, need for closure, gender, sexual orientation, and familiarity.

Appendix D

In the body of the manuscript, we have conducted follow-up tests on the interaction of gender and markedness within markedness – comparing cisgender women with cisgender men, and transgender women with transgender men. These were our follow-ups of interest to determine whether stereotype content used to differentiate cisgender women and men was also used to differentiate transgender women and men. However, it is also worth considering the simple effects comparing transgender women with cisgender women and transgender men with cisgender men, and we report those effects here for interested readers. In general, consistent with the target group means displayed in the manuscript, we found that transgender groups were stereotyped more negatively than their cisgender counterparts on positively-valenced scales (e.g., agency and communion), and less-strongly than their cisgender counterparts on less-valenced but strongly-gendered dependent variables (e.g., interest in things and people). This fits with the overall pattern described in the manuscript, where transgender women and men were less strongly differentiated than cisgender women and men on traditionally gendered stereotype content.

Table 10.

Simple effects for gender within markedness across studies.

Study	Rating	Cisgender and Transgender Women	Cisgender and Transgender Men
Study 1a	Agency	$t(124) = -5.309$	$t(124) = -8.484$
	Communion	$t(124) = -5.952$	$t(124) = 1.955$ $p = 0.053$
Study 1b	Agency	$t(107) = -3.575$ $p = 0.0005$	$t(107) = -5.758$
	Communion	$t(107) = -3.513$ $p = 0.0006$	$t(107) = 2.729$ $p = 0.007$
	Interest in Things	$t(107) = 2.539$ $p = 0.01$	$t(107) = -7.828$
	Interest in People	$t(107) = -6.535$	$t(107) = 7.996$
Study 2	Masculinity	$t(139) = 4.816$	$t(137) = -12.34$
	Femininity	$t(139) = -7.759$	$t(137) = 8.161$
Study 3	Masculine	$t(2094) = 18.865$	$t(1647) = -13.32$
	Feminine	$t(2169) = -18.920$	$t(1730) = 14.90$
	Warm	$t(1367) = -6.940$	$t(1122) = 8.396$
	Trustworthy	$t(789) = -6.101$	$t(717) = 6.902$
	Assertive	$t(484) = 5.284$	$t(415) = -4.706$
	Capable	$t(364) = -5.503$	$t(265) = 1.147$ $p = 0.25$

Note: Unless indicated in the table, $ps < 0.0001$.