Gender/Sex Diversity Beliefs:
Heterogeneity, Links to Prejudice, and Diversity-Affirming Interventions

by

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ABSTRACT

This dissertation explores the structure and significance of beliefs about the nature of gender/sex categories, or gender/sex diversity beliefs, across a series of empirical studies. In Chapter 1, I describe the recent history of the study of gender/sex categories and gender/sex diversity beliefs, and implications for the current sociopolitical situation of gender/sex minorities. Claims about the nature of gender/sex and the meaning of gender/sex categories are contentious both within and beyond feminist discourses, including in public policy and academic research, and this dissertation clarifies their implications for understanding gender/sex majorities' attitudes about minorities.

Next, in Chapter 2, I take a bottom-up approach to understanding heterogeneity in gender/sex diversity beliefs by examining variation in individuals' definitions of gender/sex categories. I analyze the presence of sociocultural and/or biological content in participants' definitions of the words *woman, man, feminine, masculine, female,* and *male*. Further, I examine the complexity of participants' definitions and the role of social location factors, particularly gender/sex and sexual minority/majority status. In Chapter 3, I explore in-depth a sub-sample of transgender-exclusionary radical feminists who participated in the research described in Chapter 2 to disrupt and control it. I contextualize why my research was targeted in particular and I describe implications for online diversity-related research more generally.

In Chapter 4, I develop the Gender/Sex Diversity Beliefs Scale (GSDB), a survey measure of beliefs about the nature of gender/sex that are especially relevant to gender/sex minority identities. I create an item list with feedback from community experts (i.e., gender/sex

minority individuals) and academic experts on gender/sex diversity and/or beliefs about the nature of social categories. Across multiple studies, I test the factor structure and test-retest reliability of the GSDB. Further, I examine the relationship of the GSDB to sociopolitical ideologies and attitudes about gender/sex minorities.

Finally, in Chapter 5, I develop an intervention to improve gender/sex majorities' attitudes about gender/sex minorities and gender/sex diversity beliefs. The intervention compels gender/sex majority participants to visually map their own gender/sex identities on diagrams with sexual configurations theory (van Anders, 2015). I analyze the intervention's immediate efficacy and whether effects endured at a follow-up four weeks later.

Together, these studies clarify how varied people's perspectives on gender/sex diversity currently are, patterns in gender/sex diversity beliefs that people hold, and the implications of gender/sex diversity beliefs for studying prejudice against gender/sex minorities. Ultimately, this dissertation provides a new conceptual framework and related survey measure for studying beliefs and attitudes about gender/sex categories. And, I identify promising new directions for interventions to challenge gender/sex majorities' prejudice against minorities.

CHAPTER 1

Introduction

Public recognition of the existence of gender and/or sex (gender/sex; van Anders, 2015)[1] diversity has increased rapidly in the early 21st century. For instance, gender/sex minority[2] (i.e., transgender, non-binary, and gender/sex diverse) activism has become highly visible on college campuses in the U.S., including advocacy for gender-neutral bathrooms and social and institutional norms of asking for and using students' self-designated pronouns (Scelfo, 2015). Numerous mainstream news media outlets have covered gender/sex minority topics in ways that assert that gender/sex is a diverse and non-binary social category (e.g., Escobar, 2016; Henig,

[1] I use the term "gender/sex" to recognize the complex, sometimes inextricable relationship between sociocultural gender and evolved/physical sex (van Anders, 2015). Although gender/sex minority identities are often framed as only or primarily about gender in research and policy – and this is true for some individuals – many gender/sex minorities and majorities alike understand gender and sex as linked and do not always (or sometimes, ever) distinguish between the two (Pryzgoda & Chrisler, 2000; Schudson et al., 2017). Further, retaining "sex" in "gender/sex" makes clear how gender/sex diversity is often physical and embodied (e.g., intersex people or people who have medically transitioned gender/sexes).

[2] I use "minority" to refer to groups with marginalized positions within social hierarchies, and "majority" to refer to groups with dominant social positions (van Anders, 2015). Importantly, these terms refer to groups' relations to power rather than simple statistical frequency.

2017). This change in public awareness has been accompanied by increased visibility for gender/sex minorities. For example, television shows and films have included more transgender and non-binary characters, and exposure to trans-inclusive media narratives has been linked to more positive attitudes toward transgender individuals (Billard, 2019; Gillig et al., 2018). However, visibility has not yet afforded safety, respect, or fair treatment for gender/sex minorities in many aspects of everyday life, and prejudice and discrimination remain prevalent (James et al., 2016; van Anders et al., 2017).

Beliefs about the nature of gender/sex relevant to perceptions of gender/sex minority and majority identities – or, *gender/sex diversity beliefs,* as I refer to them – often deal with the category structure of gender/sex, including whether or not categories like female and male are binary, have rigid boundaries, and change over time, among other aspects. Often in the past, researchers have treated people's beliefs about the structure of gender/sex categories like female and male as monolithic and self-evident, but evidence suggests they may be more varied than previously thought (Bettcher, 2012, 2014; Bornstein & Bergman, 2010; Hoffman et al., 2005; Katz-Wise & Hyde, 2015; Richards et al., 2016; van Anders, 2015; van Anders et al., 2014). For instance, many young people believe that gender/sex is a spectrum, rather than a binary (Rivas, 2015), and self-designate intermediate locations on survey measures that represent gender/sex this way (Baum et al., 2015).

The belief that gender/sex is a spectrum (or a series of spectra, a landscape, or other nonbinary visual form; Trans Student Educational Resources, 2016; van Anders, 2015) contrasts with how Garfinkel (1967) and others have described the dominant lay conceptualization of gender/sex: "the natural attitude," which includes beliefs about gender/sex categories as binary, mutually exclusive, static, and defined by genitals. Although much feminist, queer, and trans

scholarship and activism has worked to debunk the natural attitude about gender/sex (e.g., Bettcher, 2012; Fausto-Sterling, 2000; Rosario, 2009), scholars still maintain that "These are the 'facts' of gender in terms of Western reality" (Kessler & McKenna, 2000, p. 12). But while the natural attitude about gender/sex is pervasive, it is neither universally endorsed nor all-encompassing of how individuals conceptualize gender/sex (Bettcher, 2012; Katz-Wise & Hyde, 2015; Richards et al., 2016; van Anders, 2015). In this dissertation, I ask: how *do* individuals vary in their conceptualizations of gender/sex and its categories? What gender/sex diversity beliefs do people hold, and what is the significance of these beliefs for understanding and improving gender/sex majorities' attitudes about minorities?

Gender/Sex Categories in Research

Gender/sex diversity beliefs center on the nature of gender/sex categories, which has been a focal topic for feminist and non-feminist research alike through much of the 20th and early 21st centuries. One particular distinction in gender/sex categories has received significant attention from researchers: whether they are actually about "gender" (i.e., social roles) or "sex" (i.e., biological or bodily features; van Anders, 2015). Margaret Mead (1935) is widely credited as the first to theorize a distinction between sociocultural roles of women and men and biological femaleness or maleness (Delphy, 1993), and the subsequent popularization of the term "gender" to refer to these social roles is frequently attributed to sexologist John Money (1955). In the 1970s, some feminist scholars advocated for a distinction between sex and gender to emphasize that the subordination of women is due to patriarchal social structures rather than essential characteristics of the female sex (Oakley, 1972; Rubin, 1975; Unger, 1979). Feminist social scientists developed categories like androgyny and sex or gender role orientation to study the multiple and fluid ways that people express gendered personalities and psychological

characteristics (Bem, 1974; Constantinople, 1973; Spence et al., 1975). Although these efforts to separate gender and sex relied on a conceptualization in which the former is sociocultural and the latter biological, gender too (or features that most would include within gender) has been biologized by many, perhaps most notably by evolutionary psychologists (Fausto-Sterling, 1992).

Contemporarily, many feminists continue to approach gender and sex as usefully separable, the former indexing sociocultural roles and traits and the latter biological bodies. Often, *female/male* are treated as sex categories, while *woman/man* and *feminine/masculine* are understood as gender categories (although ambiguously so). However, different scholars parse these terms different ways (Muehlenhard & Peterson, 2011). Many have also argued that gender and sex are, to some degree, mutually constitutive categories that must be considered in tandem (e.g., Fausto-Sterling, 2005; Hyde et al., 2018; van Anders, 2013; van Anders et al., 2015, 2015; Wood & Eagly, 2012). Some scholars use "gender/sex" to refer to phenomena that cannot be easily separated into sociocultural or biological/bodily components, like whole identities (Fausto-Sterling, 2019; van Anders, 2015; van Anders & Dunn, 2009). Accordingly, I use "gender/sex" to holistically refer to gendered and sexed phenomena, including gender/sex's categories (woman/man, female/male, feminine/masculine) following other feminist researchers (Fausto-Sterling, 2019; Galupo, Pulice-Farrow, et al., 2017; Hyde et al., 2018; van Anders, 2015; van Anders & Dunn, 2009).

Scientists who study gender/sex outside feminist contexts often stick to assessing sex alone by asking whether research participants are female or male (Richards et al., 2016). Typically, they use *female/male* to refer to gender and sex alike, and *feminine/masculine* to refer to sex-linked behaviors or personality traits (or frequently, just as the adjective form of

female/male). However, collapsing sex and gender is not a universal practice in science. Many researchers who study transgender identities have increasingly found utility in distinguishing between gender identity (i.e., current identity as a woman, man, or gender diverse person, potentially regardless of bodily features) and sex assigned at birth, and asking about both (Bauer, 2012; Herman, 2014; Tate et al., 2013).

Clearly, there is significant variation both within and across disciplines in the meanings attributed to gender/sex categories. And this variation is consequential: many have critiqued research on topics including gender differences and sexuality, among others, that takes for granted the meaning or centrality of particular gender/sex categories (e.g., Jordan-Young, 2010; van Anders, 2015). Further, what these categories mean to individuals themselves, and how they parse which phenomena belong in each, remains unclear. Therefore, understanding gender/sex diversity beliefs necessitates a thorough investigation of how people conceptualize gender/sex categories themselves.

Sociopolitical Stakes of Gender/Sex Diversity Beliefs

As feminist, queer, and trans social movements have re-shaped the sociopolitical landscapes of a range of societies, including the U.S., questions arise about how gender/sex diversity beliefs may have changed over time, and what the significance of these changes might be. However, social scientists have paid limited attention to such questions thus far. Feminist and queer scholars, both within and beyond the social sciences, have also tended to avoid questions of variation in individual beliefs about gender/sex, instead focusing on characterizing larger societal structures. For instance, many feminist and queer projects have focused on how people (re)produce gender in interactional and iterative but socioculturally constrained ways (e.g., Butler, 1993; West & Zimmerman, 1987). And inquiry tends to be centered on social structures

that enable or constrain such interactions rather than individuals' own beliefs about what gender/sex is or how it is produced. It is important to note that much of this body of work predates (and perhaps, in part, helped produce) the current, widespread heterogeneity in gender/sex diversity beliefs. Consequently, these projects have rarely delved into gender/sex diversity beliefs themselves.

But, gender/sex diversity beliefs are important. Myriad social, political, and intellectual debates hinge upon disagreements about how to define gender/sex categories, or the boundaries between them, and the stakes of these can be high. For instance, feminists have disagreed with one another over the boundaries and significance of the categories "woman" and "female," including whether these categories are primary above other social categories, like race and class, and cissexist beliefs (i.e., beliefs that value cisgender identities and experiences above transgender and gender/sex diverse identities and experiences) like whether transgender women "properly" occupy these categories at all (Bettcher, 2007; Serano, 2013; Spelman, 1988). Additionally, while sex categories (e.g., female, male, intersex) frequently are treated as rigidly defined and stable, as per the natural attitude about gender/sex, many scholars have critiqued ideas of sex categories as inherently more binary, self-evident, homogenous, or static than gender (Butler, 1993; Delphy, 1993; Fausto-Sterling, 1992).

Political conservatives, among others, have strongly objected to critiques of gender/sex as rigid and binary, and have battled against progressive attempts to clarify the complexity of gender/sex in the U.S. as well as globally (Fausto-Sterling, 2000; Kuhar & Paternotte, 2017; van Anders et al., 2017). These political battles often play out over category definitions: for instance, in 2016, conservative legislators in North Carolina changed the language in their state's nondiscrimination laws from "sex" to "biological sex" under the false and unscientific

assumption that "biological sex" refers to a separate, self-evident, natural category that excludes transgender people (General Assembly of North Carolina, 2016). And in 2018, a leaked Trump administration memo proposed defining gender as based on sex assigned at birth, thereby making gender/sex minority identities largely invisible under the law, which prompted the #WontBeErased social media campaign, among other activist efforts (Mervosh & Hauser, 2018).

Active metaphysical debates about the nature of gender/sex exist outside of conventional political and academic arenas. For instance, "there are only two genders" is an oft-repeated phrase among the so-called "alt-right" who incorrectly view non-binary gender/sex as a recent, anti-realist, and unnatural trend particular to people active in online feminist communities (Pulice-Farrow et al., 2019; Squirrell, 2017). Popular YouTube content creators, both feminist and anti-feminist, have created videos about whether gender is binary or non-binary, some of which have received over one million views to date (e.g., ContraPoints, 2019; White, 2016). Numerous popular press articles have addressed the increased prevalence of non-binary gender/sex self-definition among young people, as well as young people's awareness of a shift in gender/sex diversity beliefs and the place of gender/sex in society (e.g., Marsh, 2016).

The nature of gender/sex and its categories is not only an active point of debate between feminists and anti-feminists, but also among feminists, both lay and academic. Self-identified "gender critical" feminists – more commonly known as "trans-exclusionary radical feminists" (TERFs) by their feminist critics – view the increased focus on transgender and non-binary gender/sex in feminist spaces as a threat to feminist goals and lesbian and gay rights (Ahmed, 2016; Williams, 2016). Although no empirical data on the prevalence of TERF ideology among feminists exist, debates about TERF ideology are active in feminist activist and academic spaces, as well as popular media (Ahmed, 2016; Kim, 2020; Watson, 2016; Williams, 2016). These

debates typically fall outside of the scope of civil disagreement; adherents to TERF ideology frequently harass transgender women, in particular, via social media (McKinnon, 2018).

In sum, metaphysical debates about the nature of gender/sex are presently active in political, academic, and lay contexts, among and between feminists and non-feminists alike. While much previous work has presumed that lay individuals almost universally endorse the natural attitude about gender/sex, contemporary evidence suggests individuals' gender/sex diversity beliefs are increasingly heterogeneous. My research focuses on mapping the scope of gender/sex diversity beliefs and considering their significance for efforts to mitigate prejudice against gender/sex minorities.

CHAPTER 2

Individual Variation in Gender/Sex Category Definitions

In this chapter, I describe my survey research on variation in people's definitions of the gender/sex categories *woman, man, feminine, masculine, female,* and *male*. Contemporary understandings of gender/sex categories are less static and less binary than they have been in the past. But, questions remain about exactly how diverse these understandings are, how that diversity might be reflected in how people define and use gender/sex-related language, and whether understandings of gender/sex are linked to social location, particularly gender/sex or sexual minority/majority status. This research contributes to current understandings of heterogeneity in people's gender/sex diversity beliefs by examining variation in understandings of gender/sex categories.

Gender/Sex Category Definitions

Little prior research has examined how individuals understand the composition of gender/sex categories, and to what extent those understandings might be heterogeneous. While there is evidence of considerable cross-cultural variation in the meanings attached to gender/sex categories, particularly femininity/masculinity and womanhood/manhood (Jandt & Hundley, 2007; Tan, Shaw, Cheng, & Kim, 2013; Williams & Best, 1990), only a few studies have explored variation within a single cultural context by examining personal definitions of these concepts (Hoffman et al., 2005; Hunter & Davis, 1994; Kallen et al., 1980; Myers & Gonda, 1982). However, these studies all have suggested considerable heterogeneity in personal definitions of gender/sex categories, particularly femininity/masculinity. For example, Hoffman

et al. (2005) found that women and men respectively defined *femininity* and *masculinity* with a wide variety of elements, including biological sex, gender self-confidence, gender self-acceptance, and societal standards, among others.

Heterogeneity in individuals' definitions of *female/male* has received less attention relative to *feminine/masculine*, although there is reason to suspect they might be heterogeneous as well. For instance, there is considerable variation in the degree to which people understand both *female/male* and *feminine/masculine* in essentialist terms (fixed, binary) or social constructionist terms (fluid, continuous), although just-published research shows that *feminine/masculine* is viewed in more social constructionist and less essentialist terms than *female/male* (Lloyd & Galupo, 2019). Also, common uses of *female/male* often denote aspects of gender like appearance or identity, rather than just genital configuration or membership in a "natural" or "biological" category (Pryzgoda & Chrisler, 2000; Watzlawik, 2009). Even for individuals who understand *female/male* as denoting biological sex categories, there may be variation in the extent to which they perceive *female/male* as a fixed, stable attribute or as something that can be changed through particular surgico-medical and/or social means (van Anders et al., 2014). Additionally, media attention toward transgender issues has increased markedly in recent years and, accordingly, so has attention toward the scientific inaccuracy of the natural attitude about gender/sex (e.g., Henig, 2017; Steinmetz, 2014). These publications often rely on a distinction between sex assigned at birth (female/male) and current gender identity (girl/woman or boy/man), in contrast to the natural attitude about gender/sex, which collapses the meanings of these categories. Therefore, individuals might vary in how they distinguish sex categories (female/male) and gender identity categories (woman/man) based on their beliefs about what gender and sex are.

Some recent scholarship has examined individuals' personal definitions of terms specifically related to gender/sex diversity. Buck (2016) found that cisgender, heterosexual individuals defined the word "transgender" with reference to gender expression, gender identity, and/or change in gender/sex. Individuals who mentioned gender/sex change had higher trans-prejudice than those who did not. Individuals who mentioned gender identity alone (or both gender identity and expression) had lower trans-prejudice than those who only mentioned gender expression or neither identity nor expression. This research demonstrates that individuals' definitions of at least some gender/sex terms are importantly linked to social attitudes. To my knowledge, research has not yet examined other terms relevant to gender/sex diversity, such as "cisgender," although evidence suggests that these terms are also politically contested, at least in particular subcultural contexts (e.g., Cava, 2016; Goldberg, 2014).

Group Differences in Defining Gender/Sex Categories

How might we expect groups, rather than just individuals, to differ from one another in how they define gender/sex categories? At a broad level, individuals who occupy privileged social locations linked to gender/sex might differ from marginalized individuals. Majority individuals might view social categories in ways that preserve the power hierarchies that benefit them (e.g., essentialist beliefs), whereas minorities might seek to challenge those hierarchies (Mahalingam, 2003, 2007). This perspective can be linked to feminist standpoint theory, which suggests that individuals who occupy marginalized positions in power hierarchies and critically engage with them have advantages over members of majorities in understanding the nature of those hierarchies (Harding, 2004). Therefore, it is possible that minority individuals will have more complex definitions of gender/sex categories than majority individuals due to greater critical engagement with gender/sex-based social hierarchy. For example, minorities might

describe several different ways a person could be a woman or a man to be inclusive of the breadth of people's experiences. Alternatively, it is possible that majorities might describe more explicit, stringent criteria for being a woman or a man (e.g., defining a man as someone with a penis, testes, and XY chromosomes), whereas minorities might prefer simple definitions that are broad and inclusive (e.g., defining a man as any person who identifies as a man).

Social groups that have challenged the natural attitude about gender/sex in political, legal, and sociocultural arenas — in particular, transgender individuals and other gender/sex minorities — might be especially likely to define gender/sex categories in ways that resist biological essentialism. For example, the idea that gender/sex is multifaceted and fundamentally nonbinary or spectrum-like is common in models of understanding and affirming gender/sex diversity adopted by community organizations (e.g., Trans Student Educational Resources, 2016; "Understanding gender," n.d.). Also, the lived experiences of many gender/sex minority individuals – although not necessarily all – contradict key aspects of the natural attitude about gender/sex, including that gender/sex is immutable and based on genital configuration at birth (Bettcher, 2007; Kessler & McKenna, 2000). Therefore, many transgender people might avoid defining gender/sex categories in ways that align with the natural attitude about gender/sex simply because they know from their own experiences that it is inaccurate.

Some evidence suggests that some groups of cisgender individuals might also conceptualize gender/sex in ways that recognize fluidity, nuance, and sociocultural influences. For instance, cisgender sexual minority individuals are more likely than cisgender heterosexual individuals to endorse a social constructionist view of gender (i.e., the belief that gender is a fluid, complexly determined social category rather than a natural given; Brownlie, 2006). Cisgender plurisexual (e.g., bisexual, pansexual) individuals also sometimes define their sexual

orientations in ways that accommodate gender/sex diversity in potential partners and recognize the existence of gender/sex diversity more broadly (Flanders et al., 2017; Galupo, Ramirez, et al., 2017).

People might also differ in how they conceptualize gender/sex categories based on race/ethnicity or their own gender. Men are more likely than women to hold essentialist beliefs about gender/sex and to endorse genetic determinist explanations of gendered behavior and gender/sex itself (Cole et al., 2007; Haslam & Whelan, 2008; Keller, 2005; Lloyd & Galupo, 2019; Smiler & Gelman, 2008). White people are more likely than Black people to endorse genetic causes for gendered attributes such as nurturance (Cole et al., 2007; Jayaratne et al., 2009). These findings are consistent with theory about privileged social groups' tendency to endorse essentialist views (Mahalingam, 2007). Therefore, it is plausible that privileged groups' tendency toward biological essentialist beliefs about gender/sex relates to group differences in conceptualizations of how biologically or socioculturally defined various gender/sex categories are.

The Current Study

I conducted a study to elucidate how individuals define gender/sex categories. Further, I intended to determine whether social location via gender/sex and sexual identities affects the complexity and content of individuals' definitions. Ultimately, my goal was to trace contemporary understandings of gender/sex categories and heterogeneity in individuals' use of gender/sex-related language. I aimed to address 3 hypotheses (*H's*):

H1: (a) *Female* and *male* will be defined primarily through biological content.

(b) Feminine and *masculine* will be defined primarily through sociocultural content.

(c) Woman and *man* will be defined through a mix of biological and sociocultural content.

H2: Gender/sex and sexual minority individuals will define gender/sex categories using more sociocultural content and less biological content than majority individuals.

H3: Gender/sex and sexual majority individuals will have simpler definitions of gender/sex categories than minority individuals (i.e., majorities will delineate fewer aspects of gender/sex that define the categories).

Methods

Participants

I recruited 516 people to complete an online survey on how people think about gender. my final sample consisted of all participants who completed at least one gender/sex category definition ($N = 307$); 98% of the final sample completed all six definitions ($n = 302$). Most participants who started the study but did not complete any gender/sex category definitions dropped out of the study shortly after consenting to participate. Participants were required to be 18 years of age or older and to have the ability to read and write in English. In addition to recruiting for participants of any gender and sexual identity online via craigslist.org, I conducted targeted online recruitment of gender and sexual minority individuals on craigslist.org and reddit.com. Following completion of the survey, participants were able to opt into a raffle to win Amazon.com gift certificates.

Participants ranged in age from 18 to 73 years ($M = 35.85$, $SD = 14.17$). They self-identified their racial/ethnic identities, and I coded them as follows: African American/Black ($n = 14$; 4.6%), Asian or Asian American ($n = 14$; 4.6%), Native American or Indigenous ($n = 2$; 0.7%), Latinx ($n = 8$; 2.6%), Middle Eastern ($n = 3$; 1.0%), Multiracial ($n = 19$; 6.2%), White (n

= 224; 73.0%), or as non-responders (*n* = 23; 7.5%). Participants self-identified their sexual orientation identities, and I categorized their responses as: asexual (*n* = 6), bisexual (*n* = 51), gay/lesbian (*n* = 73), heterosexual (*n* = 110), pansexual (*n* = 15), queer (*n* = 6), unsure/questioning (*n* = 4), using multiple labels (*n* = 17), using another label not already listed here (*n* = 8), and non-responders (*n* = 17). The majority of my sample (*n* = 185; 60.2%) reported their highest level of education as graduating from a four-year college or university or higher; others reported some college (*n* = 74), graduating from a two-year college or technical school (*n* = 21), graduating from high school (*n* = 20) or less than graduating from high school (*n* = 7).

Participants indicated their current gender/sex as woman (*n* = 212), man (*n* = 47), or not listed (*n* = 45), and three were non-responders. Of those who indicated their gender/sex was not listed, participants used labels specifying trans identity (e.g., transgender, FTM, trans woman; *n* = 8), intersex status (*n* = 1), a label indicating a non-binary gender/sex identity (e.g., non-binary, genderqueer, agender; *n* = 12), or responses that detailed nuances of their gender/sex (e.g., outness, beliefs about gender/sex) or other idiosyncratic response (*n* = 8), or opposition to the question itself based on the perception that my use of the term "gender/sex" conflated gender and sex (*n* = 16; for further discussion of this, see *Facebook Subsample*). I asked about participants' status as transgender or cisgender in multiple ways, including asking about self-identification as transgender (*n* = 63) or not (*n* = 240), with four non-responders. I also asked whether participants identified as cisgender, and participants responded yes (*n* = 177) or no (*n* = 123), with seven non-responders; notably, many participants responded no because they oppose the use of the word cisgender at all (see *Facebook Subsample*). I also asked whether participants had transitioned gender/sexes medically and/or socially, and they indicated yes (*n* = 24), no (*n* = 234), or that they are currently transitioning (*n* = 44), with five non-responders.

Facebook Subsample

During data collection, I discovered a rapid influx of participants from Facebook (FB; *N* = 170; though only 120 completed at least one gender/sex category definition), despite no research team members having shared the survey link on Facebook. Many of these participants noted that they found my survey through Facebook groups for self-identified gender-critical feminists, also commonly referred to as trans-exclusionary radical feminists (TERF; see Goldberg, 2014; Watson, 2016). TERF ideology involves the belief that transgender individuals are members of their sex assigned at birth rather than their present gender/sex. Frequently, individuals who subscribe to TERF ideology argue that transgender women are not really women and therefore not the proper subjects of feminism (Bettcher, 2017; Goldberg, 2014). I use "TERF" rather than "gender-critical" because the latter is vague and imprecise; many feminists who assert the validity of transgender identities are also critical of gender as a structure of social power. Further, the cisgender, radical feminist creators of the term "TERF" intended it as a descriptive term for a variant of radical feminism that calls for the exclusion of transgender women from feminism, as opposed to radical feminisms that include transgender women (Williams, 2016).

Adherents to TERF ideology can be of any gender/sex or sexual identity, but are perhaps most commonly women and/or sexual minorities (Goldberg, 2014). In my FB subsample, participants were mostly women (*n* = 98) and some men (*n* = 6). They identified as lesbian/gay (*n* = 44), heterosexual (*n* = 39), bisexual (*n* = 18), used another label (*n* = 8), used multiple labels (*n* = 3), or provided a detailed explanation of their sexualities (*n* = 3). And while many TERF adherents are women and/or sexual minorities, the converse is not true; TERF ideology is uncommon among women and/or sexual minorities more generally (Goldberg, 2014).

Some FB participants described an oppositional, motivated rationale for participating in my study, which they perceived as biased in favor of recognizing gender/sex diversity (e.g., "[A] friend shared it with me on facebook [sic] because she wanted me to present my anti-gender viewpoints despite the survey being biased to an ideological belief in gender"). Because I did not originally have research questions associated with TERF ideology, and including them in the general sample would ideologically skew my other groups, I decided to include this group separately for exploratory purposes.

Groups for Analysis

I categorized individuals into four groups for analyses pertinent to social identity (*H2* and *H3*): gender/sex minority individuals of any sexual identity (GSMin; $n = 82$), cisgender sexual minorities (CisMin; $n = 40$), cisgender sexual majorities (CisMaj; $n = 62$), and my subsample of participants from Facebook discussion groups on TERF ideology (FB; $n = 120$). See Table 2.1 for a breakdown of each group by gender/sex and sexual orientation identities. GSMin consisted of participants who indicated one or more of the following: (1) identification as transgender, (2) that they have transitioned gender/sexes or are currently transitioning, (3) a sex assigned at birth that differs from their present gender/sex, or (4) use of a gender/sex minority label other than or in addition to "transgender" (e.g., genderqueer, gender non-conforming). Of the remaining non-FB participants, all who indicated their sexual identity was heterosexual (without qualifications; e.g., "mostly heterosexual") were in the CisMaj group and all who indicated their sexual identity was not exclusively heterosexual were in the CisMin group. FB participants were kept separate from the other three groups for all analyses, regardless of their gender/sex or sexual identities.

Coding Gender/Sex Category Definitions

In my survey, I asked participants to define six terms: *woman, man, feminine, masculine, female,* and *male*. Participants received the following instructions: "Please provide your own personal definition of the following words related to gender/sex. Do not use any resources to help you, like a dictionary. Do not worry about whether you are giving the 'right' answer. You might find that you define some of these words the same way, and that's fine. We want to know how you understand what each word means, whatever that might be."

Content Coding

I and another coder coded participants' definitions for content relevant to my research questions. First, the coders read through all participants' definitions and took notes on the range of content participants included. Coders then developed a preliminary coding scheme using inductively generated codes, in addition to codes generated based on theory such as: whether participants mention *sex* and/or *gender*, whether they indicated a sociocultural and/or biological origin for the category, which other categories they used in their definitions of a given category, whether they included qualifying language, and the complexity of their definition (see *Complexity Coding*). Most inductively generated codes covered specific biological or sociocultural features, although some dealt with other aspects of definitions (Tables 2 and 3).

Following creation of my preliminary codebook, the coders separately coded 20% of definitions for each category, and met to revise the coding scheme throughout the process. Coders resolved discrepancies in coding for these first 20% of definitions until Cohen's κ was above 0.70 for each code. For over 90% of codes, κ was also above 0.80, indicating a high level of agreement. Complexity was my only ordinal code, so I calculated agreement separately using Krippendorff's α with the KALPHA macro for SPSS, which can accommodate ordinal variables (Hayes & Krippendorff, 2007). For all six categories' complexity codes, I found $\alpha > 0.70$ and

indicated agreement ranging from satisfactory to excellent. Next, the coders separately coded all participants' gender/sex category definitions. Finally, the coders met to resolve all coding discrepancies to consensus through discussion.

Complexity Coding

I and another coder coded for definitions' complexity using a modified version of the integrative complexity coding scheme (Baker-Brown et al., 1992). Integrative complexity is a means of conceptualizing the complexity with which an individual processes information via their capacity to consider and synthesize multiple perspectives on a given topic. It is coded based on the degree of conceptual differentiation (how many perspectives on or aspects of a phenomenon do they consider?) and integration (do they integrate these aspects together to develop an analysis of the topic?) in a participant's response. Scores of 1-3 represent progressively greater degrees of differentiation, and scores of 4-7 represent high levels of differentiation accompanied by progressively greater degrees of integration. Differentiation is sequenced before integration on the rating scale because differentiation is a necessary (but not sufficient) condition for integration (i.e., an individual must distinguish multiple perspectives on or aspects of a phenomenon in order to integrate them into an analysis; Suedfeld, Tetlock, & Streufert, 1992).

Integrative complexity has been frequently used to understand the complexity of individuals' cognitive processes as a trait-level characteristic or the complexity with which they think about a particular social or political issue. Baker-Brown et al. (1992) stated that definitions of words, and other forms of writing in which there is a simple, correct answer, cannot be scored for integrative complexity. However, the definitions of some words such as gender/sex categories are politically contested, and so how complexly participants define the terms provides

one means of understanding how complex they think gender/sex itself is. Further, while individuals' personal definitions of terms should not typically be expected to evince integration, they may still vary substantially in the degree to which individuals list different factors that comprise a definition or different perspectives on the term. Therefore, in my study, I chose to focus primarily on the degree of differentiation in a participant's response, and considered only the presence or absence of integration (1 = low differentiation; 2 = moderate differentiation; 3 = high differentiation; 4 = high differentiation accompanied by any amount of integration; see Table 2.4 for examples). I did so because my prompt did not explicitly call for integration; I instructed participants to define gender/sex categories, not analyze them (although notably, a small number of participants *did* develop analyses of gender/sex categories in their definitions, which were coded as 4's). I also did not treat participants' definition complexity ratings as evidence of their trait-level cognitive complexity because there is no evidence of a link between gender/sex category definition complexity and other aspects of cognition. Instead, I understand my codes only to index participants' sense of how multifaceted gender/sex category categories are.

Definition complexity is logically linked to response length; short responses should typically differentiate fewer dimensions of a category's definition than a long response. Therefore, I examined correlations between the word count of definitions and complexity ratings. Correlations were expectedly high (*r*'s between 0.75 and 0.80 for the six gender/sex categories), which supports the validity and logical coherence of my coding scheme.

Results

Biological and Sociocultural Content Analyses

I examined whether people's definitions of gender/sex categories varied based on inclusion of biological and sociocultural content across categories (*H1*) and across gender/sex and sexual identity groups (*H2*). I created variables indicating whether each definition had any biological or sociocultural features coded. I chose to analyze presence/absence of biological or sociocultural content rather than frequency because definitions varied widely in length and number of features listed. I conducted all analyses twice, first excluding FB participants followed by analyses including FB, in order to separately examine the influence of this subsample on any effects I observed.

Individual-Level Comparisons Across Gender/Sex Category Definitions (H1)

I conducted chi-square tests to compare the presence or absence of biological and sociocultural content in definitions across the six gender/sex categories (i.e., *woman, man, feminine, masculine, female,* and *male*; Table 2.2). I found that the number of participants who included any biological content in their definition varied across the six categories, $\chi^2(5) = 178.17$, $p < 0.001$. I therefore examined adjusted standardized residuals to identify whether the frequencies of including any biological content differed between individual categories (Sharpe, 2015). Significantly more definitions of *female* ($n = 106$) and *male* ($n = 112$) included any biological content than definitions of *woman* ($n = 50$) and *man* ($n = 44$). Definitions of both *female/male* and *woman/man* more frequently included biological content than *feminine* ($n = 22$) and *masculine* ($n = 34$), $p < 0.05$, with the exception of *masculine* and *man*, $p > 0.05$. I also found that the number of participants who included any sociocultural content in their definition varied across the six categories, $\chi^2(5) = 220.61$, $p < 0.001$. Examining adjusted standardized residuals indicated that significantly more definitions of *feminine* ($n = 166$) and *masculine* ($n = 155$) included any sociocultural content than definitions of *woman* ($n = 99$) and *man* ($n = 104$),

and definitions of both *feminine/masculine* and *woman/man* more frequently included sociocultural content than *female* ($n = 66$) and *male* ($n = 59$), $p < 0.05$.

I repeated my analyses including FB participants and found essentially the same patterns across categories for both biological and sociocultural content (i.e., *female/male* > *woman/man* > *feminine/masculine* for biological content, and the opposite pattern for sociocultural content). The only difference that emerged after including FB was that frequency of inclusion of biological content became significantly greater for *man* ($n = 86$) than *masculine* ($n = 46$), $p < 0.05$.

Group-Level Comparisons Within Gender/Sex Category Definitions (H2)

I conducted logistic regressions to predict the likelihood of biological and sociocultural content being present or absent in participants' gender/sex category definitions based on their own gender/sex and sexual identities. I coded GSMin as the reference group in each analysis. I controlled for age because it varied across my four groups, $F(3, 299) = 33.71$, $p < 0.001$; GSMin: $M = 26.59$, $SD = 7.90$, CisMaj: $M = 33.87$, $SD = 13.89$, CisMin: $M = 33.25$, $SD = 11.78$, FB: $M = 43.88$, $SD = 13.89$. I calculated separate logistic regression models for each of the six gender/sex categories for both biological and sociocultural content (i.e., 12 total logistic regression models). To account for potential Type I error inflation due to multiple comparisons, I applied the Benjamini-Hochberg procedure with a false discovery rate of 0.05 (Benjamini & Hochberg, 1995). My analyses were sufficiently statistically powered, particularly due to the high event rates of my dependent variables (Hsieh, 1989).

I analyzed whether group membership predicted the odds of including any biological content in gender/sex category definitions (Table 2.5). Group membership was a significant predictor of inclusion of biological content in definitions of *woman*, $p = 0.004$. CisMaj

participants had greater odds of including biological content in their definitions than GSMin participants.

Group membership predicted the likelihood of including any sociocultural content in definitions of *woman, man, female,* and *male*, $p < 0.001$ (Table 2.6). FB and CisMaj had significantly lower odds of including sociocultural content in their definitions of all four categories than GSMin. GSMin had greater odds of including sociocultural content in their definitions than CisMin for *woman* and *man* but not *female* or *male.* Group membership did not significantly predict inclusion of sociocultural content for both *feminine* and *masculine*, $p > 0.05$.

I repeated all analyses including the FB group and found that all non-significant models remained non-significant except two: *female,* $p < 0.001$, and *male*, $p < 0.001$. The model for *woman* remained significant, $p = 0.01$. In addition, I repeated analyses with CisMin coded as the reference group to specifically compare CisMin with CisMaj. CisMin and CisMaj did not significantly differ in their odds of including biological and/or sociocultural content in their definitions of any gender/sex category, $p > 0.05$.

Finally, I analyzed whether other social identities (i.e., race/ethnicity and comparisons between women and men) affected how much biological or sociocultural content individuals included in their gender/sex category definitions. I did not control for age in these analyses because there were no age differences between women and men or across race/ethnicity groups, $p > 0.05$. There were no differences in how frequently white people and people of color included sociocultural or biological content for any gender/sex category definitions, $p > 0.05$. There were also no significant differences in how frequently women and men included sociocultural or biological content for any gender/sex category definitions, $p > 0.05$.

Definition Complexity Analyses (*H3*)

I analyzed the complexity of each definition using a modified integrative complexity coding scheme (see Methods). I predicted that minority individuals (GSMin, CisMin) would have more complex definitions of gender/sex categories than majority individuals (CisMaj). Due to the high frequency of simple definitions (i.e., complexity = 1) for each of the six categories, distributions of complexity codes were highly right-skewed. Therefore, the analyses in this section all use non-parametric statistical tests.

First, I examined Spearman rank correlations between complexity codes to examine whether including a complex definition for one term was associated with complexity for others. Correlations between complexity codes within a pair of gender/sex categories (e.g., *woman* and *man*) were all very large (*woman/man*: $\rho = 0.79$; *feminine/masculine*: $\rho = 0.76$; *female/male*: $\rho = 0.79$), which supports my qualitative observation that participants frequently defined paired gender/sex categories in identical ways, only swapping out language accordingly (e.g., *woman*: "a person with XX chromosomes" and *man*: "a person with XY chromosomes"). Complexity codes were also significantly positively correlated across all non-paired categories, although at lower magnitudes ($0.14 < \rho\text{'s} < 0.31$).

I conducted Kruskal-Wallis tests on complexity codes for each of the six gender/sex categories across the four identity groups (Figure 2.1). I could not control for age in these analyses, but I independently confirmed via regression that age was not a significant predictor of definition complexity for any gender/sex category, $p > 0.05$. Definition complexity varied based on group membership for definitions of *woman*, $H(2) = 10.35$, $p = 0.006$, *man*, $H(2) = 12.01$, $p = 0.002$, *feminine,* $H(2) = 6.32$, $p = 0.04$, *masculine,* $H(2) = 6.34$, $p = 0.04$, *female,* $H(2) = 25.17$, $p < 0.001$, and *male*, $H(2) = 21.06$, $p < 0.001$. I examined pairwise comparisons for each of the significant results. I again applied the Benjamini-Hochberg procedure to control for multiple

comparisons. For definitions of *woman*, CisMaj, $p = 0.005$, and CisMin, $p = 0.008$, both had significantly less complex definitions than GSMin and did not differ from one another. For *man*, GSMin also had significantly more complex definitions than the other groups (CisMaj: $p = .006$; CisMin: $p = .002$), which did not differ from one another. GSMin had significantly more complex definitions than CisMaj for *feminine*, $p = 0.02$, and *masculine*, $p = 0.02$. For *female*, CisMaj had less complex definitions than GSMin, $p < 0.001$, and CisMin, $p = 0.01$. GSMin also had more complex definitions than CisMin, $p < 0.001$. For *male*, CisMaj had less complex definitions than GSMin, $p < 0.001$.

When I repeated my analyses with FB, all effects held constant except for *feminine*, which was no longer significant, $H(3) = 7.13$, $p = 0.07$. The pairwise comparison for definition complexity of *masculine* between GSMin and CisMaj also became non-significant, $p = 0.03$. FB had significantly less complex definitions of *woman*, $p = 0.001$, and *man*, $p < 0.001$ than GSMin. FB also had significantly more complex definitions of *masculine*, $p = 0.02$, *female*, $p < 0.001$, and *male*, $p < 0.001$, than CisMaj.

Patterns in Miscellaneous Codes

In addition to my biological and sociocultural codes, I analyzed a variety of codes related to other aspects of gender/sex category definitions (see Table 2.3 for full list and code frequencies). These analyses were exploratory; most involve inductively generated codes. Here, I describe a few patterns I observed.

One notable pattern occurred in one of my codes about the various ways in which participants described gender/sex categories as problematic, including whether the categories were defined by stereotypes, were meaningless, or whether the participant defined the category in a manner that self-consciously contradicted a normative definition. While the latter two codes

were relatively infrequent across categories, many participants specifically noted, while defining *feminine* (n = 39; 12.9%) and *masculine* (n = 43; 14.1%), that *feminine* and *masculine* are stereotypical or implicate stereotypes to some degree.

I coded whether participants included the terms *gender* and/or *sex* in their definitions to better understand how individuals associate the six categories with gender and/or sex. Frequencies of using both *gender* and *sex* in a single definition are listed in Table 2.3 but were excluded from statistical comparisons because expected counts for cells were often less than 5. I found that usage of *gender* and *sex* varied significantly across the categories, $\chi^2(5) = 71.07$, $p < 0.001$. Comparison of individual cells via adjusted standardized residuals revealed that *gender* was mentioned significantly more often than expected and *sex* significantly less than expected for *woman*, *man*, *feminine*, and *masculine*, and *sex* was mentioned significantly more often than *gender* for *female* and *male*. This effect appeared to be largely driven by the high number of mentions of *sex* for *female* (n = 90) and *male* (n = 88). Therefore, differential usage of *sex* and *gender* appeared especially salient for *female* and *male* compared to other gender/sex categories.

I coded which other gender/sex categories were mentioned in a given gender/sex category definition as a means of understanding which gender/sex categories were being used as reference categories to define others. I found that for *woman* and *man*, *female* and *male* were mentioned respectively in over 60% of definitions (*female* in 63.4% of *woman* definitions; *male* in 63.2% of *man* definitions). For *feminine, woman* (24.8%) and *female* (35.8%) were both mentioned somewhat frequently, as well as *man* (26.6%) and *male* (36.4%) for *masculine*. However, for *female* and *male,* other categories were mentioned relatively less frequently: *woman* appeared in only 15.5% of *female* definitions and *man* in only 11.1% of *male* definitions. This might suggest

that many individuals use *female* and *male* as foundational categories to define other gender/sex categories.

I also examined whether definitions mentioned cisgender or transgender status to explore which gender/sex categories individuals associated with these terms. I conducted a chi-square test to compare across the six gender/sex categories and found that cisgender/transgender status was mentioned for some categories more than others $\chi^2(5) = 32.91$, $p < 0.001$. Specifically, a number of participants brought up cisgender/transgender status in definitions of *woman* ($n = 33$) and *man* ($n = 31$). They brought up cisgender/transgender status slightly less frequently in definitions of *female* ($n = 25$) and *male* ($n = 25$), and only occasionally in definitions of *feminine* ($n = 7$) and *masculine* ($n = 6$). I observed a similar pattern in how often participants described a category as an identity or membership in a category as based in self-identification (see Table 2.2, "Identity"), suggesting that participants might have considered gender identity and cisgender/transgender status as relevant to the terms *woman*, *man, female*, and *male*, and, to a much lesser extent, to *feminine* or *masculine*.

Discussion

My research investigated heterogeneity in individuals' definitions of these gender/sex categories: *woman*/*man*, *feminine*/*masculine*, and *female*/*male*. I found that individuals' definitions of gender/sex categories vary in meaningful ways, including whether they contain biological and/or sociocultural content and in their degree of complexity. Also, I found evidence for variation in gender/sex category definitions based on social location. Status as a gender/sex minority or majority, and sexual minority/majority status to a lesser extent, mattered for individuals' gender/sex category definitions. Overall, my study demonstrates that there is heterogeneity in the extent to which individuals' definitions of gender/sex categories align with

the natural attitude about gender (i.e., perceiving gender/sex as immutable and defined by genitals; Garfinkel, 1967; Kessler & McKenna, 2000). This aligns with recent popular and scholarly accounts of emergent, nonessentialist understandings of gender/sex becoming increasingly prevalent (Henig, 2017; Norton & Herek, 2013; Steinmetz, 2014). My research helps clarify the scope and implications of contemporary heterogeneity in understandings of gender/sex language.

I found support for all three parts of *H1*: individuals included more biological content in their definitions of *female/male* than other categories (*H1a*), more sociocultural content in definitions of *feminine/masculine* (*H1b*), and included intermediate amounts of biological and sociocultural content in definitions of *woman/man* (*H1c*). These findings align with previous research that has suggested that individuals generally associate biological aspects with terms like *sex*, *female*, and *male* and sociocultural aspects with *gender*, *feminine*, and *masculine* (Pryzgoda & Chrisler, 2000). My study expands upon previous literature by presenting evidence that *woman* and *man* are defined with intermediate levels of biological and sociocultural content. I interpret this finding as indicating that people's conceptualizations of the categories *women* and *men* are rooted in both gender and sex, which mirrors contemporary scientific definitions of these terms (e.g., "gender/sex"; Hyde et al., 2018; van Anders, 2015).

Another novel finding from my research is that social location via status as a gender/sex or sexual minority or majority is linked to whether individuals include biological and/or sociocultural content in certain gender/sex category definitions. My results partially supported *H2*: cisgender sexual majorities defined *woman* using biological content more frequently than gender/sex minorities, and they defined *woman* and *man* using sociocultural content less frequently than gender/sex minorities. Gender/sex minorities did not significantly differ from

cisgender sexual minorities in their frequency of including biological or sociocultural content in definitions of any gender/sex category.

Why might cisgender sexual majorities differ from gender/sex minorities in how they define *woman/man*? One possibility is that gender/sex minorities define *woman* and *man* in ways that are intentionally inclusive due to a greater understanding of the diversity of women's and men's gender/sexed bodily features (e.g., not all men might have penises, but all men might self-identify as men). Therefore, gender/sex minorities might emphasize sociocultural aspects like identity in their gender/sex category definitions. Another possibility is that gender/sex minorities and cisgender sexual majorities both perceive gender/sex in ways that socially benefit them. For majorities, this could involve perceiving gender/sex in ways that align with the natural attitude about gender, which naturalizes cisgender identity and erases gender/sex minority identities; for minorities, this could mean perceiving gender/sex in ways that reflect its complexity in their own lived experiences and the experiences of other members of their communities. This latter possibility is reflected in contemporary debates over gender/sex-segregated public restrooms (van Anders et al., 2017). For example, cisgender, sexual majority, conservative politicians in the U.S. and other officials have created policies to define gender as wholly biological and synonymous with sex assigned at birth (General Assembly of North Carolina, 2016). Proponents of these policies that seek to restrict transgender people's access to public facilities have frequently justified them by explicitly arguing that they socially benefit cisgender people – often cisgender girls and women, specifically – and disregarding their negative impact on gender/sex minorities (van Anders et al., 2017).

Not all of my results supported *H2*. Notably, cisgender sexual minorities did not differ from cisgender sexual majorities in how frequently they included biological or sociocultural

content in gender/sex category definitions. This finding suggests that gender/sex and sexual minority statuses do not have equivalent effects on understandings of gender/sex categories. Some prior research has demonstrated that sexual identity moderates cisgender people's attitudes about transgender people (Werriner et al., 2013). But how sexual identity might impact cisgender individuals' understandings of gender/sex itself (e.g., under which conditions those understandings of gender/sex are inclusive of gender/sex diversity) remains a topic for further investigation.

My results largely supported *H3.* Gender/sex minority participants' definitions of *woman* and *man* were more complex than the other groups' definitions. Gender/sex minority participants also had more complex definitions of *feminine, masculine, female,* and *male* than cisgender sexual majorities. Cisgender sexual majorities had the least complex definitions of *female* of any group. These findings indicate that gender/sex minority or majority status matters for the depth of people's thinking about gender/sex categories. And, they align with what feminist standpoint theory might predict; namely, that minority groups who critically engage with their minority identities have insights into social categories through which they are minoritized that may not be readily accessible to majorities (Harding, 2004). Cisgender individuals, particularly cisgender sexual majorities, might think about gender/sex less than gender/sex minority individuals because of their privileged social location in a gender/sex-based hierarchy. Majorities' relative inattention to gender/sex might then manifest in definitions of gender/sex categories that involve less differentiation between factors influencing gender/sex category membership and less engagement with nuance. At the same time, recent findings indicate that some cisgender individuals might think about their gender/sexes in more multidimensional ways than previously thought – especially, but not exclusively, cisgender sexual minorities (Abed et al., 2019;

Jacobson & Joel, 2018; Joel et al., 2014). Future research might directly examine links between how frequently or deeply individuals think about gender/sex, their status as gender/sex minorities or majorities, and their understandings of gender/sex and its categories.

While I found that gender/sex and sexual minority/majority status mattered for content type and definition complexity, I found null effects for comparisons between women and men and comparisons between people of color and white people. Why might this be the case? While previous evidence indicates that women and/or Black people have less biologically essentialist beliefs about the differences between women and men than do men and/or white people, it is possible that these differences are more evident in beliefs and attitudes (e.g., essentialism) than gender/sex category definitions (Cole et al., 2007; Smiler & Gelman, 2008). I focused on definitions because of my interest in variation in understandings of gender/sex language and conceptions of gender/sex categories. It is possible that comparisons between women and men or race/ethnicity comparisons are more meaningful when attitudes are measured alongside or instead of variation in definitions.

Exploratory Findings

Because I did not anticipate having a group composed primarily of TERF adherents in my study, the FB group was not included in *H2* or *H3*. However, my exploratory analyses revealed several aspects of this group's gender/sex category definitions worth discussing. One such finding was that the FB group defined *female/male* using biological content more frequently than gender/sex minority participants and they defined *woman/man* and *female/male* using sociocultural content less frequently. These findings align with extant work on TERF ideology, which typically posits that *woman/man* and *female/male* are purely biological categories (Watson, 2016). For example, in responses to open-ended questions, many FB participants

criticized my use of the term "gender/sex," because it suggests *woman/man* and *female/male* have sociocultural elements. It is important to note that much recent scholarship indicates that these gender/sex categories *do* have sociocultural elements, both scientifically and pragmatically in everyday language use (Hyde et al., 2018; Pryzgoda & Chrisler, 2000; van Anders, 2015). The results of the present study also indicate that people of all gender/sex and sexual identities understand *woman/man*, and *female/male* to a lesser extent, to encompass sociocultural features – particularly identity (Table 2.2). Therefore, my results suggest that conceptions of *woman/man* and *female/male* that position them as self-evident, wholly biological categories (e.g., TERF ideology, anti-trans public policies) do not align with the varied content of people's definitions of these categories (*woman/man* especially, which participants defined with a wide range of sociocultural features).

My exploratory analyses of codes indexing features of definitions other than complexity or biological and sociocultural content had implications for how gender/sex categories link to a variety of other terms. Patterns in participants' references to *gender* and *sex* in their definitions were particularly compelling. Participants used the term *sex* frequently in definitions of *female/male*, but not other categories, and female/male definitions frequently included biological content and not sociocultural content. One possible explanation for this finding is that the term *sex* is particularly strongly associated with *female*/*male*, whereas *gender* is not as strongly linked to any particular gender/sex category. An important potential implication is that a survey question worded as "What is your sex?" or options like "male or female" might cue participants to think about their bodies or biologies, as opposed to their identities as women, men, or gender/sex diverse individuals, more so than "What is your gender?" or possibly "What is your gender/sex?" This might rightly be distressing to some individuals, particularly some transgender

and nonbinary individuals who might feel that researchers are more interested in their bodily anatomy or sex assigned at birth than their present identities. At the same time, gender/sex minority participants included sociocultural content in their definitions of *female* and *male* more frequently than cisgender sexual majorities and FB participants – including identity-related content – and therefore might still see these options as addressing identity. Future research might test directly how different language shapes participants' affect and responses to gender/sex survey questions.

Limitations and Future Directions

One notable facet of my study that limits its generalizability is that I asked participants to generate their own gender/sex category definitions rather than asking them whether they would include specific kinds of biological or sociocultural content in each category. Therefore, some of the effects I found in the types of content participants included might reflect the extent to which that content was readily cognitively available for participants in the study. For instance, fewer than 10% of definitions of *female/male* included mentions of ovaries, testes, or gonads in general. It is likely that many more participants understand *female/male* to encompass gonads in their definitions and that this low number reflects that participants did not consider gonads to be as centrally important as other features (e.g., genitals, chromosomes). Other potential factors include prototypicality of particular features (e.g., genitals may be understood as more prototypical features than gonads, even if both are considered representative) and implicit use of metonymy (e.g., someone writing "vagina" might have imagined their response to also subsume vulva, ovaries, and uterus). Therefore, future research might benefit from presenting participants with a list of biological and sociocultural features and asking which features participants consider to fit into which categories.

Another reason participants might have chosen only to name few features in their definitions, even when they view many more as relevant, is for rhetorical purposes. For example, FB participants often defined *woman* and *man* as "adult human female" and "adult human male" respectively, mirroring some dictionary definitions (*Woman*, n.d.). Referencing this definition in contexts related to gender/sex diversity can rhetorically function to make gender/sex appear simple (i.e., identity as a woman or man is just a function of sex) and is a strategy employed by TERF adherents (*Woman Billboard Removed after Transphobia Row*, 2018). However, a definition like "adult human female" might imply certain biological features, but does not explicitly include them, and therefore my content analysis likely did not capture its full intention.

Another important limitation in the present study's scope is that I focused on gender/sex category definitions rather than gender/sex language use. For instance, I did not ask individuals to interpret the meaning of gender/sex categories in different linguistic contexts, which might have allowed me to better understand how individuals actually use gender/sex terms when speaking or interpreting speech. Therefore, while the present study suggests that links between heterogeneity in gender/sex category definitions and variation in gender/sex language use might be a fruitful site for further inquiry, my data do not function as evidence for such links.

Finally, the present study used an online convenience sample, which limits its generalizability. For example, the gender/sex minority group was significantly younger than either of the gender/sex majority groups. It is possible that an older sample of gender/sex minority individuals would conceptualize gender/sex categories differently. And because all my recruitment occurred online, it is possible that my overall sample is much more active in online discussions about gender/sex than other members of their respective groups. For example, the men in my study might not be representative of men in general in the degree to which they think

about gender/sex – which might be exacerbated by the relatively small number of men in the study. Future research should explore variations in understandings of gender/sex language with more representative samples.

Conclusion

My research found evidence for patterns in individuals' inclusion of biological and sociocultural content in their definitions of gender/sex categories and differences in definition content and complexity based on gender/sex and sexual minority/majority status. My study suggests that individuals generally perceive *feminine/masculine* as linked to sociocultural content, *female/male* as linked to biological content, and *woman/man* as composed of a mix of sociocultural and biological content. Cisgender individuals define *woman/man* and *female/male* in ways that are less complex, more inclusive of biological content, and less inclusive of sociocultural content than transgender individuals, although this effect varies based on cisgender individuals' sexual identities (and also whether they participate in online discussions of TERF ideology). I conclude that contemporary understandings of gender/sex categories are heterogeneous and not inevitably aligned with the natural attitude about gender.

CHAPTER 3

Avalanche Samples: Gender/Sex Majorities' Motivated Disruption of Gender/Sex Diversity Research

Diversity research that catches the ire of over-empowered majorities with ideological objections to its content can be subject to backlash via attempts to disrupt the research process. Online survey research might be particularly at risk for disruption by groups of majorities who organize together via social movement online communities, and who might participate in diversity research to mock, challenge, and/or delegitimize it (Caren et al., 2012). Indeed, an organized group of gender/sex majorities participated in my online survey research on individual variation in people's definitions of gender/sex categories (specifically, *woman, man, feminine, masculine, female,* and *male*) with the expressed intent of challenging what they perceived as my study's political bias in favor of gender/sex diversity (see Chapter 2; Schudson et al., 2019).

In this chapter, I delineate how gender/sex majorities organized to disrupt my research, and I analyze the implications of their actions for understanding majority opposition to diversity research more broadly. I describe how individual and group emotions, entitlement based on social location via race/ethnicity and education, and resistance to the content of the targeted research might motivate majorities to engage in disruptive actions. Finally, I explore the scope of majority disruption beyond my own research and consider future directions.

Majorities' Motivated Disruption of my Research

People involved in Facebook discussion groups centering trans-exclusionary radical feminism (TERF; see Goldberg, 2014; Watson, 2016) participated *en masse* in my research on

gender/sex category definitions (n = 170; see Chapter 2). TERF ideology involves the belief that transgender individuals are members of their sex assigned at birth rather than their present gender/sex. Notably, the term "radical" in "TERF" refers to a historical connection to radical feminism rather than TERF politics actually being a radical challenge to patriarchy. I refer to TERF politics as reactionary throughout because of their investment in sustaining an oppressive status quo. Participants from Facebook TERF discussion groups (or "FB participants") indicated in free-response items that their decision to participate was motivated by ideological opposition to my research.

FB participants comprised nearly one-third of the total number of people that interacted with my survey (N = 516; 307 of which completed the survey, including 120 FB participants). They largely completed the survey as intended. Most, but not all, responded in appropriate ways to each question rather than with jokes, insults, or other unusable data. The survey asked participants to provide their own definitions of six gender/sex terms – *woman, man, feminine, masculine, female,* and *male* – without consulting a dictionary or other source. Most FB participants defined *woman* and *man* as "adult human female" and "adult human male" respectively, in accordance with the most common dictionary definitions and provided a range of definitions for the other terms. Therefore, although FB participants' participation was unsolicited and evinced their resistance to the framing of my study, their data were still usable.

In order to determine what FB participants' data meant and how to incorporate them, it was important to understand how FB participants came to participate in my survey and why. I first became aware of the issue because the influx of FB participants was unusually rapid. Of the 170 FB participants who started the survey, 154 participated within a three-day period, which was an order of magnitude faster than my intentional recruitment methods. I was then able to

determine that these participants were referred to the study from Facebook through Qualtrics, the online survey platform I used for this study. Notably, I did not post the link to the study on Facebook. Based on FB participants' qualitative responses, I surmised that a participant encountered the survey link somewhere I had posted it (i.e., Craigslist) and then reposted the link in at least one TERF Facebook discussion group. Then, that participant or others continued to distribute it in TERF groups.

These TERF Facebook discussion groups function as social movement online communities: group members connect with one another and act collectively based on shared goals of advancing TERF ideology and opposing sociopolitical inclusion of trans people (Caren et al., 2012). Sharing my study link among themselves was one such collective action. Had I encouraged participants to share the study link with their personal networks, this would simply constitute the common method of respondent-driven sampling (also known as "snowball sampling"). However, because this practice of sharing the study on Facebook was unsolicited, rapid, and had disruptive effects on the study, it can be understood not as respondent-driven but rather respondent-*controlled* – or, what I refer to as an "avalanche sample."

Many participants in the avalanche sample noted that they perceived my project as "biased" (i.e., ideologically positioned in a way that they oppose) due to my use of terms like "cisgender," "gender/sex," and "sex assigned at birth" in demographic questions. Certainly, like all research, my research is ideologically situated. And they were partially correct in their assessment of the ideological positioning of my study: language used to describe gender/sex diversity is politically contested because gender/sex minority identities and experiences are presently politically contested (e.g., discriminatory policies in the U.S. that regulate gender/sex minorities' access to public spaces and define gender/sex minority identities as illegitimate; Fogg

Davis, 2018; Minter, 2016; van Anders et al., 2017). In my research in general, and in this study, I advocate for understanding and acceptance of gender/sex diversity in my research. I phrased survey items based on extant best practices for describing gender/sex diversity (e.g., using terms like "cisgender," "gender/sex," and "sex assigned at birth," which TERF adherents oppose). However, I do not view my position as "biased" in the sense of containing an unfounded and unjustifiable slant in ideology. I follow feminist science studies scholars who show that all scientists work from a particular standpoint, and that the goal of science is not bias-free objectivity but rather a reflexive, situated approach that facilitates modest, well-supported knowledge claims over universalist accounts of phenomena (Haraway, 1988; Harding, 2004).

The avalanche sample did not fully derail my research, but it did have certain disruptive effects. For example, I intended to statistically compare the types of features mentioned in gender/sex category definitions by different social groups, including gender/sex and sexual minorities and majorities. However, FB participants varied systematically from other groups in their social group composition. Among these who provided demographic information, participants were mostly women (n = 98) and some men (n = 6). They identified as lesbian/gay (n = 44), heterosexual (n = 39), bisexual (n = 18), used another label (n = 8), used multiple labels (n = 3), or provided a detailed explanation of their sexualities (n = 3). While adherents to TERF ideology can be of any gender/sex or sexual identity, they are most commonly women and/or sexual minorities[3] (Goldberg, 2014), and this was reflected in the FB group in my study.

[3] I refer to FB participants as gender/sex majorities despite the fact that many have minoritized social positions (in particular, as women and/or bisexual and lesbian/gay people). This is because "majority" is a contextually specific term. In the context of this study, a relevant aspect of these

Importantly, the converse is not true: there is no evidence to suggest that a significant proportion of women and/or sexual minorities endorse TERF ideology. Therefore, including FB participants in analyses comparing women and men, or sexual minorities and sexual majorities, was likely to be misleading and over-represent TERF ideology. I decided to include the FB group in analyses separately from the rest of the sample for exploratory purposes, which allowed me to still conduct the group comparisons I had originally planned.

Motivations for Disrupting Diversity-Centered Research

FB participants' comments indicated that they perceived my study and what it symbolized (i.e., growing acceptance of gender/sex diversity) as threatening and were thus motivated to disrupt its imagined political agenda. My initial reaction to the avalanche sample consisted of wondering "Why me? Why my study?" And although I meant those questions rhetorically and self-pityingly, they are useful to answer in earnest. I did not have data to address the "Why me?" question; how FB participants imagined me was generally unclear from what they wrote. But, I was able to draw some preliminary conclusions about the "Why my study?" question from FB participants' expressed affect, antipathy toward social change, and their social identities.

Affect and Collective Action.

One way to understand FB participants' motivations is by examining the affect underlying their responses to open-ended questions at the end of the survey (e.g., "If you encountered any problems with this survey, or if you would like to give additional comments,

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participants' social positions is as cisgender or otherwise non-transgender individuals who endorse biologically essentialist, anti-trans ideology.

please provide them here"). For instance, one FB participant wrote, "Losing sex segregated spaces and legislating personal identity as law is very scary for me. I want my granddaughters to be allowed to choose if they want to allow males into their showers, social events and academic institutions." Importantly, my survey does not have any items related to legislation or sex-segregated spaces and institutions. Regardless, the questions I did ask (e.g., personal definitions of gender/sex categories) seemed to cue this participant to express their fears about how acceptance of gender/sex diversity might change their social world. Similarly, one of the FB participants who seemed to approve of the survey wrote:

> "I am very concerned about the removal of the category of female as a discrete sex class, and worry what this means for women and girls around the world in the medium and long term, when there is no longer a term to describe 'people with vaginas'. Or will we have to be called 'people with [vaginas]'? That doesn't feel particularly progressive to me. Good luck with your study."

Again, this participant expressed their anxiety (i.e., "very concerned," "worry") about what they perceived as the negative impact of gender/sex inclusive linguistic shifts. It is unclear in both of these participants' comments whether they perceived me, as the researcher, as someone advocating for "the removal of the category of female" or "legislating personal identity," or whether they viewed me as a current or potential future political ally. Many other FB participants wrote clearly negative, sometimes angry comments that suggested they viewed me as a gender/sex diversity advocate trying and failing to conceal my bias (e.g., "By offering gender/sex as a unified concept your bias is showing. Big time").

Regardless of the valence of FB participants' comments, their responses indicated that the survey's content elicited strong feelings of fear and/or anger. Anger in particular is an

approach-related emotion (e.g., toward confrontation, problem-solving) and can help motivate collective action (Carver & Harmon-Jones, 2009; van Zomeren et al., 2004). It is possible that anger and/or fear might spread within social movement online communities via emotional contagion, including synchronized online behavior (Hatfield et al., 1993). And when anger is directed at research that is perceived as biased and one in which participation as an intervention is feasible (e.g., an online survey), this might trigger an avalanche sample. Also, certain emotions might be more likely to trigger an avalanche sample than others. For example, it is possible that some emotions (e.g., surprise) might trigger mockery or disdain in private discussions, but not spur direct intervention. Future meta-research should investigate the affective underpinnings of organized disruption of research studies.

Whiteness and Attitudes about Science

In addition to emotions underlying participants' comments, there are also trait-level characteristics of the FB participants that might also help explain the occurrence of an avalanche sample, including the fact that most were white (n = 111; 87% of those who indicated their race/ethnicity) and had high levels of formal education, including a four-year college degree and/or some form of graduate training (n = 95; 79% of those who indicated their education history). FB participants were not disproportionately white relative to the full sample; but regardless, whiteness and education history might have important implications for FB participants' relationship to social science research. For example, Black and white people differ in the extent to which they trust science and participate in science and related institutions (e.g., medicine) (Brandon, Isaac, & LaVeist, 2005).

Indeed, the processes through which minorities become minoritized and by which that minoritization is sustained are often contingent upon modes of science that legitimize dominant

ideologies. For example, biological and social science about race have both been instrumental to anti-Black cultural sentiment and state violence (e.g., eugenics and sociological research pathologizing Black American families; Kevles, 1995; Mumford, 2012). Potentially as a result of this history, Black Americans endorse choice-based explanations of race, gender, and varied psychological constructs (e.g., math aptitude) more than white people, who prefer genetic or culturally essentialist explanations (Cole et al., 2007; Jayaratne et al., 2009). Both genetic and culturally essentialist beliefs are premised in lay perceptions of scientific truths. For example, believing that Black culture or Black people's DNA are the foundation of racial inequities relies on implicit scientific arguments (and sometimes cite flawed, published scientific research). This evidence supports the potential existence of a link between whiteness and beliefs about science – including institutional science and/or lay understandings of science – as essential to understanding social phenomena.

I posit that the whiteness and high levels of formal education of the FB sample might help explain these participants' investment in science as an institution. FB participants who perceived me as a biased advocate for gender/sex minorities might have understood themselves to be protecting the sanctity of science as an inherently good institution. Alternatively, they might have simply hoped to harness the power of institutionally supported science to promulgate their beliefs further. Regardless, their actions indicated that they cared enough about the outcome of my research to intervene in it. It is possible that they were correct to care about my research – after all, institutionally supported science has historically held significant power in the U.S. At the same time, their actions reflect an anxiety that, without their interference, science might proceed down the "wrong" path and re-entrench the "wrong" ideas.

FB participants' fear of the potential of science to cause harm might reflect the complexity of their experiences as women and/or sexual minorities. As people who are marginalized for their gender/sexes and/or sexual orientations, they might be wary of the negative impact science can have on minoritized groups and fear for their own groups at the expense of others (i.e., gender/sex minorities). Simultaneously, as white and/or formally educated people, they might see science as an inherently good enterprise in need of their stewardship and protection from biased researchers. Further empirical work is necessary to understand the relationship between social location, attitudes about science, and perceived ability to influence scientific knowledge among TERF adherents and other reactionary groups that organize to disrupt diversity-centered research online.

Social Change and Status Threat

Finally, it is important to attend to the specific types of social change that FB participants feared (e.g., gender-neutral language and spaces) to better understand what kinds of social issues might motivate majority disruption of research. Fear and anger toward gender-neutral language and spaces is a form of antipathy toward social change, and FB participants' language suggested they perceived these issues as urgent social threats with far-reaching effects (e.g., "[I] worry what this means for women and girls around the world in the medium and long term"). The inclusion of gender-neutral language in a scientific study might have been especially threatening to FB participants who believe in the power of science to legitimize certain frameworks, including minoritized frameworks. That is, FB participants might have worried that my research would be published in scientific journals and/or disseminated to the public, which might further legitimize gender/sex diversity frameworks (which they erroneously perceived as inaccurate and sexist).

The threat that particular linguistic cues in my study induced for FB participants might have been an especially strong motivating factor for the avalanche sample. Majorities' support for hierarchy and majority group dominance is heightened when they perceive social threats (Morrison & Ybarra, 2008). For instance, men's gender essentialism (i.e., beliefs that gender differences are real, natural, and immutable) is only associated with sexism when men are presented with information suggesting that the gap between men's and women's social statuses is closing (Morton et al., 2009). These findings suggest that when majorities believe minorities are gaining higher status, they endorse ideologies that justify the existing status differential from which they benefit. It is possible that TERF adherents, and potentially cisgender individuals more broadly, also experience similar threats when reading gender-neutral and/or inclusive language and are motivated to protect their social status. And while most prior research on gender-based social threats are about men's masculinity (see Vandello & Bosson, 2013), gender/sex diversity related social threats might be salient for cisgender women too, who socially benefit from their majority status as cisgender. Future empirical work should investigate the role of status threat in motivating collective action among gender/sex majorities.

Majorities' Disruptive Actions in Other Online Contexts

Was my experience with the avalanche sample of supporters of TERF ideology unique? Or have other researchers had similar experiences? And, if so, which researchers and for which kinds of research? Prior literature on disruptive participation in psychology is sparse, particularly for Internet-based and/or survey research. However, I have spoken to other researchers studying gender/sex diversity and transgender identity/experience who have encountered similar issues. For instance, the U.S. Trans Survey had issues with avalanche samples of TERF adherents, similar to my study (A. Flores, personal communication, Aug 1, 2017). I learned about instances

like this one because they involved TERF adherents specifically, and either I or my advisor (Dr. van Anders) were put in touch with these researchers. It remains unclear whether majority interference in diversity-centered social science research is a strategy specific to TERF adherents, or if other organized groups of majority individuals use this strategy also (e.g., white supremacists disrupting research on racial/ethnic diversity).

Outside of research contexts, there is evidence of reactionary social movement online communities other than TERF adherents performing disruptive collection actions. These reactionary groups include participants in the "manosphere" (e.g., men's rights activists) and white supremacists (Caren et al., 2012; Heikkilä, 2017; Marwick & Caplan, 2018). Some forms of Internet-based collective action that mirror avalanche samples include *e-mail bombs* (van Laer & van Aelst, 2010), in which participants flood a target email server to show the magnitude of opposition to a specific policy, action, individual, etc., and *brigades* (Heikkilä, 2017), in which group members collectively perform a disruptive action such as leaving comments on articles, attempting to sway opinion polls, or harassing individuals. Brigades are functionally similar to avalanche samples: a member of a social movement online community directs other members to interact in a specific way with an ideologically opposed target.

Notably, tactics such as e-mail bombs, brigades, and avalanche samples might be used for achieving either progressive or reactionary goals. My study was disrupted by reactionary groups opposed to the expansion of gender-based protections for gender/sex minorities, but it is conceivable that social movement online communities that include and/or center gender/sex minorities might organize to disrupt research that is linked to restricting rights for gender/sex minorities. Fundamentally, an avalanche sample is a form of digital, research-based protest, and protest can be used to promote social progress or call for a reversion to a more unequal past. It

remains an empirical question which social movement online communities actually use avalanche sampling as a tactic, for what purposes, and whether their goals are ever to protect social progress rather than backlash against the expansion of rights for minoritized groups.

Based on my experiences, I posit that the avalanche sample might be a more ambivalent tactic than other collective actions from social movement online communities, like email bombs or brigades. For instance, some FB participants indicated approval of my research in their responses to open-ended questions and perceived it as important and/or aligned with their values (although most did not). And the vast majority of FB individuals participated in good faith; they responded to questions in ways that were coherent and reflective of their opinions. In contrast, the avalanche sample in the U.S. Trans Survey functioned as a sort of data vandalism: TERF adherents responded randomly to lower the overall quality of data and researchers had to perform careful data cleaning procedures to mitigate their impact (A. Flores, personal communication, Aug 1, 2017).

In sum, the scope of the problem of majority interference remains unclear and a generative topic for further meta-research on researchers' experiences. Open questions include whether organized disruption of diversity-centered research is a strategy unique to TERF adherents (and if so, why) and what features of research surveys might trigger avalanche samples.

Conclusion

TERF adherents organized to participate *en masse* in my research about variation in gender/sex category definitions in order to assert the dominance of their biologically essentialist beliefs. This particular form of motivated, majority disruption of research, which I have labeled an avalanche sample, represents a concerning and understudied methodological obstacle for

online survey research. Although I have communicated with a few other researchers who have had similar issues with TERF adherents disrupting their research related to gender/sex diversity, it remains unclear how widespread this issue is and whether social movement online communities other than TERF adherents use similar tactics to disrupt research. The avalanche sample of TERF adherents might have been spurred to action by anger, fear, reverence for "objective" science that legitimizes dominant frameworks, and the severity of the perceived social threat my research represented to them. More meta-research is necessary to understand the factors that drive organized groups of majorities to disrupt particular diversity-centered research projects. As online-based recruitment becomes increasingly normative in the social sciences and research on gender/sex diversity grows, it is important for researchers to be prepared to manage backlash.

CHAPTER 4

Gender/Sex Diversity Beliefs: Scale Construction, Validation, and Links to Prejudice

In Chapter 2, I found evidence of variation in people's understandings of gender/sex categories. This research suggested that heterogeneity in gender/sex diversity beliefs is evident in how people define gender/sex categories. In Chapter 4, I describe the construction and validation of the Gender/Sex Diversity Beliefs Scale (GSDB). In tandem with changes in public awareness of gender/sex minority identities, there has been increased scholarly attention to social constructionist perspectives on gender/sex, which often position gender/sex as a diverse, socioculturally contingent, and non-binary category (e.g., Lloyd & Galupo, 2019; Richards et al., 2016; Schudson, Beischel, & van Anders, 2019; Zimman, 2017). Historically, scholars have described normative lay beliefs about gender/sex as essentialist, meaning they are premised in the belief that gender/sex has a singular, underlying reality that cannot be changed (Bettcher, 2007; Garfinkel, 1967; Gelman, 2003; Kessler & McKenna, 2000; Rubin, 1975; Tee & Hegarty, 2006). But, psychological research on emergent, social constructionist beliefs about gender/sex diversity is still nascent. Accordingly, in this chapter, I ask: What is the latent structure of contemporary social constructionist and essentialist beliefs about the nature of gender/sex diversity? And might gender/sex diversity beliefs be meaningfully associated with people's attitudes about gender/sex minorities?

Essentialism and Prejudice against Gender/Sex Minorities

Prior research on essentialist beliefs about gender/sex has often focused on beliefs about whether differences between (typically implicitly) cisgender women and men are natural and biologically based (Coleman & Hong, 2008; Haslam et al., 2000; Prentice & Miller, 2006; Smiler & Gelman, 2008). This research has yielded many important insights about the relationship between gender/sex essentialism and sexism. However, it has also typically presupposed that all people understand "women" and "men" as natural kinds (i.e., metaphysically discrete, inevitable categories) with self-evident members and non-members. In effect, less research has explicitly examined heterogeneity in people's beliefs about whether "women" and "men" are natural kinds and the extent to which they are diversely structured and malleable categories (Rothbart & Taylor, 1992). Natural kind beliefs are especially relevant to prejudice and stigma toward gender/sex minorities and as such, they require greater empirical attention. For example, discriminatory policies aimed at regulating transgender people's access to gendered public spaces have been premised in beliefs about female and male as fundamentally discrete, immutable categories (van Anders et al., 2014, 2017).

Some recent studies that have examined links between essentialism and prejudice against gender/sex minorities have found that essentialism is linked to trans-prejudice (i.e., prejudice against transgender people) and support of anti-trans public policies (Callahan & Zukowski, 2019; Ching & Xu, 2018; Roberts et al., 2017; Wilton et al., 2018). Notably, these studies have typically used generalized measures of essentialism (i.e., endorsement of essentialist beliefs about social categories broadly) or measures of gender/sex essentialism that only consider differences between implicitly cisgender women and men. General measures of essentialism of social categories or measures that do not clearly implicate gender/sex minority identities are not fully acceptable substitutes for a measure of essentialist beliefs about gender/sex minorities

because individuals can have essentialist beliefs about some social categories and not others (Haslam, Rothschild, & Ernst, 2002).

Measures that have explicitly assessed natural kind beliefs focused on the nature of gender/sex minority and majority identities (e.g., endorsement of a gender/sex binary) have found strong links to trans-prejudice and social policies that affect gender/sex minorities (Clark & Hughto, 2019; Hill & Willoughby, 2005; Kanamori et al., 2017; Norton & Herek, 2013; Tee & Hegarty, 2006). However, some have used insufficiently validated measures (see Billard, 2018; Morrison et al., 2017). And none have systematically examined essentialist and social constructionist beliefs about gender/sex minorities based on the multiple dimensions of psychological essentialism (Haslam et al., 2000; Rothbart & Taylor, 1992). For instance, perhaps the most widely used trans-prejudice scale, the genderism and transphobia scale (GTS; Hill & Willoughby, 2005) includes a few essentialist beliefs about gender/sex (e.g., "People are either men or women"). However, other than those few items, the GTS largely assesses beliefs about the normality and acceptability of gender nonconformity and interpersonal behaviors and attitudes. Other scales also mix together some essentialist beliefs about gender/sex with self-reported behavioral tendencies and attitudes toward transgender individuals and other gender/sexes (Kanamori et al., 2017; Nagoshi et al., 2008; Walch, Ngamake, et al., 2012). Billard (2018) advocated for the creation of new trans-prejudice scales with greater clarity in conceptualizations of transgender people, consistent use of attitudinal items instead of mixing in behavioral items, and avoidance of language that might reinforce participants' stigmatizing views (e.g., through misgendering).

In parallel to Billard's (2018) suggestion of greater precision in *how* we measure trans-prejudice, I propose precision in *what* we measure to understand attitudes relevant to trans-

prejudice. Specifically, I propose that measuring cognitive components of prejudice (e.g., essentialist and social constructionist beliefs) separately from affective components (e.g., fear, disgust, hate) will allow us to better understand their relationship with one another and with relevant outcomes (Stangor et al., 1991; Tropp & Pettigrew, 2005a; Zajonc, 1980). Prior scales, like the GTS, have included a small number of essentialist and social constructionist beliefs about gender/sex diversity alongside affective prejudice toward gender/sex minorities, which might reflect an implicit assumption that the affective and cognitive components are closely associated. But, measuring essentialist and social constructionist beliefs about gender/sex diversity separately from affective trans-prejudice is necessary for investigation of which beliefs about the nature of gender/sex undergird affective prejudice or affirmation.

Importantly, although I distinguish between beliefs about gender/sex diversity and attitudes about gender/sex minorities, I approach both concepts as possessing linked functions for perceivers. Psychologists have distinguished (or not distinguished) between attitudes and beliefs in different ways, although typically they have conceptualized attitudes as evaluative and beliefs as descriptive (Fishbein, 1963). Some have challenged the boundary between attitudes and beliefs and demonstrated how both beliefs and attitudes serve interwoven functions for perceivers, rather than existing in concrete form, like possessions (Abelson & Prentice, 1989). Although the beliefs on which I focus are primarily descriptive, I examine a highly diverse set of beliefs and approach them from this functionalist perspective. My investigation takes as a premise that descriptive beliefs about the nature of gender/sex are not static cognitive entities, but rather might be contextually deployed (or disavowed) to serve particular inter- and intrapersonal functions, such as appearing non-prejudiced or communicating social or political group affiliation (Hegarty & Golden, 2008).

Affirming Perspectives on Gender/Sex Diversity

Social constructionist beliefs about gender/sex might be especially central to affirming perspectives on gender/sex diversity. Gender/sex diversity affirmation involves the acknowledgment and/or acceptance of the existence of many and varied gender/sexes. Social constructionist beliefs position gender/sex as not defined by an inherent essence and subject to change over time for individuals and societies, among other beliefs. Social constructionist beliefs are present both within and beyond queer, feminist, and/or academic contexts, and are particularly salient in gender/sex minority communities (Zimman, 2017). And, with the recent increase in attention to gender/sex diversity in media coverage and political discourse, it is possible that they are more common among gender/sex majorities than previously thought.

Although many social constructionist beliefs are theoretically linked to gender/sex diversity affirmation, social constructionist beliefs are not the only basis for positive attitudes toward gender/sex minorities. Certain essentialist beliefs might actually be too: in particular, beliefs that essentialize gender/sex minority identities as natural kinds, rather than only "female" and "male." For instance, believing the female/male binary is natural, rather than socially produced, is essentialist and is associated with prejudice (Norton & Herek, 2013; Tee & Hegarty, 2006). On the other hand, believing transgender identities are natural and immutable is also essentialist, but might actually be associated with affirmation. This bifurcated relationship to prejudice across essentialism of minority identities and essentialism of group differences functions similarly for sexual orientation, but not for binary gender/sex (i.e., a lens focused on women and men only) or race/ethnicity (Grzanka et al., 2016; Haslam et al., 2002; Jayaratne et al., 2009; Nagoshi et al., 2008; Tawa, 2017).

Why are some kinds of essentialist beliefs positively associated with attitudes about gender/sex and sexual minorities, but the same is not true for attitudes about women and/or racial/ethnic minorities? Racial/ethnic and binary gender/sex groups are normatively viewed as natural kinds, and oppression of women and/or racial/ethnic minorities has frequently relied on justifying these groups' subordination to men and/or white people by naturalizing group differences (Haslam et al., 2000; Mahalingam, 2007; Morton et al., 2009; Ryazanov & Christenfeld, 2018). Conversely, gender/sex and sexual minority identities have been constructed as pathologies more so than natural kinds (Ansara & Hegarty, 2012; Haslam et al., 2000; Herek, 2007). Therefore, essentialist accounts of gender/sex and sexual minority identities as natural and immutable can have disruptive effects on the status quo and have been rhetorically important to many contemporary sexual and gender minority social movements (although essentialist accounts are also exclusionary of sexual and gender/sex minorities who do not experience their identities as immutable or as natural kinds; Diamond & Rosky, 2016; Grzanka et al., 2016; Hegarty, 2002). In sum, the relationship between prejudice and essentialism is contingent on both which group is being essentialized and also *which aspects* of a group are being essentialized (e.g., minority identities or group differences). So, when minority gender/sexes are essentialized – rather than binary gender/sex or differences between women and men – essentialism might be negatively linked to prejudice.

The Present Research

I aimed to design the Gender/Sex Diversity Beliefs Scale (GSDB) to measure both essentialist and social constructionist beliefs about gender/sex that are pertinent to attitudes about gender/sex minorities. My goals included: (a) Constructing a valid, reliable scale that can be used broadly in research on gender/sex diversity and/or prejudice, (b) Determining the latent structure

of gender/sex essentialism as it pertains to gender/sex minorities, rather than just cisgender women and men, and (c) Assessing how various gender/sex diversity beliefs link to prejudice against gender/sex minorities and gender/sex attitudes more broadly. I conducted three studies to address my goals: In Study 1, I created a preliminary version of the GSDB and did an exploratory study to determine its factor structure. In Study 2, I assessed the stability of the factor structure via confirmatory factor analysis and examined criterion-related validity, including links between the GSDB and prejudice against gender/sex minorities and measures establishing concurrent and divergent validity. Finally, in Study 3, I established the test-retest reliability of the GSDB. Ultimately, I intended for my research to illuminate variation in current understandings of the nature of gender/sex and its implications for prejudice and affirmation of gender/sex minorities.

Item Generation and Refinement

Content Categories

I developed content categories to guide item generation for the GSDB based on a review of prior literature on essentialist and social constructionist beliefs about social categories, as well as literature on attitudes and beliefs about gender/sex minorities. These content categories represented different aspects of people's beliefs about gender/sex diversity. The purpose of developing content categories was not to facilitate predictions for a latent structure for the GSDB, but rather to help generate items that were appropriately representative of the range of essentialist and social constructionist beliefs individuals might have about gender/sex diversity.

Most content categories mirrored the dimensions of essentialism outlined by Haslam et al. (2000), but item generation was also shaped by scholarship related to prejudice against gender/sex minorities (e.g., Bettcher, 2007; Currah & Moore, 2009; van Anders et al., 2014). I

derived eight content categories from prior theory about essentialism of social categories: (1) Immutability (aspects of gender/sex cannot change), (2) Necessity (certain features are necessary for gender/sex category membership), (3) Naturalness (aspects of gender/sex are natural), (4) Inherence (aspects of gender/sex have a deep-seated reality), (5) Informativeness (aspects of gender/sex allow for accurate inferences about people), (6) Uniformity (people of the same gender/sex are similar), (7) Exclusivity (gender/sex is binary and categories are mutually exclusive), and (8) Cultural/Historical Stability (gender/sex categories are the same across cultures and historical periods). For all categories, I included both essentialist and social constructionist beliefs.

In addition to the above, I included items in two novel categories: Authenticity (some gender/sex category members are more real or authentic than others) and Eliminativism (getting rid of aspects of gender/sex from society is desirable). I included Authenticity because theory and historical evidence alike suggest that beliefs about gender/sex minorities' identities being inauthentic or fraudulent are especially salient and are strongly tied to prejudice (Bettcher, 2007; Currah & Moore, 2009). I included eliminativism because of my interest in representing a broad range of social constructionist beliefs in addition to essentialist beliefs, and because eliminativism is a salient part of scholarly and popular discourses about feminism and gender/sex diversity (Koenig & Richeson, 2010; Mikkola, 2017).

Content Validity

Concurrent with development of the content categories, I generated an extensive list of items to populate each category. Dr. van Anders and I discussed and refined the list. Then, several undergraduate and graduate lab members offered suggestions on items, and I refined the list further.

I consulted gender/sex minority individuals to help establish content validity of scale items (Morrison et al., 2017). Gender/sex minority individuals who have critically engaged with their social positions can possess especially valuable perspectives on gender/sex diversity that I might not, as a cisgender person (Harding, 2004). Transgender, non-binary, and gender/sex diverse individuals ($N = 10$) were recruited via a post on my personal Facebook page to provide feedback on scale items via an online survey. Individuals rated each item on two Likert-style 5-point scales assessing the item's relevance to the scale and its clarity in phrasing and meaning. Individuals also were able to give qualitative feedback about each content category and commented on the representativeness of the whole scale to beliefs about gender/sex diversity. Individuals were compensated with $50 Amazon gift cards for their time and expertise. I revised scale items based on individuals' ratings and qualitative feedback, focusing on items that had a low mean rating (i.e., less than 4.0) for relevance and/or clarity.

Next, I solicited feedback from academic experts on essentialism, trans-prejudice, and/or non-binary gender/sex ($N = 8$; see *Acknowledgments* section). Academic experts did not receive financial compensation. I used the same online survey, and again I revised items with low relevance and/or clarity ratings and based on qualitative feedback. In addition to other revisions, academic experts' feedback led to the removal of one content category labeled "Social Significance," which I originally created to address beliefs about power, privilege, and oppression, but feedback suggested was too conceptually distinct from essentialist and social constructionist beliefs and potentially difficult for many cisgender participants to understand. After this last round of revisions, I had an 86-item list which I used in Study 1 (Appendix A).

Study 1: Exploratory Factor Analysis

The goals of my first study were to determine the factor structure of the GSDB and to reduce the preliminary item list to a shorter final list. I also intended to examine the GSDB's concurrent validity with transphobia and divergent validity with social desirability. I predicted that GSDB factors would correlate moderately highly with transphobia, which would support the idea that the GSDB measures related but separable constructs.

Participants

I recruited participants (N = 304) from Amazon Mechanical Turk (MTurk) using CloudResearch, which allowed me to recruit experienced MTurk workers (i.e., minimum of 100 tasks and task approval rate of 95%; Litman, Robinson, & Abberbock, 2017; Peer, Vosgerau, & Acquisti, 2014). MTurk samples provide greater validity for research on sociopolitical attitudes than other convenience sample alternatives (e.g., introductory psychology students), particularly due to greater variation in age, socioeconomic status, and geographic location (Clifford et al., 2015). Participants were recruited to participate in a 15-20 minute online survey about how they think about gender. I had less than 1% missing data on the GSDB; only one participant had > 5% missing data and therefore was excluded, leaving a final sample size of N = 303 (Tabachnick & Fidell, 2013). I performed expectation maximization to impute missing values. Participants ranged in age from 19 to 72 (M = 34.4, SD = 10.2). See Table 3.1 for demographics.

Measures

Gender/Sex Diversity Beliefs Scale (GSDB)

Participants completed the 86-item version of the GSDB. Items included essentialist and social constructionist beliefs about gender/sex from 10 content categories (Immutability, Authenticity, Necessity, Naturalness, Inherence, Informativeness, Uniformity, Exclusivity,

Eliminativism, Cultural/Historical Stability). Participants rated their agreement with each item on a Likert scale (1 = strongly disagree to 7 = strongly agree).

Genderism and Transphobia Scale—Revised (GTS-R; α = .96; Hill & Willoughby, 2005; Tebbe, Moradi, & Ege, 2014).

The GTS-R is a 22-item version of the GTS which consists of transphobia/genderism (17 items) and gender-bashing (5 items) factors. Transphobia/genderism items cover moral opposition to gender variance, discomfort, and disgust (e.g., "If I found out that my best friend were changing their sex, I would freak out" and "Masculine women make me feel uncomfortable"). Gender-bashing items cover violent behaviors toward transgender and gender/sex diverse individuals (e.g., "I have beat up men who act like sissies"). Items are rated on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree).

Marlowe-Crowne Social Desirability Scale (MCSDS; Crowne & Marlowe, 1960; Reynolds, 1982).

Participants completed the 13-item short form C of the MCSDS, which measures participants' tendencies toward socially desirable responding. Items describe socially desirable but uncommon behaviors, such as "I am always courteous, even to people who are disagreeable." Participants rated whether each item was true or false of them. For each item, I coded the socially desirable option as 1 and the other option as 0. Participants' responses were summed; higher scores reflect more socially desirable responding.

Results

Exploratory Factor Analysis

I conducted exploratory factor analysis (EFA) using principal axis factoring extraction and a direct oblimin rotation. The Kaiser-Meyer-Olkin measure of sampling adequacy was .95

and Bartlett's test of sphericity was significant ($p < .001$), which indicates that the data are very well suited for factor analysis. Factor correlations were all low, so I performed the EFA again using a Varimax rotation; results presented here are from this second EFA (Tabachnick & Fidell, 2013).

The EFA extracted 15 factors with eigenvalues greater than 1. In order to determine how many factors to retain, I conducted a parallel analysis (O'Connor, 2000). The parallel analysis suggested a six-factor solution, with which I proceeded. This six-factor solution explained 56.19% of the variance. I selected items for the final version of the scale based on three criteria: high factor loadings (all were greater than 0.5), low cross-loadings (all loadings were more than 0.15 greater than the highest cross-loading), and parsimony (e.g., if two items fit the other criteria but were highly similar content-wise, only one was retained).

The first factor, which I labeled "Affirmation," had an eigenvalue of 31.98 and accounted for 37.19% of the variance. This factor included items from all content domains except Uniformity, Inherence, and Informativeness. Items associated with recognizing the existence of gender/sex diversity loaded positively; those associated with denying gender/sex diversity loaded negatively. I retained 14 items, including 1-3 items from each content category that loaded with the factor (i.e., Immutability, Necessity, Exclusivity, Cultural/Historical Stability, Naturalness, Authenticity, and Eliminativism). I included more items from content categories in which proportionally more items loaded very highly with the factor (e.g., Exclusivity), and fewer from those that had fewer items that loaded with the factor (e.g., Eliminativism). I only included items that loaded positively with the factor to maximize internal reliability and conceptual uniformity within the factor; this led to the factor being comprised primarily of social constructionist beliefs,

but also some essentialist beliefs about the naturalness and inherence of gender/sex minority identities.

The second factor, which I labeled "Gender Normativity" had an eigenvalue of 6.13 and accounted for 7.13% of the variance. This factor consisted of items from the Necessity and Authenticity content categories about the importance of femininity for women and masculinity for men and the inauthenticity of non-normative gender expressions (e.g., feminine men). Four items were retained based on my criteria.

The third factor, which I labeled "Uniformity," had an eigenvalue of 3.54 and accounted for 4.12% of the variance. This factor consisted primarily of items from the Uniformity content category. It also included some Authenticity and Informativeness items, although factor loadings for these items were all moderate and all cross-loaded with other factors, so only Uniformity items were retained.

The fourth factor, which I labeled "Surgery", had an eigenvalue of 2.57 and explained 2.99% of the variance. This factor consisted of two Authenticity items about genital surgery as a necessary precondition for a person to "truly" transition gender/sexes; both were retained.

The fifth factor, which I labeled "Upbringing", had an eigenvalue of 2.25 and explained 2.61% of the variance. This factor consisted of three Immutability items about the role of upbringing and early experiences in determining gender/sex. I retained two of the three items; one was eliminated for parsimony.

The sixth factor, which I labeled "Biology & Gender", had an eigenvalue of 1.86 and explained 2.16% of the variance. This factor consisted of three Naturalness items about the role of biology in shaping gender (femininity, masculinity, and gender diversity). I retained two of

the three items; one item about the role of biology in non-binary identities was eliminated for a high, positive cross-loading with the Affirmation factor.

I performed a final EFA on the retained items, which yielded the same 6 factor structure and explained 69.27% of the variance (Table 3.2). When performing the final EFA with a direct oblimin rotation, some of the factor correlations rose above the threshold for assuming orthogonality. However, the factor structure was the same regardless of whether I applied a direct oblimin or varimax rotation; the relative magnitude of eigenvalues for the second through sixth factors changed slightly when using the direct oblimin, but all items loaded with the same factors. Factor loadings listed in Table 3.2 are from the varimax rotation.

Criterion-Related Validity

I analyzed criterion-related validity of the GSDB by examining correlations between the GSDB factors, social desirability, and genderism/transphobia (Table 3.3). Most GSDB factors did not correlate with the social desirability, as expected. However, Gender Normativity and Uniformity each had small, significant positive correlations with social desirability (r = .12 for both).

I observed significant correlations between all GSDB factors and genderism/transphobia except for the Upbringing (r = .06) and Biology & Gender (r = .10) factors. Notably, correlations varied from the moderate level I predicted (Uniformity, r = .52; Surgery, r = .45) to high (Affirmation, r = -.69; Gender Normativity, r = .80).

Study Discussion

I tested the factor structure of the GSDB and derived a six-factor structure. One factor, Affirmation, explained the majority of the variance and included items from most content categories. Notably, the content categories that did not load with the Affirmation factor (i.e.,

Informativeness, Inherence, and Uniformity) all are typically associated with entitativity beliefs (i.e., beliefs about groups as bounded, homogenous entities; Haslam et al., 2000). This might indicate that judgments of the entitativity of gender/sex minorities and majorities might not be an especially salient and/or coherent aspect of people's beliefs about gender/sex diversity. Other factors included Gender Normativity, Uniformity, Surgery, Upbringing, and Biology & Gender. All factors except Upbringing and Biology & Gender were strongly associated with trans-prejudice. Correlations between the Genderism and Transphobia Scale and the Affirmation and Gender Normativity factors were stronger than predicted. One possible explanation is that because the Genderism and Transphobia Scale measures both affective and cognitive prejudice toward transgender and gender/sex diverse individuals – including some essentialist beliefs – these factors actually are measuring overlapping constructs. Therefore, I decided to include purely affective measures of prejudice (i.e., feeling thermometers) in Study 2 to further assess the GSDB's links to prejudice. Feeling thermometers also allowed me to examine GSDB factors' links to different gender/sex groups separately.

Study 2: Confirmatory Factor Analysis and Criterion-Related Validity

My goals for my second study were to assess the stability of the GSDB factor structure with a new sample and to examine criterion-related validity with relevant personality variables and political ideologies. I also aimed to replicate my finding that some GSDB factors were linked to trans-prejudice and expand on it by examining links between the GSDB and feelings toward a range of different gender/sexes individually.

Participants

Again, I recruited participants (N = 300) from MTurk using CloudResearch. Participants ranged in age from 18 to 72 (M = 37.8, SD = 12.1). See Table 3.1 for demographics. Participants

were recruited to participate in a 15-20 minute online survey about social and political beliefs. All items for all scales in the survey had less than 1% missing data; only one participant had > 5% missing data and therefore was excluded, leaving a final sample size of $N = 299$. I performed expectation maximization to impute missing values.

Measures

Gender/Sex Diversity Beliefs Scale (α = .85)

Participants completed a 27-item version of the GSDB (see Table 3.2 for item-level descriptive statistics). The distributions for all items were approximately normal, except for "Masculine women are not truly women" which displayed unacceptably high kurtosis; this item was deleted from the scale. Three other items were ultimately deleted from the scale (see *Confirmatory Factor Analysis* and Study 3). Internal reliabilities for final versions of individual factors were: α = 0.96 (Affirmation), α = 0.72 (Gender Normativity), α = 0.72 (Uniformity), α = 0.91 (Surgery), α = 0.75 (Upbringing), and α = 0.78 (Biology & Gender).

Right-Wing Authoritarianism (RWA; α = .94; Altemeyer, 1981; Zakrisson, 2005).

RWA measures authoritarian attitudes and beliefs (e.g., "Our country desperately needs a mighty leader who will do what has to be done to destroy the radical new ways and sinfulness that are ruining us"). I chose to assess the concurrent validity of the GSDB with RWA because of evidence of strong links between RWA and essentialism (Haslam & Levy, 2006; Keller, 2005). I used a 15-item revised version developed by Zakrisson (2005) to assess RWA in a form that is less contingent on attitudes toward specific groups (e.g., atheists, lesbian and gay individuals) than the original. Participants rated their feelings toward each item on a scale from 1 (very negative) to 7 (very positive).

Social Dominance Orientation (SDO; α = .95; Ho et al., 2015).

SDO assesses individuals' general preference for or against social inequality. I used the SDO_7, a 16-item scale. Items include: "Some groups of people are simply inferior to other groups" and "Inferior groups should stay in their place." Participants are instructed to rate their feelings about each statement from 1 (very negative) to 7 (very positive). Similar to RWA, prior research has suggested positive links between SDO and essentialism (Haslam & Levy, 2006; Keller, 2005).

Conservatism (α = .91; Pratto, Sidanius, Stallworth, & Malle, 1994).

Participants rated their political orientation on "foreign policy issues," "economic issues," and "social issues" separately, on a scale of 1 (very liberal) to 7 (very conservative), with the midpoint labeled "middle of the road." A composite conservatism score was calculated by averaging their scores on the 3 items.

Need for Closure Scale (α = .92; Roets & Van Hiel, 2011b; Webster & Kruglanski, 1994).

The Need for Closure (NFC) scale consists assesses individuals' tolerance for ambiguity, decisiveness, closed-mindedness, and need for predictability and order. NFC has been described as a basic form of motivated cognition that leads to prejudice via essentialism (Roets & Van Hiel, 2011a). I used a 15-item short version (Roets & Van Hiel, 2011b) which contains items including: "I dislike unpredictable situations" and "When I am confused about an important issue, I feel very upset." Responses were measured via 6-point Likert scales (1 = completely disagree, 6 = completely agree).

Gender Essentialism Scale (GES; α = .95; Skewes, Fine, & Haslam, 2018).

The GES is a 25-item scale measuring essentialist beliefs about women and men. The GES focuses on beliefs about differences between women and men. For example, "Men and women have different abilities" and "Fathers have to learn what mothers are able to do

naturally." I intended to assess whether the GES and GSDB measure divergent forms of gender/sex essentialism.

Gender/Sex Feeling Thermometers

Participants rated their feelings toward gender/sex groups on a scale from 0 to 100 and were instructed to imagine the scale as a thermometer, with higher numbers indicating warmth or favorability, and lower numbers indicating coldness or unfavorability (Norton & Herek, 2013). There were feeling thermometers for 11 gender/sex categories: cisgender women, cisgender men, non-binary individuals, transgender women, transgender men, women in general, men in general, feminine men, masculine men, feminine women, and masculine women. I chose these groups in order to separately assess attitudes toward various gender/sex minority and majority groups.

Results

Confirmatory Factor Analysis

I conducted confirmatory factor analysis on the GSDB using MPlus version 8.2 (Muthén & Muthén, 2019). I tested multiple models, each using the ML estimator. In one model, I tested the factor structure I found in Study 1 (GSDB-Full), excluding the Biology & Gender factor which was dropped from the scale due to low test-retest reliability (see Study 3).[4] I also analyzed the Affirmation factor on its own (GSDB-Affirm). I did so because I anticipate that some researchers who only want to measure affirming beliefs about gender/sex diversity might use the Affirmation factor on its own in future work (see General Discussion). Further, the Affirmation

[4] I originally tested the full six-factor model. However, following the exclusion of the Biology & Gender factor based on its low test-retest reliability in Study 3, I re-ran my models without that factor. All GSDB-Full results reported in this paper are based on a five-factor model.

factor comprises the bulk of the GSDB, both in terms of content and theoretical significance, so some researchers might exclude the minor factors (i.e., Gender Normativity, Uniformity, Surgery, and Upbringing) for parsimony.

I tested a two-factor model (GSDB-2) as a theoretical alternative to the GSDB factor structure I had previously derived (Kline, 2015). my rationale for testing this model was to determine whether a more parsimonious structure might fit the GSDB. In the EFA in Study 1, the Affirmation factor explained a very large proportion of the variance and was strongly negatively correlated with trans-prejudice, whereas all other factors that significantly correlated with trans-prejudice correlated positively (Table 3.3). Therefore, it is plausible that the scale might actually assess only two types of beliefs: those negatively associated with trans-prejudice (i.e., Affirmation) and those positively associated with trans-prejudice (i.e., Gender Normativity, Uniformity, and Surgery). Because the Upbringing factor did not correlate with the GTS-R, it was excluded from this model.

Fit indices for all three models are listed in Table 3.4. I examined several measures of model fit (Schermelleh-Engel et al., 2003), including: the χ^2 test, comparative fit index (CFI), Tucker-Lewis Index (TLI), root mean square error of approximation (RMSEA) and its 90% confidence interval, and standardized root mean square residual (SRMR). I also examined the χ^2/df ratio, because all chi-square tests were significant, which is common with large sample sizes (Schermelleh-Engel et al., 2003; but see Kline, 2015)

The GSDB-Full model showed acceptable fit across indicators, χ^2 (265) = 685.32, $p <$ .001, χ^2/df = 2.59, CFI = .92, TLI = .91, SRMR = .07, RMSEA = .07. However, the item, "Transgender men can only truly be men if they look and behave in masculine ways," on the Gender Normativity factor, had an unacceptably low factor loading (Saris et al., 2009). Also,

modification indices suggested multiple possible misspecifications in the model involving this item. Therefore, this item was deleted from the scale. To further improve fit, I allowed errors to correlate between a pair of items with a high modification index: “Non-binary identities are valid” and “Non-binary identities have always existed” (Affirmation). my final model fit the data well, χ^2 (281) = 553.25, $p < .001$, $\chi^2/df = 2.35$, CFI = .94, TLI = .93, SRMR = .05, RMSEA = .07 (Figure 3.1).

Similar to the GSDB-Full, GSDB-Affirm also fit the data well, χ^2 (76) = 204.90, $p < .001$, $\chi^2/df = 2.70$, CFI = .96, TLI = .96, SRMR = .03, RMSEA = .08. I allowed error terms to correlate between the same two items about non-binary identities as for GSDB-Full. Notably, some indices (CFI, TLI, SRMR) showed excellent fit of this model to the data, whereas the RMSEA indicated just acceptable fit (Schermelleh-Engel et al., 2003).

Finally, the theoretical alternative model, GSDB-2, exhibited poor fit to the data across all fit indices, χ^2 (187) =906.35, $p < .001$, $\chi^2/df = 4.85$, CFI = .85, TLI = .83, SRMR = .11, RMSEA = .11 (DeVellis, 2012). Modification indices suggested allowing error terms to correlate between the two Surgery items and each of the Uniformity items, which would ultimately restructure the model to resemble GSDB-Full. Therefore, I rejected GSDB-2 as an alternative model.

Concurrent and Divergent Validity

I examined correlations between GSDB factors and several theoretically related constructs using $\alpha = 0.05$ to determine significance (Table 3.6). Affirmation exhibited significant and strong negative correlations with SDO (r = -.52), RWA (r = -.61), GES (r = -.65), and conservatism (r = -0.63). Gender Normativity significantly correlated positively with SDO (r = .45), RWA (r = .60), NFC (r = .14), GES (r = .65), and conservatism (r = .47). Uniformity also

significantly correlated positively with SDO (r = .25), RWA (r = .39), GES (r = .54), and conservatism (r =.29). Surgery had small, significant positive correlations with SDO (r = .21), RWA (r = .19), GES (r = .25), and conservatism (r = .19). Upbringing did not significantly correlate with any other constructs.

Gender/Sex Group Attitudes

I examined correlations between each of the GSDB factors and 11 gender/sex groups using $\alpha = .05$ to determine significance (Table 3.5). All the same factors that significantly correlated with the GTS (Affirmation, Gender Normativity, Uniformity, and Surgery) correlated with feeling thermometers about gender/sex minorities, and correlations were in the same direction. Upbringing also remained uncorrelated with prejudice toward gender/sex minorities. Notably, GSDB factors displayed smaller correlations with attitudes toward gender/sex minorities than they did with the GTS in Study 1, as I expected.

Affirmation was significantly and strongly associated with positive feelings toward gender/sex minorities ($.60 > r\text{'s} > .70$), suggesting that affirming beliefs about gender/sex diversity have a strong relationship with feelings toward gender/sex minorities but they are not entirely overlapping constructs. I observed a very high correlation (r = .80) between Gender Normativity and the GTS in Study 1, suggesting convergent validity of the Gender Normativity factor with the GTS (Table 3.3). However, Gender Normativity had a non-convergent, significant relationship to feeling thermometers in the present study ($-.45 > r$'s $> -.55$), suggesting it is a related but separable construct from feelings toward gender/sex minorities.

In addition to prejudice toward transgender and non-binary individuals, I examined correlations between GSDB factors and feelings toward gender diverse women and men (with cisgender/transgender status unspecified). Affirmation was significantly positively correlated

with feelings toward feminine men (r = .46) and masculine women (r = .43). Gender Normativity was significantly negatively correlated with feelings toward masculine women (r = -.45) and feminine men (r = -.50). Uniformity had a significant, weak negative relationship with feelings toward masculine women (r = -.22) and feminine men (r = -.23), as did Surgery (feminine men: r = -.17; masculine women: r = -.13).

I also examined the relationship of GSDB factors with feelings toward gender/sex majorities (cisgender women and men), women and men in general, and feminine and masculine men and women (who might be gender/sex majorities or minorities, depending on factors that were not specified in my prompts including self-identification and status as cisgender or transgender, among others). Affirmation had small, significant positive correlations with feelings toward cisgender women (r = 0.16) and cisgender men (r = 0.13), and no other factor did. Gender Normativity had small, significant positive relationships with feelings toward men in general (r = 0.15), feminine women, (r = 0.16), and masculine men (r = 0.23). Uniformity had small, significant positive relationships with feelings toward men in general (r = 0.19), masculine men (r = 0.19), and feminine women (r = 0.15).

Incremental Validity

To determine the incremental validity of the GSDB for predicting attitudes about gender/sex minorities beyond related measures, I conducted hierarchal linear regression with the measures examined for concurrent validity (social dominance orientation, right-wing authoritarianism, need for closure, gender essentialism, and conservatism) entered at Step 1 and summed scores for each GSDB factor at Step 2 (Table 3.7). Feelings toward transgender women, transgender men, and non-binary individuals were all very highly correlated (.87 > *r's* > .97), so

I used a summed average of the three variables as my outcome variable (i.e., feelings toward gender/sex minorities).

At Step 1, the model was significant $F(5, 289) = 37.83$, $p < .001$, adjusted $R^2_{adj} = .39$. When the GSDB was added to the model, it remained significant and explained a significantly greater portion of the variance in feelings toward gender/sex minorities, $F(10, 284) = 31.30$, $p < .001$, $R^2_{adj} = .52$. Affirmation, $\beta = .50$, $p < .001$, and Gender Normativity, $\beta = .20$, $p = .001$ factors were both significant predictors. Notably, gender essentialism (Skewes et al., 2018) was a significant predictor at Step 1, but not at Step 2, supporting the conclusion that gender/sex diversity beliefs uniquely explain variance in feelings toward gender/sex minorities as compared to essentialist beliefs about differences between women and men.

Study 2 Discussion

In this study, I found the factor structure of the GSDB remained stable with a new sample. And, I confirmed that the Affirmation factor exhibits good fit when modeled on its own. The GSDB exhibits concurrent validity with theoretically related constructs, including social dominance, right-wing authoritarianism, and conservatism. I also observed that most GSDB factors exhibited strong correlations with the gender essentialism scale from Skewes et al. (2018). However, these correlations were not so strong as to suggest that the GSDB and gender essentialism scale measure identical constructs; therefore, I interpret these results as evidence that the GSDB is not redundant with measures of gender/sex essentialism that focus on differences between (typically implicitly assumed) cisgender women and men.

I also replicated my finding of links between GSDB factors and prejudice with a different measure that is able to disaggregate gender/sex groups (i.e., feeling thermometers). As I predicted, correlations between the GSDB and gender/sex minority feeling thermometers were

similar to correlations between the GSDB and genderism/transphobia, but generally lower – particularly for the Gender Normativity factor. This is likely because the Genderism and Transphobia Scale measures both cognitive and affective prejudice, and thus somewhat overlaps with the GSDB, whereas feeling thermometers are a purer measure of affective prejudice and do not overlap with the GSDB. Therefore, I conclude that the GSDB measures beliefs about gender/sex that are highly relevant to feelings toward gender/sex minorities, but separate. Further, I found evidence of the incremental validity of the GSDB, particularly the Affirmation and Gender Normativity factors, for predicting attitudes toward gender/sex minorities over a number of measures related to hierarchal and conservative sociopolitical beliefs. Future research on prejudice against transgender and/or non-binary people will benefit from incorporating the GSDB in addition to commonly studied sociopolitical ideology variables, such as social dominance orientation.

Finally, I also examined links between GSDB factors and feelings toward gender/sex majorities and other gender/sex groups for exploratory purposes. The Affirmation factor positively correlated with feelings toward gender/sex majorities (i.e., cisgender women and cisgender men) and groups that might be labeled as either majorities or minorities depending on contextual factors (i.e., feminine men and masculine women), and did not correlate negatively with feelings toward any group. This suggests that affirmation of gender/sex diversity does not involve antipathy toward gender/sex majorities, at least in a gender/sex majority sample, and might actually be associated with more positive feelings toward gender/sex groups overall. Gender Normativity and Uniformity, which were both associated with prejudice toward gender/sex minorities, feminine men, and masculine women were also associated with positive feelings toward men, and masculine men in particular. Further research might investigate links

between Gender Normativity and Uniformity beliefs and other constructs; for example, an investigation of links to femmephobia (Hoskin, 2019) to better understand why these factors are simultaneously associated with warm feelings toward some groups of men (i.e., masculine men, men in general) and not others (i.e., transgender men, cisgender men, feminine men).

Study 3: Test-Retest Reliability

I calculated two-week and four-week test-retest reliability of the GSDB using two separate samples. I first examined two-week test-retest reliability with a sample of MTurk participants (Study 3a; $N = 48$). Sample size was determined based on recommendations from Walter, Eliasziw, & Donner (1998). More recent recommendations suggest larger samples to establish test-retest reliability (i.e., $N > 100$; Terwee et al., 2012); therefore, I also examined GSDB data collected at two time points four weeks apart from another sample (Study 3b; $N = 500$; Schudson et al., 2020).

Study 3a

The two-week test-retest reliability of Affirmation was excellent, *ICC* = 0.97, 95% CI (0.94, 0.98). Gender Normativity, *ICC* = 0.83, 95% CI (0.71, 0.90) and Surgery, *ICC* = 0.89, 95% CI (0.81, 0.93) exhibited good reliability. Uniformity *ICC* = 0.69, 95% CI (0.51, 0.81) and Upbringing, *ICC* = 0.60, 95% CI (0.38, 0.75) exhibited low, albeit potentially acceptable reliability. Biology & Gender exhibited unacceptably low reliability, *ICC* = 0.24, 95% CI (-0.05, 0.48). For this reason, Biology & Gender was dropped from the GSDB and was not included in the study from which the four-week test-retest reliability data are drawn.

Study 3b

The four-week test-retest reliability of Affirmation remained excellent, *ICC* = 0.91, *95% CI* (0.89, 0.92). Gender Normativity, *ICC* = 0.82, *95% CI* (0.79, 0.85), and Surgery, *ICC* = 0.70,

95% CI (0.65, 0.74), each continued to exhibit good or acceptable test-retest reliability. And test-retest reliability for both Uniformity, *ICC* = 0.68, *95% CI* (0.63, 0.73), and Upbringing *ICC* = 0.56, *95% CI* (0.49, 0.61), remained questionable.

Overall, results from Study 3 suggests that participants' responses to the Affirmation factor displayed excellent consistency over time. The retained minor factors of the GSDB range from somewhat to very consistent over time.

General Discussion

In the present research, I constructed the Gender/Sex Diversity Beliefs Scale (GSDB), a scale measuring essentialist and social constructionist beliefs about gender/sex diversity. The final GSDB consists of five factors: Affirmation, Gender Normativity, Uniformity, Surgery, and Upbringing and exhibits strong psychometric properties, including good model fit and test-retest reliability ranging from acceptable to excellent. All GSDB factors except Upbringing were associated with feelings toward gender/sex minorities that were either negative (Gender Normativity, Uniformity, Surgery) or positive (Affirmation). My findings show that the GSDB measures essentialist and social constructionist beliefs about gender/sex that are distinct from, although linked to, other constructs including affective trans-prejudice and essentialist beliefs about differences between women and men. And, the GSDB demonstrated concurrent validity with other measures of sociopolitical ideology.

My research clarifies the latent structure of beliefs about the nature of gender/sex, including essentialist and social constructionist beliefs. I tested items relevant to a broad range of dimensions of essentialism identified in previous literature and novel dimensions uniquely relevant to gender/sex diversity (Bettcher, 2007; Haslam et al., 2000; van Anders et al., 2014). Essentialist attitudes about social categories have often factored into naturalness and entitativity

dimensions in prior research, with variation across studies and target social categories (Haslam et al., 2000). The GSDB, on the other hand, is composed of one large factor (Affirmation) that includes most dimensions of essentialism except a few entitativity-related aspects (i.e., uniformity, informativeness, and inherence), and several other smaller factors that measure specific kinds of prejudice-linked or neutral beliefs. The Affirmation factor included items that are particularly relevant to contemporary discourse on gender/sex diversity (i.e., the beliefs that were most identifiably trans-affirming or anti-trans). Other factors measured beliefs about gender/sex diversity that are important but less rhetorically central to public debates over trans rights (e.g., Uniformity). Therefore, it is likely that people's essentialist and social constructionist beliefs about gender/sex diversity are currently primarily structured around their imagined relationship to affirmation or denial of the existence of gender/sex diversity.

I found that gender/sex diversity affirming beliefs were mostly social constructionist, although some were essentialist. In particular, a few essentialist items that focused on the naturalness and cultural/historical universality of gender/sex minority identities loaded positively on the Affirmation factor (e.g., "Non-binary gender identities have always existed"). This finding mirrors previous research on essentialism of sexual minority identities in which beliefs about the naturalness and universality of minority sexual orientations are associated with positive attitudes toward sexual minorities (Haslam & Levy, 2006). A notable distinguishing feature of these affirmation-linked essentialist beliefs is that they essentialize minority identities themselves (i.e., minority identities have an underlying reality) rather than the social category (i.e., gender/sex or sexual orientation themselves have an underlying reality that is incompatible with minority self-understandings and experiences). Whether essentialist beliefs are politically valuable for gender/sex minorities, regardless of associations with positive attitudes, is an interesting site for

future research. Research on essentialism and sexual minority identities has found negative consequences of essentialist, "born this way" explanations of sexual minority identity at legal and structural levels, albeit some evidence of positive effects for individual mental health (Diamond & Rosky, 2016; Morandini et al., 2015). Further evidence is needed to understand the implications of essentialist, affirmation-linked beliefs about gender/sex diversity for gender/sex minorities.

One notable limitation of my research is that it indexes a current set of beliefs about gender/sex diversity that resonate with a predominantly white, formally educated, U.S.-based sample at the time of data collection (i.e., late 2018 - early 2019). Which kinds of beliefs about gender/sex diversity are prevalent – and how they link to prejudice and other attitudes – might be different depending on sample characteristics and might change across time and place (though this could be argued of any measure that is tied to sociopolitical attitudes). Still, the GSDB will need to be validated in different contexts and potentially modified or updated for use at different points in time or with different populations.

Future research might also examine the predictive validity of the GSDB for outcomes relevant to sociopolitical recognition of gender/sex minority identities and experiences. Some potentially fruitful questions include: Which GSDB factors, if any, predict support or opposition to trans-inclusive policies about access to gendered social spaces or athletics? Or, does the Surgery factor predict support restrictive policies about obtaining a new birth certificate or ID with an updated gender marker, which often require individuals to have undergone genital surgery (van Anders et al., 2014)?

Additionally, a strength of the GSDB for future research is its adaptability. The full GSDB exhibits mostly strong psychometric properties, although test-retest reliability for a few of

the minor factors (i.e., Uniformity and Upbringing) is questionable. The Affirmation subscale exhibits very strong psychometric properties and includes items representative of most dimensions of essentialist and social constructionist beliefs about social categories. The Affirmation subscale is also a strong predictor of feelings toward gender/sex minorities, with evidence of incremental validity compared to gender essentialism, social dominance orientation, and other variables relevant to gender/sex attitudes. Therefore, the Affirmation subscale could be effectively used in future research on its own. The Affirmation subscale allows researchers to study beliefs about gender/sex diversity without exposing participants to highly stigmatizing content found in previous scales (e.g., Hill & Willoughby, 2005) that might lead to disengagement among gender/sex minority participants and their close others. Gender/sex diversity affirmation might have significant implications for outcomes such as self-perception, internalized stigma, and identity centrality, among others.

Conclusion

My research demonstrates that the GSDB is a reliable, valid measure of essentialist and social constructionist beliefs about gender/sex diversity. The Affirmation factor, comprised mostly of social constructionist beliefs, is strongly linked with positive feelings toward gender/sex minorities; the essentialist Gender Normativity, Uniformity, and Surgery factors are associated with negative feelings toward gender/sex minorities. This research advances our understanding of the cognitive basis of prejudice against gender/sex minorities and opens up new lines of inquiry into methods of fostering gender/sex diversity affirming beliefs and reducing prejudice-linked beliefs.

CHAPTER 5

Sexual Configurations Theory as an Intervention to Improve Attitudes Toward Gender/Sex Minorities

In Chapter 4, I described the development of the Gender/Sex Diversity Beliefs Scale (GSDB), a survey measure of essentialist and social constructionist beliefs about the nature of gender/sex, and I empirically demonstrated its relevance to understanding attitudes about transgender and non-binary people. In Chapter 5, I will describe an experimental test of an intervention to help gender/sex majorities cultivate affirming gender/sex diversity beliefs and positive attitudes toward gender/sex minorities. This intervention involved prompting cisgender participants to map their own gender/sexes via sexual configurations theory (SCT; van Anders, 2015). I will describe the implications of this research for intergroup contact theory, the role of self-knowledge in intergroup attitudes, and efforts to advance the sociopolitical equality of gender/sex minority individuals.

Sexual Configurations Theory

SCT is a recently introduced theoretical framework for describing and studying gender/sex and sexual diversity (van Anders, 2015). Among other aspects, SCT allows for disaggregating gender (i.e., sociocultural aspects linked to femininity, masculinity, and gender diversity), sex (i.e., biological aspects linked to femaleness, maleness, and sex diversity), and gender/sex (i.e., whole identities linked to gender and/or sex such as woman, man, genderqueer, agender, etc.) in individuals' own senses of self in addition to their partnered sexualities. SCT is modeled on three-dimensional diagrams that allow individuals to self-locate their gender/sexes

and partnered sexualities with attention to binary, nonbinary, and norm challenging aspects of a given sexual or gender/sex parameter, in addition to denoting the importance of that parameter, including whether it is important at all (Appendix C).

Recent empirical work with SCT has demonstrated that it can be efficacious for educating sexual and gender/sex minority individuals about sexual and gender/sex diversity as well as majority individuals (Abed et al., 2019; Beischel et al., 2020; Schudson et al., 2017). In these studies, participants located themselves on a series of SCT diagrams delineating individual gender/sex and/or partnered sexualities. By considering the specificity of their own location on each diagram relative to the full range of possible locations, participants reported understanding better how their sexualities and gender/sexes are situated within the diverse array of gender/sexes and partnered sexualities that people actually have. Notably, some sexual and gender/sex majority individuals have also reported that engaging with SCT caused them to reflect on their own experiences of social privilege (Abed et al., 2019). Abed et al. suggested that SCT might be particularly valuable as an intervention into prejudice against gender/sex and sexual minorities through incorporation into diversity workshops or other prejudice reduction efforts. But this remains to be seen.

SCT might be particularly effective at promoting affirming beliefs about gender/sex diversity because it is based in the lived experiences of gender/sex minority individuals. For instance, SCT allows for visualization of nonbinary gender/sex, temporality, and the theoretical independence of each facet of gender/sex, among others. These insights from gender/sex minorities' lived experiences contrast with many (although not all) essentialist ideas about gender/sex that are linked to prejudice against gender/sex minorities, as demonstrated in Chapter

4. SCT therefore provides a means of understanding gender/sex in ways that directly contrast the hegemonic understandings of gender/sex that underlie prejudice.

Reducing Prejudice Toward Gender/Sex Minorities

Prejudice reduction interventions aimed at anti-transgender prejudice have taken multiple forms in prior research, including education-based and humanizing interventions. Education-based interventions in previous studies have mostly been operationalized in highly didactic forms that focus on providing clinical information (e.g., describing gender dysphoria, mental health disparities, etc.). Typically, education-based interventions have shown inconsistent efficacy for reducing anti-transgender prejudice (Case & Stewart, 2013; Galinec & Korajlija, 2017; Mizock et al., 2017; Tompkins et al., 2015; Walch, Sinkkanen, et al., 2012). Humanizing interventions focus on individuals' affective connections to gender/sex minorities and anti-transgender prejudice. Often, humanizing interventions are based in intergroup contact theory, which stipulates that contact improves intergroup relations under particular, cooperative conditions (Allport, 1954; Pettigrew, 1998). These interventions typically use actual or simulated contact with gender/sex minorities via the sharing of personal narratives (Case & Stewart, 2013; Galinec & Korajlija, 2017; McDermott et al., 2018; Tompkins et al., 2015; Walch, Sinkkanen, et al., 2012). Some studies also incorporate perspective-taking to encourage gender/sex majorities to consider minority viewpoints and experiences (Broockman & Kalla, 2016; Tompkins et al., 2015).

In general, humanizing and intergroup contact-based interventions have been more consistently effective than education-based interventions. Across social categories, evidence suggests that intergroup contact is one of the most effective methods of prejudice reduction (Paluck & Green, 2009; Pettigrew, 1998; Pettigrew & Tropp, 2008; Tropp & Pettigrew, 2005b).

In the context of gender/sex minority prejudice reduction, correlational studies indicate that contact with transgender individuals is negatively linked to anti-transgender prejudice. These studies have found that cisgender people with some degree of contact with transgender people have less prejudiced attitudes than those with no contact (Barbir et al., 2017; Hoffarth & Hodson, 2018; King et al., 2009; Tadlock et al., 2017; Wang-Jones et al., 2017; Willoughby et al., 2010).

These findings of the relative efficacy of intergroup contact compared to education-based interventions raises the question of whether there is value in continuing to investigate education-based interventions at all. But, one important reason for the discrepancy in efficacy between contact-based and education-based interventions is how education has been operationalized. The interventions used in prior research might have failed to challenge and/or actually strengthened biologically essentialist, prejudice-linked beliefs about gender/sex by framing gender/sex identities as a niche, clinical issue (Tompkins et al., 2015; Walch, Sinkkanen, et al., 2012). In contrast, Case and Stewart (2013) utilized a relatively didactic intervention but, instead of focusing on clinical aspects, their intervention challenged myths about transgender identity, many of which were essentialist beliefs based in the natural attitude about gender (Bettcher, 2007; Garfinkel, 1967; Kessler & McKenna, 2000). They found that this approach was equally successful in reducing anti-transgender prejudice compared to two other interventions that exposed participants to transgender individuals' personal narratives. Therefore, I contend that education-based interventions could be equally effective as more affectively focused, humanizing interventions if they focused on exploring gender/sex diversity and fostering affirming beliefs, rather than presenting clinical and potentially medicalizing information about gender dysphoria.

Changing Prejudice Through Self-Knowledge

At present, the efficacy of dynamic, diversity-focused, education-based interventions has received little empirical attention. SCT might be an especially valuable framework because it centers gender/sex diversity in its construction – both its construction as a theory and in the structure of its diagrams. Further, SCT encourages individuals to deeply consider their own gender/sex identities and locate their identities among diverse possibilities. Seeing one's majority identity situated among diverse minority identities might help engender depathologizing views of gender/sex diversity by emphasizing the situated nature of all gender/sex locations – even majority ones. SCT is a unique education-based intervention in this respect: it educates participants about gender/sex diversity but also functions as a framework for self-knowledge.

Why might having cisgender people engage in an activity that facilitates knowing one's own gender/sex more deeply (i.e., SCT) affect their attitudes about other groups? First, self-concepts and perceptions of others are deeply intertwined (Crocker et al., 1987; Ehrlich, 1973). For instance, self-esteem in particular shapes people's motivations to endorse prejudice and affects the contexts in which prejudice can be mitigated (Crocker et al., 1987; Galinsky & Ku, 2004). For instance, prejudice can serve self-protective functions when people's self-concepts are threatened (Fein & Spencer, 1997). Outgroup derogation is a method of individual and collective self-esteem enhancement for ingroup members, because it strengthens distinctions between groups and concretizes hierarchy (Crocker et al., 1987). Diversity frameworks like SCT ask individuals to visualize their identities in a way that lacks clear intergroup boundaries at all. Therefore, it is possible that an SCT intervention might weaken distinctions between gender/sex groups and mitigate individuals' need for self-enhancement via prejudice. Although notably, there is a possibility that the lack of intergroup boundaries on an SCT diagram might induce a

status threat to gender/sex majorities, which could cause a backlash effect (i.e., greater prejudice).

At a broad level, SCT makes gender/sex diversity self-relevant for gender/sex majorities, who might otherwise view gender/sex diversity as completely disconnected from their own experience. Specifically, SCT allows individuals to directly visualize their own location within gender/sex diversity. Participants can indicate binary gender/sex identification with SCT (i.e., they do not have to indicate that they personally hold non-binary or non-normative identifications or experiences), but their marks are always positioned relative to all other gender/sexes. This relative positioning might increase majorities' perceptions of self-other overlap with gender/sex minorities (Galinsky et al., 2005). Further, people cognitively process self-relevant information preferentially to other kinds of information (Humphreys & Sui, 2015; Rogers et al., 1977). Therefore, the self-relevance effect of the SCT intervention might increase participants' uptake of SCT's gender/sex diversity framework.

Because SCT is rooted in self-knowledge, it can be completed by gender/sex majorities on their own. Some prior interventions have required gender/sex minorities to actively participate in interventions by telling their own stories of gender/sex transition to study participants (e.g., Walch et al., 2012). Overreliance on interventions that require gender/sex minorities to tell emotionally vulnerable personal narratives to majority audiences risks placing an excessive burden on minority individuals to end majorities' prejudice against them (White Hughto et al., 2015). These contact-based interventions in which gender/sex minorities tell personal narratives have shown efficacy in reducing prejudice (Walch, Sinkkanen, et al., 2012), and personal narrative remains an important tool for combatting prejudice. However, it is important to develop effective interventions that do not require gender/sex minority individuals

to perform the emotionally demanding labor of changing gender/sex majorities' hearts and minds. A broader range of effective interventions can help prevent the entire burden of ending prejudice against gender/sex minorities from falling on individual gender/sex minorities. And, in this respect, SCT holds significant promise.

Finally, it is important to consider the possibility that gender/sex majorities might not benefit from a gender/sex diversity framework like SCT because they view their own gender/sexes as simple. However, evidence suggests that many gender/sex majorities have feelings and identifications that branch from their gender/sex identity (Abed et al., 2019; Joel et al., 2014). Further, the context of SCT might especially encourage diverse identifications. The identity-based motivation framework (Oyserman, 2009; Oyserman et al., 2017) suggests that identities are dynamically constructed in context, rather than static entities that precede and determine social interactions and decision-making. The context of a broad, three-dimensional, visual space to locate one's own gender/sex might cue individuals to frame their identities in context-specific ways. People who typically would describe their own gender/sex solely as "woman" or "man" might consider a range of other elements in the context of an SCT gender/sex diagram (e.g., femininity, masculinity, relation to social norms, gender/sex strength, and bodily variation, among others) and self-locate in ways that incorporate those elements in different ways. Therefore, SCT might involve a process of self-discovery that facilitates self-description in nuanced ways.

Durable Prejudice Reduction

Can SCT have a lasting effect on attitudes about gender/sex minorities? Some evidence suggests that prejudice reduction effects can be durable across time under specific circumstances – in particular, when the intervention requires effortful cognitive processing and active, empathic

consideration of minority individuals' perspectives (Broockman & Kalla, 2016; Vezzali et al., 2012). SCT is highly effortful to engage with and stimulates majorities to consider minority individuals' viewpoints and experiences (Abed et al., 2019; Schudson et al., 2017). But, there remain many open questions about what makes a prejudice reduction intervention effective in the long-term or the short-term only. This knowledge gap is exacerbated by the fact that researchers do not often measure longitudinal outcomes of prejudice reduction interventions, especially brief, experimental interventions (Husnu & Crisp, 2010; Paluck & Green, 2009).

Examining longitudinal durability of prejudice reduction interventions is particularly necessary to understand the mechanisms through which prejudice reduction successfully occurs and persists. Prejudice is commonly understood as having deep roots in childhood upbringing and therefore highly resistant to change (Allport, 1954; Bigler & Liben, 2007). Also, prejudicial attitudes are often undergirded by beliefs about social categories that naturalize systems of power and domination that benefit majority groups (Keller, 2005; Mahalingam, 2007). Therefore, it is remarkable that some interventions have successfully reduced prejudice at all despite its deep roots and interconnections with broader beliefs about social categories. SCT might be well-positioned to have a longitudinal impact because it focuses on broadening the beliefs about gender/sex as a social category that underlie prejudice toward gender/sex minorities. Changes in beliefs about social categories might have implications extending far beyond a single laboratory session.

The Present Research

In this study, I investigated whether an SCT intervention can reduce gender/sex majorities' prejudice toward gender/sex minorities. I pre-registered the study's hypotheses, methods, and analysis plan with AsPredicted.org (#26145). Pre-registration is an emerging

practice in social psychology, and experimental sciences more broadly, that facilitates transparency in reporting the *a priori* assumptions, predictions, and plans guiding research (van 't Veer & Giner-Sorolla, 2016). I hypothesized that participating in a sexual configurations theory (SCT) based prejudice reduction intervention will increase positive feelings toward transgender and non-binary individuals in cisgender individuals. Further, I hypothesized that the prejudice reduction effect would be stronger for participants who map their own gender/sexes via SCT, compared to those who learn about SCT but do not use the diagrams, which would in turn be more effective than a neutral condition. Finally, I predicted that these effects would be evident at baseline and at follow-up four weeks later.[5]

Methods

Participants

I recruited participants ($N = 600$) to participate in a research study on their beliefs about gender using Amazon Mechanical Turk (MTurk) via CloudResearch (Litman et al., 2017). MTurk is well suited to collecting reliable, longitudinal, experimental data (Buhrmester et al., 2016; Stoycheff, 2016). Sample size was determined via Monte Carlo power analysis for mediation models (Schoemann et al., 2017), based on an expected retention rate of two-thirds of

[5] I also hypothesized that gender/sex diversity beliefs would mediate the relationship between experimental condition and feelings toward gender/sex minorities at follow-up. However, I later determined I could not properly examine mediation because there was no true pre-test measure of gender/sex diversity beliefs (i.e., I did not have data on change over time). I will examine gender/sex diversity beliefs as a mediator in a follow-up study.

participants from Time 1 to Time 2, as observed in other longitudinal studies that used MTurk for recruitment (Daly & Nataraajan, 2015; Stoycheff, 2016)

Study participants ranged in age from 18 to 76 (M = 40.33, SD = 12.17). They indicated their racial/ethnic, gender/sex, and sexual identities via free response, and I coded them into categories. See Table 4.1 for demographic information.

Measures

Gender/Sex Diversity Beliefs Scale (GSDB; (Schudson & van Anders, 2020)

The GSDB is a 23-item scale that measures essentialist and social constructionist beliefs about gender/sex pertinent to gender/sex minority identities (see Chapter 4; see Appendix B). I used summed scores on the Affirmation subscale (14 items; α = .96), which comprises the bulk of the GSDB and is the subscale most relevant to attitudes toward gender/sex minorities.

Feelings Thermometers

Feelings thermometers measure the valence of individuals' feelings toward particular groups from 0, coldest or least favorable, to 100, warmest or most favorable (see Chapter 4). I measured feelings toward the following gender/sex groups: transgender women, transgender men, non-binary individuals, feminine men, masculine men, feminine women, masculine women, cisgender women, cisgender men, men in general, and women in general. Feelings toward transgender women, transgender men, and non-binary people were all highly correlated with one another (r's > .9), so they were averaged to produce a composite score of feelings toward gender/sex minorities.

Modified Differential Emotions Scale (mDES; Fredrickson et al., 2003)

The mDES is a 20-item scale assessing positive and negative emotions. Participants rated how strongly they felt each of the emotions during the video and activity on a scale from 1 (not

at all) to 5 (extremely). I added an additional item, "connected to others different from me," to assess whether feelings of connectedness might play a role in the impact of the intervention.

Intergroup Contact with Gender/Sex Minorities

Three separate items assessed whether participants have a family member, friend, or acquaintance who is transgender and/or nonbinary. Contact with gender/sex minority individuals is associated with lower prejudice (Hoffarth & Hodson, 2018; King et al., 2009; Tadlock et al., 2017; Wang-Jones et al., 2017). In analyses, I grouped participants by those with any intergroup contact (i.e., responded "yes" to at least one of the three items; $n = 252$) and those with no intergroup contact ($n = 321$).

Procedure

Baseline

Participants were randomly assigned to one of three conditions. In the Diagrams condition, participants watched a 12-minute video providing information on gender, sex, and gender/sex and explaining how to map these dimensions on SCT diagrams, and then mapped their own gender/sexes on three, separate SCT diagrams (gender, sex, and gender/sex) using a digital drawing interface (Beischel et al., 2020). In the Video Only condition, participants watched the same video explaining SCT, but did not complete SCT diagrams themselves. Instead, they spent at least 5 minutes completing a word search with a neutral theme for hidden words (i.e., fruits and vegetables). This allowed the Video Only condition to control for the impact of self-locating one's gender/sex with SCT diagrams separately from learning about SCT and gender/sex more broadly through the instructional video. In the Neutral condition, participants watched a 12-minute neutral travel video that has been shown in prior research to have minimal impact on self-reported affect and arousal (Goldey & van Anders, 2011), and then

completed the same neutral word search as in the Video Only condition. The Neutral condition controlled for engaging with SCT at all, whether via instructional video and/or self-location on the diagrams. Finally, participants provided demographic information and completed all survey measures.

Follow-up

Participants were re-contacted four weeks later to notify them of their eligibility to complete the second part of the study. Retention was high (N = 518; 86.3% of the original sample). Participants completed a brief online survey consisting only of feeling thermometers and the GSDB.

Analysis

I used IBM SPSS 26.0 for data analysis. In all analyses, I excluded participants who straight-lined responses to scale measures (n = 9). I also excluded gender/sex minority participants (n = 18) because of my specific interest in assessing the impact of the intervention on cisgender individuals.

Statistical analyses varied from those that I pre-registered. Pre-registered analyses were suited to assessing change over time in attitudes; however, I ultimately designed the study such that I did not have measures of feelings toward gender/sex minorities or beliefs about gender/sex diversity prior to administration of the intervention. Therefore, I instead used analyses suited to assessing the impact of the intervention at baseline and the stability of effects at follow-up (i.e., univariate ANOVA).

Results

Prejudice Reduction at Baseline

I examined the effect of experimental condition on feelings toward gender/sex minorities and gender/sex diversity affirmation beliefs. Feelings toward gender/sex minorities did not significantly differ across the three conditions based on the omnibus test, $F(2, 570) = 2.71$, $p = .068$ $\eta^2_p = 0.009$ (Figure 4.1). Because the omnibus test was less theoretically meaningful than pairwise comparisons between the Diagrams condition and each of the other two conditions, and its marginal p-value raised the possibility that pairwise comparisons might reveal important patterns in the data, I proceeded to examine post-hoc tests. Post-hoc LSD tests suggested that participants in the Diagrams condition had more positive feelings toward gender/sex minorities than those in the Neutral condition, $p = .022$, but not in the Video Only condition, $p = .12$. The Video Only and Neutral conditions did not significantly differ, $p = .43$. Gender/sex diversity affirmation beliefs did not significantly differ across the three conditions based on the omnibus test, $F(2, 570) = 2.14$, $p = .12$, $\eta^2_p = 0.007$ (Figure 4.2). Post-hoc LSD tests suggested that participants in the Diagrams condition had more positive feelings toward gender/sex minorities than those in the Video Only condition, $p = .040$, but not in the Neutral condition, $p = .20$. Again, the Video Only and Neutral conditions did not significantly differ, $p = .43$.

Moderating Role of Intergroup Contact

I conducted pre-registered analyses exploring the role of intergroup contact as a moderator of the effect. I conducted a factorial 3x2 ANOVA with experimental condition and intergroup contact (i.e., any or none) as independent variables and feelings toward gender/sex minorities as the outcome. The model was statistically significant, $F(5, 567) = 13.99$, $p < .001$, $\eta^2_p = 0.11$. Intergroup contact had a significant, large effect on feelings toward gender/sex minorities, $F(1, 567) = 63.48$, $p < .001$, $\eta^2_p = 0.10$. The effect of experimental condition on feelings was non-significant, $F(2, 567) = 2.78$, $p = .063$, $\eta^2_p = 0.01$, as was the interaction of

intergroup contact and experimental condition, $F(2, 567) = .82$, $p = .44$, $\eta^2_p = 0.003$. I examined simple effects to determine if the Diagrams condition differed significantly from the other conditions based on intergroup contact. Among participants with some level of contact with gender/sex minorities, those in the Diagrams condition had significantly more positive feelings than those in the Video Only condition, $p = .025$, but not in the Neutral condition, $p = .063$. Among those who had no contact with gender/sex minorities, the Diagrams condition did not differ from Video Only, $p = .32$, or Neutral, $p = .78$.

I then conducted the same factorial 3x2 ANOVA (experimental condition and intergroup contact (i.e., any or none) as independent variables) but with affirming gender/sex diversity beliefs as the outcome. The model was also statistically significant, $F(5, 567) = 17.16$, $p < .001$, $\eta^2_p = 0.13$. Intergroup contact had a significant, large effect on affirming gender/sex diversity beliefs, $F(1, 567) = 81.98$, $p < .001$, $\eta^2_p = 0.12$. The effect of experimental condition was non-significant, $F(2, 567) = 2.08$, $p = .13$, $\eta^2_p = 0.007$, as was the interaction of intergroup contact and experimental condition, $F(2, 567) = .13$, $p = .88$, $\eta^2_p = .001$. I examined simple effects to determine if the Diagrams condition differed significantly from the other conditions based on intergroup contact. Gender/sex diversity affirming beliefs were not significantly higher in the Diagrams condition than the other conditions for participants with intergroup contact (Video Only, $p = .45$, Neutral, $p = .10$) or for those without (Video Only, $p = .37$, Neutral, $p = .24$).

Prejudice Reduction at Follow-up

I analyzed whether the prejudice reduction effects observed at baseline among participants with intergroup contact with gender/sex minorities were evident at follow-up four weeks later, but they were not. There were no significant differences between conditions at follow-up in feelings toward gender/sex minorities, $F(2, 476) = 1.47$, $p = .23$, $\eta^2_p = 0.006$, or in

gender/sex diversity affirming beliefs, $F(2, 475) = .78$, $p = .46$, $\eta^2_p = 0.003$. Effects remained nonsignificant when I explored intergroup contact as a moderator.

Exploratory Analyses of Emotions

I conducted pre-registered analyses exploring the impact of the SCT intervention on emotions. First, I conducted an exploratory factor analysis on the modified differential emotions scale (mDES) to examine its structure in the context of the present experiment. I used maximum likelihood extraction and a promax rotation. The factor analysis yielded 3 factors. First was positive emotions with an eigenvalue of 7.38, which explained 35.12% of the variance. Another factor consisted of negative emotions, with an eigenvalue of 4.37, which explained 20.79% of the variance. And finally, the factor analysis yielded a factor with items related to shame, with an eigenvalue of 1.44, which explained 6.84% of the variance. I retained all factors for further analysis, and I calculated factor scores by summing items.

I analyzed the relationship between experimental condition, intergroup contact, and emotions via three separate 3x2 ANOVAs, using factor scores for each of the three factors. The overall model for positive emotions was not significant, $F(5, 567) = 1.84$, $p = .10$, $\eta^2_p = .02$, although intergroup contact had a significant effect on positive emotions, such that participants who had contact with gender/sex minorities experienced more positive emotions than those who did not, $F(1, 567) = 5.24$, $p = .022$, $\eta^2_p = .009$.

The overall model was significant for negative emotions, $F(5, 567) = 6.71$, $p < .001$, $\eta^2_p = 0.056$. Both experimental condition, $F(2,567) = 8.19$, $p < .001$, $\eta^2_p = .03$, and intergroup contact, $F(1, 567) = 13.17$, $p < .001$, $\eta^2_p = .02$, had significant effects on negative emotions. I examined simple effects, which indicated that, among participants who had no intergroup contact with gender/sex minorities, those in the Video Only condition reported more negative emotions than

those in the Diagrams condition, $p = .021$, or the Neutral condition, $p < .001$. Finally, the model predicting shame-related emotions was not significant, $F(5, 567) = 1.17$, $p = .32$, $\eta^2_p = 0.01$. However, participants who reported no intergroup contact with gender/sex minorities had higher shame-related emotions, $F(1, 567) = 3.97$, $p = .047$, $\eta^2_p = .007$.

Discussion

In Chapter 5, I experimentally tested the efficacy of SCT as an intervention to increase gender/sex majorities' gender/sex diversity affirming beliefs and positive feelings toward gender/sex minorities. In this intervention, gender/sex majorities mapped their own gender/sexes via SCT diagrams. I also tested two control conditions: one in which SCT was explained via video but participants did not have a chance to map their own gender/sexes, and a neutral control. I found partial support for my hypothesis: The Diagrams condition significantly improved participants' feelings toward gender/sex minorities relative to the Video Only condition, though not the Neutral condition, and improved participants' gender/sex diversity affirming beliefs relative to the Neutral condition, but not the Video Only condition. Taken together, I interpret these findings as strong though preliminary evidence for the potential of SCT to be used as a potentially effective prejudice reduction intervention.

I also hypothesized that the impact of the intervention on attitudes about gender/sex minorities would be durable over time, but I did not find support for this part of my hypothesis. The effect of the Diagrams condition on feelings toward gender/sex minorities and gender/sex diversity affirming beliefs was not evident at follow-up four weeks later. It is possible that SCT does not have long-term efficacy when used as a brief, single-session intervention. Alternatively, the SCT intervention itself might be altered to increase the long-term impact of the single-

session. Future research should explore both of these possibilities to better understand the timescale and determinants of the extinction process for the effect of the intervention.

I found that intergroup contact had a large main effect on both feelings toward gender/sex minorities and gender/sex diversity affirming beliefs. This finding accords with other studies that have found intergroup contact is a strong, negative predictor of implicit and explicit attitudes toward gender/sex minorities (Hoffarth & Hodson, 2018; King et al., 2009; Tadlock et al., 2017; Wang-Jones et al., 2017). The present research adds that intergroup contact with gender/sex minorities is strongly linked to people's beliefs about gender/sex diversity more broadly (i.e, social constructionist and essentialist beliefs about the nature of gender/sex). One potential explanation for this relationship between intergroup contact and beliefs about gender/sex diversity is that knowing a gender/sex minority is a form of firsthand knowledge that a cisnormative, binary framing of gender/sex does not accommodate actual gender/sex diversity embodied by real people. Also, the opposite causal relationship might exist: A gender/sex majority person might not know any gender/sex minority individuals because they endorse beliefs about the invalidity of gender/sex diverse identities, and therefore it could be unsafe for a gender/sex minority person in their life to disclose their identity. Put simply, gender/sex majorities who reported no intergroup contact in the study might actually know a gender/sex minority person; they just might not know that they do.

I explored the role of intergroup contact in SCT's efficacy as an intervention. Simple effects showed that that the impact of the SCT intervention on feeling thermometers varied depending on intergroup contact, such that only individuals who had a gender/sex minority friend, family member, and/or acquaintance showed significantly warmer feelings toward gender/sex minorities compared to those in the Video Only control (the same pattern was evident

for Neutral control, although non-significant). Therefore, the efficacy of the intervention might depend somewhat on whether individuals actually know a gender/sex minority person. Although the video explaining SCT shows a number of example characters, including several gender/sex minority characters, people who do not personally know any gender/sex minorities might still have difficulty conceptualizing what gender/sex diversity looks like. Further, the example characters in the videos are cartoons, so it is unclear whether participants experience the video as a form of simulated intergroup contact, as they might with real people as examples.

My results provide some insight into the affective experiences of participants completing the intervention. In particular, participants' negative and shame-related emotions varied based on experimental condition and intergroup contact. Overall, participants with no intergroup contact had higher negative and shame-related emotions compared to those who had intergroup contact. For negative emotions specifically, this effect was driven by higher negative emotions among participants without intergroup contact in the Video Only condition, compared to those without intergroup contact in the Diagrams or Neutral conditions. It is possible that simply viewing a video explaining SCT might induce some level of backlash among some gender/sex majorities without intergroup contact, but that actually having the chance to complete SCT diagrams afterward mitigates this effect. Importantly, gender/sex majorities can successfully locate their gender/sexes using SCT regardless of their attitudes about gender/sex minorities. But, gender/sex majorities who did not have the chance to use SCT might perceive SCT as exclusionary, because most of the surface area of the diagram represents minority gender/sexes (Appendix C). I interpret these results as indicating the necessity of SCT diagrams in the SCT intervention. It is not sufficient to merely educate participants about gender/sex diversity via SCT; they have to

locate their own gender/sexes within SCT to understand and/or internalize its model of gender/sex.

The present study has some important limitations. First, although I based the sample size on a power analysis, I did not have strong prior information off which to base the estimated effect size, so the study is somewhat underpowered relative to the actual effect size of the intervention. A replication with a larger sample size would help determine if the effects observed in the present study are replicable and stable across outcome measures. Second, I originally hypothesized that gender/sex diversity affirming beliefs would mediate the prejudice reduction effect of the intervention. However, because I did not have a pre-test measure of gender/sex diversity affirming beliefs, I was not able to test this possibility. In follow-up work, I will assess gender/sex diversity beliefs prior to the intervention and analyze changes from pre- to post- as a mediator. Finally, the SCT intervention in this study was administered once in a single online, experimental session. It is possible that the SCT intervention might have a greater impact when administered longitudinally and/or in-person.

Conclusion

I found evidence supporting the efficacy of SCT as an intervention to improve gender/sex majorities beliefs about gender/sex diversity and attitudes toward gender/sex minorities. SCT is capable of affecting gender/sex majorities' self-knowledge, which has implications for their knowledge about and feelings toward others. Efforts to promote equity for gender/sex minorities might benefit from addressing gender/sex majorities self-concepts in tandem with extant strategies (e.g., direct and indirect forms of intergroup contact and education), and SCT might be an effective means of doing so.

CHAPTER 6

General Discussion

In this dissertation, I characterized gender/sex diversity beliefs, determined their significance for understanding prejudice against gender/sex minorities, and developed an intervention that increased gender/sex majorities' diversity-affirming beliefs. In Chapter 1, I argued that contemporary attitudes about gender/sex minorities are entwined with beliefs about the nature of gender/sex categories, or gender/sex diversity beliefs. Further, I showed that understanding prejudice toward gender/sex minorities relies on better understanding gender/sex diversity beliefs, and it is vitally important to do so in the present sociopolitical context of pervasive prejudice and discrimination against gender/sex minorities.

I conducted a series of empirical studies to explore contemporary variation in beliefs about gender/sex diversity and examine their correlates and consequences. In Chapter 2, I conducted an online study of people's definitions of common gender/sex terms in order to better understand variation in how people conceptualize gender/sex categories. I found that whether participants included sociocultural or biological content in their definitions varied across terms, such that *feminine* and *masculine* were primarily comprised of sociocultural content, *female* and *male* were primarily biological, and *woman* and *man* definitions were comprised of both sociocultural and biological content. Further, whether participants were gender/sex and/or sexual minorities or majorities affected the content and complexity of their definitions.

In Chapter 3, I explored a subsample of TERF adherents who participated in the research described in Chapter 2 *en masse* in order to fill it with cissexist perspectives. I named

this unexpected phenomenon an "avalanche sample," because it parallels "snowball sampling" (also known as respondent-driven sampling, in which researchers ask participants to recruit others); but, unlike respondent-driven sampling, an avalanche sample is sudden, unsolicited, and disruptive. I analyzed factors that led to the avalanche sample in my research, including group emotions like anger and fear, the role of whiteness and its relationship to felt entitlement toward the stewardship of science, and status threats for dominant social groups. I concluded that online survey researchers studying diversity-related topics in general, and especially those who study gender/sex diversity, should be aware of the possibility of sociopolitically motivated disruptive actions like avalanche samples.

Next, in Chapter 4, I developed and validated the Gender/Sex Diversity Beliefs Scale (GSDB). The GSDB is a robust, unique predictor of feelings toward gender/sex minorities and displays strong psychometric properties. Iterative factor analyses across multiple studies indicated that the latent structure of gender/sex diversity beliefs is primarily based on affirmation or denial of the validity of gender/sex minority identities and experiences. Only primarily so, because a smaller subset of gender/sex diversity beliefs factored based on particular sub-topics, including whether surgery is necessary to validate a transgender person's gender/sex.

In Chapter 5, I developed an intervention utilizing sexual configurations theory (SCT; van Anders, 2015) to transform cisgender participants' gender/sex diversity beliefs and feelings toward gender/sex minorities. The SCT intervention effectively increased majorities' gender/sex diversity affirming beliefs and warm feelings toward gender/sex minorities. I also found that intergroup contact, operationalized as whether gender/sex majority participants have friends, family members, and/or acquaintances who are gender/sex minorities, was a strong predictor of both gender/sex diversity beliefs and feelings toward gender/sex minorities.

In this final chapter, I discuss the implications of my dissertation for understanding contemporary beliefs and attitudes about gender/sex diversity and for future research in this field.

Contributions to the Field

My research makes numerous contributions to the study of rapidly shifting societal beliefs about the nature of gender/sex. First, the findings of Chapter 2 demonstrate that gender/sex diversity beliefs are embedded in variations in how people define and understand gender/sex categories. Current policy battles over gender/sex minorities' access to public space, healthcare, and other arenas of public and private life often revolve around different interpretations of the scope of gender/sex categories and their social significance (e.g., General Assembly of North Carolina, 2016). Prior theory has suggested commonsense framings of gender/sex categories as neatly bounded are flawed at a metaphysical level; my research adds to this body of work by demonstrating the non-universality of how individuals draw boundaries around gender/sex categories (Bettcher, 2007; Butler, 1993; Fausto-Sterling, 2005). At the same time, my research showed significant patterns in how people define gender/sex terms, suggesting that different interpretations or uses of language might cue particular ways of understanding gender/sex. For example, a researcher using *female* and *male* instead of *woman* and *man* might cue more biological and fewer sociocultural associations in participants in their research. My findings raise new questions about the consequences of particular uses of gender/sex language in many areas, including scientific communication (e.g., how do people interpret gender/sex difference or similarity claims based on which terms are used?) and social perception (e.g., are people's understandings of gender/sex terms related to how they perceive certain gender/sex groups?), among others.

In Chapter 4, I found further evidence of heterogeneity in people's understandings of gender/sex, in this instance via gender/sex diversity beliefs. The development of the GSDB yielded insights about the latent structure of contemporary beliefs about the nature of gender/sex. Specifically, people's gender/sex diversity beliefs are primarily organized based on whether they affirm the existence of gender/sex diversity or deny its existence. Affirming beliefs included a range of social constructionist beliefs and certain essentialist beliefs also. These findings add clarity to ongoing debates about the relationships of essentialism and social constructionism to prejudice. Prior research has argued that essentialism is linked to prejudice toward a range of social groups, including women and racial/ethnic minorities, but has seemingly paradoxically found that some essentialist beliefs are related to positive feelings toward sexual minorities (Grzanka et al., 2016; Haslam et al., 2002; Hegarty & Golden, 2008). Some researchers have suggested essentialism is linked to negative feelings toward gender/sex minorities, unlike with sexual minorities (Wilton et al., 2018). However, my findings suggest a similar logic structures the relationship between beliefs about gender/sex minorities and sexual minorities. Essentialist beliefs that locate an essence or underlying reality within gender/sex minority identities (e.g., "Transgender identities are natural") are linked to positive feelings toward gender/sex minorities, whereas essentialist beliefs that locate an essence in majority gender/sexes only (e.g., "There have only been two genders throughout history") are related to prejudice. Therefore, the central factor in whether a belief about gender/sex links to prejudice against gender/sex minorities is not whether it is essentialist or not, but whether it is broadly interpreted to legitimize the existence of minority gender/sexes.

The GSDB may prove to be a valuable tool for researchers of gender/sex diversity, transphobia, and beliefs and attitudes about gender/sex at a broad level. Prior research on

gender/sex essentialism has typically focused exclusively on differences between (implicitly cisgender) women and men who are normatively feminine and masculine, respectively (Haslam et al., 2000; Prentice & Miller, 2006; Skewes et al., 2018). And even when prior research has addressed gender/sex diversity, it has not systematically examined multiple facets of essentialism or included social constructionist beliefs at all (Kanamori et al., 2017; Tee & Hegarty, 2006). The GSDB allows survey researchers to study how people think about gender/sex diversity with a nuanced, valid, and reliable measure that is inclusive of a broad range of essentialist and social constructionist beliefs about the nature of gender/sex. Researchers of prejudice against gender/sex minorities in particular are likely to find value in including the GSDB in future studies. Gender/sex diversity affirming beliefs uniquely predicted a large amount of variance in feelings toward gender/sex minorities, beyond other closely associated and commonly studied variables such as conservatism and gender essentialism (i.e., operationalized as beliefs about differences between women and men). This finding opens up numerous new lines of inquiry into what role gender/sex diversity affirming beliefs have in structuring feelings toward gender/sex minorities. That is, does believing gender/sex is a diverse social category lead to positive feelings toward gender/sex minorities (or vice versa)?

The research described in Chapter 5 applied insights from Chapters 2 and 4 about heterogeneity in understandings of the nature of gender/sex toward an intervention into prejudice against gender/sex minorities. Some prior research has found that manipulations focused on intergroup contact and/or cognitive empathy can effectively reduce prejudice against gender/sex minorities (Broockman & Kalla, 2016; McDermott et al., 2018; Walch, Sinkkanen, et al., 2012). But it remains unclear whether interventions that provide majorities relatively low-quality contact with minorities (i.e., watching a video or listening to a panel, as opposed to forming a

meaningful, cooperative relationship over time) are capable of shifting the beliefs about gender/sex that underlie prejudice and institutional discrimination and fostering gender/sex diversity affirming beliefs. My research adds to this literature by introducing a new potential solution: guided introspection about one's own majority identity using a minority-centered framework. I found that having gender/sex majorities situate their own identities via SCT led to positive changes in gender/sex diversity affirming beliefs and warm feelings toward gender/sex minorities.

For people who hold gender/sex diversity denying beliefs, SCT represents a significant worldview shift. SCT presents gender/sex as multifaceted, containing both binary and nonbinary elements, and provides space for communicating nuance that both gender/sex minorities and majorities are capable of using (Abed et al., 2019; Schudson et al., 2017). By soliciting gender/sex majorities to situate themselves within gender/sex diversity as delineated by SCT, my intervention was able to affect both majorities' feelings toward minorities and also their broader beliefs about the nature of gender/sex. My research thereby demonstrates an understudied linkage between majority individuals' self-concepts, their broader views of social categories, and their attitudes about minority groups. Research on prejudice toward other social groups (e.g., ableism, heterosexism, etc.) might benefit from examining this relationship between majorities' self-concepts and their beliefs and attitudes.

Limitations and Future Directions

This dissertation yielded insights about contemporary variation in beliefs about gender/sex with certain constraints on their generalizability that future research should address. One of the most significant constraints on the generalizability of all the present results is how beliefs about gender/sex are deeply shaped by culture and time. Of course, the study of all social

phenomena is shaped by culture and time. But it is often especially salient in research on gender/sex diversity because gender/sex is heavily essentialized and commonly imagined as a transhistorical universal (Gelman, 2003; Haslam et al., 2000). Research on gender/sex diversity and gender/sex minority identities themselves are therefore sometimes critiqued as excessively culture-bound and uniquely a product of Western societies in the 21st century (Clark et al., 2019). Because gender/sex diversity beliefs challenge this transhistorical narrative and have only entered gender/sex majorities' consciousness recently, this research might be subject to similar critiques. And certainly, the results of my studies are specific to the contexts in which they were collected (i.e., the U.S. in the 21st century, with majority white and college-educated samples). But gender/sex diversity itself is not a recent or Western-only phenomenon (Dutta & Roy, 2014; Towle & Morgan, 2002). And further, research on majority gender/sexes that excludes considerations of gender/sex diversity is also culturally and historically specific in its erasure. Therefore, to recognize the cultural and historical specificity of research on beliefs about gender/sex is not to cede its value, but to properly contextualize it. My research opens up new lines of inquiry related to how gender/sex diversity beliefs might be similar or different across cultural contexts and at different points in the future as people's beliefs about gender/sex and broader social conditions continue to change.

One limitation of my dissertation consistent across all studies is my reliance on online convenience samples. Although there is a considerable amount of data to suggest that participants from MTurk (Chapters 3 and 4) perform similarly to general population samples in a range of research contexts, cautious interpretation is still important (Clifford et al., 2015; Peer et al., 2014). In Chapter 2, a convenience sample was useful because my goal was to explore heterogeneity in definitions of gender/sex terms across social locations and recruiting online

allowed for targeted recruitment of gender/sex and sexual minorities. But, my use of a convenience sample also means that my research will need to be replicated with population-level studies with diverse groups of English-speakers in order to make certain frequency claims, such as how common it is for people to conceptualize identity as a component of *woman/man* vs. *masculine/feminine* vs. *female/male*, for instance. Further, as detailed in Chapter 3, the presence of the FB sample (consisting of anti-transgender online groups) demonstrated how data collection in online contexts brings unique challenges and can introduce polarized perspectives.

While the GSDB developed in Chapter 4 is useful for research with gender/sex majorities, one current limitation is that it might not be sufficiently nuanced for in-depth exploration of how gender/sex minorities think about gender/sex diversity. Although I developed the GSDB with significant input from gender/sex minority academic and community experts, I empirically tested it with an almost entirely majority sample. Future research could analyze measurement invariance of the GSDB across gender/sex minorities and majorities (i.e., whether patterns in how minorities and majorities respond to the GSDB are similar or different), although it is highly probable that the GSDB represents the latent structure of contemporary beliefs about gender/sex diversity among majorities only. Not only might minority and majority participants respond differently to the same items, but exploratory factor analysis can produce entirely different latent structures across participant social locations (Chadwick et al., 2017). Therefore, it would be prudent to test the full preliminary item list – or even an expanded and/or qualitatively different item list – with a gender/sex minority sample to create a version of the GSDB that better represents beliefs about gender/sex diversity that circulate within gender/sex minority communities.

The SCT intervention in Chapter 5 showed considerable promise for future prejudice reduction efforts, and I plan to conduct further research to determine for whom it is most effective and under what conditions. First, it is important to attempt to replicate my finding of the SCT intervention's effectiveness relative to the control conditions, particularly because the significance of the effect depended on the outcome measure (i.e., gender/sex diversity affirming beliefs or warmth toward gender/sex minorities) and the specific control (i.e., Video Only or Neutral). It is also necessary to address the role of intergroup contact in follow-up studies. The present study suggested that SCT might be more effective as an intervention for gender/sex majorities who have a family member, friend, and/or acquaintance who is a gender/sex minority. By what mechanism might intergroup contact affect how people interpret SCT or engage with the intervention? Is it possible to design the intervention in a way that is especially effective for people without intergroup contact, who had much more negative attitudes about gender/sex minorities? And finally, it is important for future research to determine whether alterations to the SCT intervention might help it reduce prejudice durably over time. I did not find any effect of the intervention at follow-up four weeks later, which suggests that its benefits waned over time. Ultimately, my research seeks to determine how to positively change gender/sex majorities' gender/sex diversity beliefs and feelings toward gender/sex minorities in ways that last far beyond a single laboratory session. Future research will incorporate social psychological insights about persuasive messages, such as presenting gender/sex diversity affirming beliefs as descriptively normative (Cialdini et al., 1990).

Conclusion

This dissertation explored contemporary heterogeneity in gender/sex diversity beliefs, their links to prejudice against gender/sex minorities, and the efficacy of a prejudice reduction

intervention for gender/sex majorities focused on self-knowledge. I found evidence of considerable variation in how people think about and define gender/sex categories, and patterns that suggest people understand gender/sex terms to carry different implications for the sociocultural and biological nature of gender/sex categories. My research also demonstrated that gender/sex diversity beliefs are primarily structured based on whether they affirm or deny the existence of gender/sex diversity, and gender/sex diversity affirming beliefs have considerable value for predicting attitudes about gender/sex minorities. Finally, I found that soliciting gender/sex majorities to deeply consider their own gender/sex identities using SCT, a framework that centers gender/sex minority experiences and identities, improved their attitudes about gender/sex minorities and their gender/sex diversity affirming beliefs.

Prejudice and discrimination against gender/sex minorities remains a pervasive problem among gender/sex majorities. The task of transforming how gender/sex majorities think about gender/sex categories is an urgent one that requires psychologists' attention. The cost of gender/sex diversity denial is evident in discriminatory laws, dehumanizing rhetoric, and even human lives. This dissertation provides conceptual and methodological tools for researchers invested in challenging gender/sex majorities' prejudice against minorities, including a new construct – gender/sex diversity beliefs – that is a core determinant of prejudice toward or affirmation of gender/sex minority identities. Gender/sex is a complex social category that extends far beyond rigid, essentialist definitions of *female* and *male*, and promoting expansive understandings of gender/sex is crucial for building a future that is safe for gender/sex minorities.

Table 2.1. *Composition of each group by gender/sex and sexual orientation.*

	Gender/sex			Sexual orientation		
	Women	Men	Another gender/sex	Sexual minority	Sexual majority	Total†
GSMin	39	17	26	71	9	82
CisMin	32	8	0	40	0	40
CisMaj	45	16	1*	0	62	62
FB	96	6	16	72	38	120

† Row totals do not always equal group total due to nonresponse.
* Participant wrote "female" and "I don't like being called a woman."

Table 2.2 *Frequency of definitions that received each biological or sociocultural content code for each gender/sex category.*

	Woman (*n* = 304)	**Man** (*n* = 302)	**Feminine** (*n* = 302)	**Masculine** (*n* = 305)	**Female** (*n* = 304)	**Male** (*n* = 305)
Sociocultural						
Sociocultural origin	15	15	105	104	7	4
Identity	70	69	3	3	48	49
Roles/expectations	13	13	60	59	4	3
Social power	9	6	24	23	4	4
Behaviors	17	13	90	94	7	6
Softness/hardness	2	3	50	25	3	2
Physical presentation	14	14	95	84	6	3
Preferences	3	1	11	15	1	0
Expressive/communal traits	7	3	76	1	5	0
Instrumental/agentic traits	8	12	4	82	1	5
Traits (general)	19	23	118	117	9	7
Biological						
Biological origin	29	29	1	2	82	82
Genitals	34	37	2	5	77	89
Gonads	7	12	0	1	18	31
Hormones	6	5	3	4	17	20
Chromosomes	17	20	4	2	94	89
Gametes	6	7	1	1	65	71
Reproduction	16	7	6	1	56	38
Uterus	11	0	0	0	26	0
Other sex characteristics	15	14	15	24	39	32
Body (general)	21	19	16	17	51	52
Both						
Origin is both sociocultural and biological	7	5	8	7	4	4

Table 2.3. *Frequency of definitions that received each descriptive code for each gender/sex category.*

Descriptive codes	**Woman** (*n* = 304)	**Man** (*n* = 302)	**Feminine** (*n* = 302)	**Masculine** (*n* = 305)	**Female** (*n* = 304)	**Male** (*n* = 305)
Definition uses qualifying language	35	33	78	74	43	46
Category is defined by stereotypes	5	4	39	43	1	1
Category is meaningless or unhelpful	1	2	7	11	2	1
Definition contradicts norms	10	7	13	11	8	7
Mentions cisgender/ transgender	33	31	7	6	25	25
Mentions *gender*	24	19	22	21	17	15
Mentions *sex*	15	17	16	16	90	88
Mentions both *gender* and *sex*	7	7	4	3	3	5
Mentions *woman*	-	5	75	3	47	3
Mentions *man*	2	-	1	81	2	34
Mentions *feminine*	18	0	-	2	7	1
Mentions *masculine*	0	18	2	-	0	10
Mentions *female*	193	2	108	0	-	16
Mentions *male*	2	191	2	111	14	-
Mentions other two categories within a set[1]	13	13	17	12	3	3
Mentions categories across sets	5	4	20	20	4	6

[1]"Set" refers to *woman/feminine/female* or *man/masculine/male*.

Table 2.4. *Examples for levels of the definition complexity code.*

Complexity Code	Description	Example
1	Low differentiation	*Woman:* "Someone who identifies as female" *Masculine*: "Characteristics of a man"
2	Moderate differentiation	*Man*: "A person who is born with male sexual organs and/or who identifies as a man" *Male*: "Someone with male genitalia. This describes the physical sex of a person more than their gender identity."
3	High differentiation; no integration	*Female*: "A person who had their sex marked as such on their birth certificate and at least at the time of their birth appeared to have or was surgically altered to have a particular kind of external genitalia." *Woman*: "Usually a person born female & raised as a girl, with all the cultural/societal conditioning about femininity, gender roles/expectations/limits, etc."
4	High differentiation; some integration	*Feminine*: "Femininity is complicated. There are expected roles of wanting children, cooking, taking care of the household, cleaning. I believe in equality among the sexes. I myself see myself as feminine. I wear dresses, skirts, paint my nails, wear makeup, wear clothing to show off my features. Those are considered feminine in this society. If men had always done the same, it would be considered more normal among the sexes and not feminine."

Table 2.5. *Logistic regression models predicting odds of including biological content in definitions for CisMin, CisMaj, and FB as compared to GSMin.*

Predictor	Woman		Man		Feminine		Masculine		Female		Male	
	B (SE)	OR (95% CI)	*B (SE)*	OR (95% CI)	*B (SE)*	OR (95% CI)	*B (SE)*	OR (95% CI)	*B (SE)*	OR (95% CI)	*B (SE)*	OR (95% CI)
CisMin†	0.07 (0.50)	1.07 (0.40, 2.84)	0.09 (0.50)	1.09 (0.41, 2.91)	-0.63 (0.69)	0.53 (0.14, 2.07)	0.20 (0.52)	1.22 (0.44, 3.40)	-0.17 (0.40)	0.84 (0.39, 1.84)	-0.29 (0.41)	0.75 (0.34, 1.66)
CisMaj†	1.19* (0.40)	3.29* (1.51, 7.17)	0.81 (0.41)	2.24 (1.01, 4.98)	-0.17 (0.53)	0.84 (0.30, 2.37)	0.43 (0.44)	1.54 (0.65, 3.68)	0.40 (0.36)	1.49 (0.73, 3.01)	0.42 (0.37)	1.53 (0.74, 3.16)
FB	0.45 (0.40)	1.58 (0.73, 3.41)	0.51 (0.39)	1.66 (0.77, 3.58)	0.29 (0.48)	0.55 (0.52, 3.42)	-0.05 (0.47)	0.95 (0.38, 2.40)	2.23* (0.47)	9.33* (3.73, 23.33)	2.25* (0.49)	9.47* (3.63, 24.66)
	FB excluded											
χ^2 ($df = 2$)	11.06*		4.53		0.90		0.94		2.13		2.90	
p	0.004		0.10		0.64		0.62		0.35		0.23	
	FB included											
χ^2 ($df = 3$)	11.11*		4.46		2.00		1.72		36.50*		34.04*	
p	0.01		0.22		0.57		0.63		< 0.001		< 0.001	

* = significantly different from GSMin (at adjusted α as determined by Benjamini-Hochberg procedure)

† = reported values are from models in which FB is excluded

Table 2.6. *Logistic regression models predicting odds of including sociocultural content in definitions for CisMin, CisMaj, and FB as compared to GSMin.*

Predictor	Woman		Man		Feminine		Masculine		Female		Male	
	B (SE)	OR (95% CI)	*B (SE)*	OR (95% CI)	*B (SE)*	OR (95% CI)	*B (SE)*	OR (95% CI)	*B (SE)*	OR (95% CI)	*B (SE)*	OR (95% CI)
CisMin†	-0.78 (0.42)	0.46 (0.20, 1.04)	-0.74 (0.41)	0.48 (0.21, 1.08)	0.02 (0.68)	1.02 (0.27, 3.88)	-0.44 (0.56)	0.65 (0.22, 1.93)	-0.17 (0.41)	0.84 (0.38, 1.88)	0.05 (0.42)	1.05 (0.46, 2.41)
CisMaj†	-1.63* (0.38)	0.20* (0.09, 0.42)	-1.37* (0.37)	0.25* (0.12, 0.53)	-0.08 (0.60)	0.92 (0.28, 2.98)	-0.65 (0.49)	0.52 (0.20, 1.37)	-0.71 (0.38)	0.49 (0.23, 1.03)	-0.79 (0.41)	0.45 (0.21, 1.00)
FB	-2.52* (0.40)	0.08* (0.04, 0.18)	-2.78* (0.41)	0.06* (0.03, 0.14)	0.21 (0.58)	1.24 (0.39, 3.89)	0.62 (0.55)	1.85 (0.63, 5.46)	-2.34* (0.48)	0.10* (0.04, 0.25)	-1.82* (0.47)	0.16* (0.06, 0.41)
	FB excluded											
χ^2 (*df* = 2)	19.36*		14.17*		0.03		1.80		3.77		4.86	
p	< 0.001		0.001		0.98		0.41		0.15		0.09	
	FB included											
χ^2 (*df* = 3)	51.84*		57.82*		0.55		7.76		32.67*		34.04*	
p	< 0.001		< 0.001		0.91		0.05		< .001		< .001	

* = significantly different from GSMin (at adjusted α as determined by Benjamini-Hochberg procedure)

† = reported values are from models in which FB is excluded

Table 3.1. *Participant demographics*.

Demographic		Study 1 *N* (%)	Study 2 *N (%)*
Education			
	Some high school	4 (1.3)	1 (0.3)
	High school graduate	58 (19.1)	43 (14.4)
	Some college	60 (19.8)	65 (21.7)
	Training other than college	7 (2.3)	8 (2.7)
	Graduate from two-year college	27 (8.9)	38 (12.7)
	Graduate from four-year college	118 (38.9)	105 (35.1)
	Some graduate or professional school	6 (2.0)	7 (2.3)
	Received graduate or professional degree	23 (7.6)	32 (10.7)
Gender/Sex			
	Woman	109 (36.0)	138 (46.2)
	Man	190 (62.7)	160 (53.5)
	Gender/Sex Diverse	3 (1.0)	1 (0.3)
Race/Ethnicity			
	Asian / Asian American	10 (3.3)	19 (6.4)
	Black / African American	25 (8.3)	23 (7.7)
	Indigenous / Native American	4 (1.3)	2 (0.7)
	Latinx / Hispanic	11 (3.6)	19 (6.4)
	Multiracial	9 (3.0)	5 (1.7)
	White	233 (76.9)	229 (76.6)
	Nonresponse	11 (3.6)	2 (0.7)
Sexual Orientation/Identity			
	Asexual / Demisexual	1 (0.3)	4 (1.3)
	Bisexual / Pansexual	23 (7.6)	19 (6.4)
	Gay / Lesbian	9 (3.0)	11 (3.7)
	Heterosexual	263 (86.8)	259 (86.6)
	Mostly Heterosexual	1 (0.3)	2 (0.7)
	Queer	1 (0.3)	0 (0)
	Nonresponse	5 (1.7)	4 (1.3)

Table 3.2. *Rotated factor loadings and item-level descriptive statistics for 27 initially retained items of GSDB.*

Item	Affirmation	Gender Normativity	Uniformity	Surgery	Upbringing	Biology & Gender	M (SD)	Skewness / Kurtosis
There are many different gender identities people can have.	**.816**	-.184	-.085	-.070	.058	-.027	4.02 (2.07)	-.15 / -1.32
Non-binary gender identities are valid.	**.813**	-.274	-.153	-.061	.045	.072	4.07 (2.10)	-.16 / -1.31
A person's gender can change over time.	**.800**	-.094	-.105	.027	.187	-.053	3.43 (1.96)	.21 / -1.23
Being a woman or man has nothing to do with what genitals you have.	**.799**	-.180	-.242	-.139	-.022	-.050	3.46 (2.00)	.21 / -1.26
Transgender identities are natural.	**.769**	-.218	-.210	.005	-.007	.042	3.97 (2.04)	-.07 / -1.25
Biological sex is not just female or male; there are many possibilities.	**.754**	-.108	-.089	.001	-.031	.067	3.46 (1.99)	.21 / -1.22
It is possible to have more than one gender identity at the same time.	**.748**	-.047	-.203	-.056	.150	-.003	3.52 (1.96)	.16 / -1.12
It would be best if society stopped labeling people based on whether they are female or male.	**.733**	-.102	-.096	-.011	.105	-.074	3.72 (1.98)	.08 / -1.21
Non-binary gender identities have always existed.	**.710**	-.193	-.068	-.103	.031	.047	4.14 (2.02)	-.24 / -1.35
The only thing that determines whether someone truly is a woman or a man is	**.679**	-.090	-.064	-.015	.002	.088	3.77 (2.10)	.08 / -.64

whether they identify as a woman or a man.								
People who express their gender in ways that go against society's norms are just being their true selves.	**.672**	-.310	-.135	.022	.074	.085	4.61 (1.84)	-.60 / -.64
Gender is about how you express yourself (e.g., how you dress or act).	**.640**	.035	.018	-.036	.209	.100	3.52 (1.85)	.13 / -1.10
Transgender people were born the way they are.	**.622**	-.212	-.045	.047	-.047	.222	4.34 (1.88)	-.45 / -.86
Not all cultures have the same gender identities.	**.569**	-.145	-.100	-.071	.031	-.097	4.43 (1.89)	-.37 / -.86
*A masculine woman is not truly a woman.	-.114	**.744**	.085	.137	.035	.093	2.15 (1.35)	1.59 / 2.46
Men who behave in feminine ways are looking for attention.	-.379	**.720**	.180	.016	.072	-.028	2.78 (1.65)	.71 / -.46
A real man needs to be masculine.	-.358	**.711**	.103	.034	-.012	.132	2.96 (1.79)	.74 / -.48
**Transgender men can only truly be men if they look and behave in masculine ways.	-.102	**.550**	.165	.361	.012	.129	2.71 (1.47)	.55 / -.53
People of the same gender tend to be similar to each other.	-.344	.184	**.663**	.036	.018	.177	3.74 (1.62)	-.05 / -.95
People of the same biological sex are mostly similar to each other.	-.309	.261	**.619**	.038	.035	.063	3.72 (1.68)	-.03 / -1.04
Feminine people are similar to other feminine people, and masculine people are similar to other masculine people.	-.260	.288	**.579**	.152	.017	.080	4.00 (1.55)	-.33 / -.71

A person with a vagina can only ever be a man if they have surgery to have a penis instead.	-.222	.325	.121	**.721**	.086	.039	3.18 (1.77)	.43 / -.76
A person with a penis can only ever be a woman if they have surgery to have a vagina instead.	-.286	.305	.107	**.688**	.066	.081	3.17 (1.77)	.44 / -.75
Gender identity is affected by how a person is raised.	.164	.150	-.010	.039	**.716**	-.055	3.71 (1.67)	-.13 / -1.00
A person's experiences growing up determine whether they will be feminine or masculine.	.025	.052	.099	.094	**.685**	.179	3.46 (1.57)	-.15 / -.99
†Feminine men are feminine because of their biology.	.080	.118	.094	.025	.035	**.658**	3.85 (1.62)	-.12 / -.61
†Masculine women are masculine because of their biology.	-.028	.123	.154	.044	.097	**.639**	3.83 (1.64)	-.15 / -.71
Factor internal reliability (Cronbach's α)	.95	.83	.80	.85	.66	.67		

* Removed due to unacceptable skewness and kurtosis
** Removed due to low factor loading in Study 2
† Removed due to factor's low test-retest reliability in Study 3

Table 3.3. *Study 1 correlations between GSDB factors, Genderism and Transphobia Scale-Revised (GTS-R), and Marlowe-Crowne Social Desirability Scale (MCSDS).*

	Affirmation	Gender Normativity	Uniformity	Surgery	Upbringing	Biology & Gender	GTS-R	MCSDS
Affirmation	-	-.49**	-.50**	-.36**	.13*	.025	-.69**	-.04
Gender Normativity		-	.50**	.51**	.11*	.21**	.80**	.12*
Uniformity			-	.38**	.07	.22**	.52**	.12*
Surgery				-	.14*	.17**	.45**	.08
Upbringing					-	.12*	.06	-.05
Biology & Gender						-	.10	-.05
GTS-R							-	.06
MCSDS								-

** Correlation is significant at $p < .01$

* Correlation is significant at $p < .05$

Table 3.4. *Model summaries for confirmatory factor analysis of the GSDB.*

	χ^2	*df*	*p*	χ^2/df	CFI	TLI	SRMR	RMSEA (90% CI)
GSDB-Full	514.36	219	<.001	2.35	.94	.93	.05	.067 (.060, .075)
GSDB-Affirm	229.40	77	<.001	2.98	.96	.96	.03	.075 (.063, .089)
GSDB-2	906.35	187	<.001	4.85	.85	.83	.11	.113 (.106, .121)

Table 3.5. *Study 2 correlations between GSDB factors and gender/sex feeling thermometers.*

	Trans Women	Trans Men	Non-Binary	Cis Women	Cis Men	Fem Men	Masc Men	Fem Women	Masc Women	Women - general	Men - general
AF	.63**	.65**	.65**	.16**	.13*	.46**	-.09	-.08	.43**	.00	-.08
GN	-.53**	-.53**	-.48**	.01	-.01	-.50**	.23**	.16**	-.45**	.02	.15*
UN	-.28**	-.27**	-.21**	.04	.03	-.23**	.19**	.15**	-.22**	.10	.19**
SU	-.17**	-.15**	-.21**	-.08	.00	-.17**	.05	-.02	-.13*	-.01	.02
UP	.01	.03	.03	-.09	-.11	.00	-.03	-.12*	.03	-.11	-.06
M	59.68	59.64	56.39	76.62	72.57	64.49	75.06	81.62	65.29	80.59	75.06
SD	30.54	30.88	31.77	23.81	24.27	26.47	21.84	19.11	26.07	18.96	20.42

AF = Affirmation; GN = Gender Normativity; UN = Uniformity; SU = Surgery; UP = Upbringing; Fem = Feminine; Masc = Masculine
** Correlation is significant at $p < .01$
* Correlation is significant at $p < .05$

Table 3.6. *Study 2 correlations between GSDB factors, SDO, RWA, NFC, GES, and Conservatism.*

	AF	GN	UN	SU	UP	SDO	RWA	NFC	GES	Cons.
AF	-	-.53**	-.25**	-.26**	.13*	-.52**	-.61**	-.06	-.65**	-.63**
GN		-	.46**	.25**	.08	.45**	.60**	.14*	.65**	.47**
UN			-	.15**	.15*	.25**	.39**	.11	.54**	.29**
SU				-	.15*	.21**	.19**	.06	.25**	.19**
UP					-	-.01	-.02	.09	.02	.01
SDO						-	.60**	-.06	.49**	.59**
RWA							-	.22**	.58**	.69**
NFC								-	.16**	.15**
GES									-	.52**
Cons.										-

AF = Affirmation; GN = Gender Normativity; UN = Uniformity; SU = Surgery; UP = Upbringing; SDO = social dominance orientation; RWA = right-wing authoritarianism; NFC = need for closure; GES = Gender Essentialism Scale; Cons. = conservatism

Table 3.7. *Hierarchal regression for variables predicting feelings toward gender/sex minorities.*

Predictor	*β*	*SE*	*t*	*p*	*R*	R^2_{adj}	ΔR^2_{adj}
Step 1					.63	.39	.39
Conservatism	-.12	.40	-1.77	.08			
Gender Essentialism	-.30	.06	-5.21	<.001*			
Need for Closure	-.12	.10	-1.49	.14			
Right-Wing Auth.	-.06	.11	-.76	.45			
Social Dominance	-.26	.09	-4.19	<.001*			
Step 2					.72	.52	.13
Conservatism	.03	.38	.54	.59			
Gender Essentialism	-.03	.07	-.43	.67			
Need for Closure	-.11	.09	-2.51	.01*			
Right-Wing Auth.	.08	.11	1.19	.24			
Social Dominance	-.23	.08	-4.04	<.001*			
Affirmation	.50	.09	7.63	<.001*			
Gender Normativity	-.20	.58	-3.37	.001*			
Uniformity	<.01	.37	.02	.99			
Surgery	.04	.39	1.01	.32			
Upbringing	-.02	.46	-.45	.65			

***** = significant at $p < 0.05$

Table 4.1. *Participant demographics.*

Demographic		*N* (%)
Education		
	Some high school or less	8 (1.3)
	High school graduate	77 (12.8)
	Some college	139 (23.2)
	Training other than college	28 (4.7)
	Graduate from two-year college	94 (15.7)
	Graduate from four-year college	177 (29.5)
	Some graduate or professional school	14 (2.3)
	Received graduate or professional degree	47 (7.8)
	Nonresponse	16 (2.7)
Gender/Sex		
	Woman	268 (49.5)
	Man	297 (44.7)
	Gender/Sex Minority	18 (3.0)
	Cisgender*	14 (2.3)
	Nonresponse	3 (0.5)
Race/Ethnicity		
	Asian / Asian American	30 (5.0)
	Black / African American	48 (8.0)
	Indigenous / Native American	4 (0.7)
	Latinx / Hispanic	25 (4.1)
	Multiracial	20 (3.3)
	White	469 (78.2)
	Nonresponse	4 (0.7)
Sexual Orientation/Identity		
	Asexual	6 (1.0)
	Bisexual / Pansexual	44 (7.3)
	Gay / Lesbian	25 (4.2)
	Heterosexual	515 (85.8)
	Queer	2 (0.3)
	Nonresponse	8 (1.3)

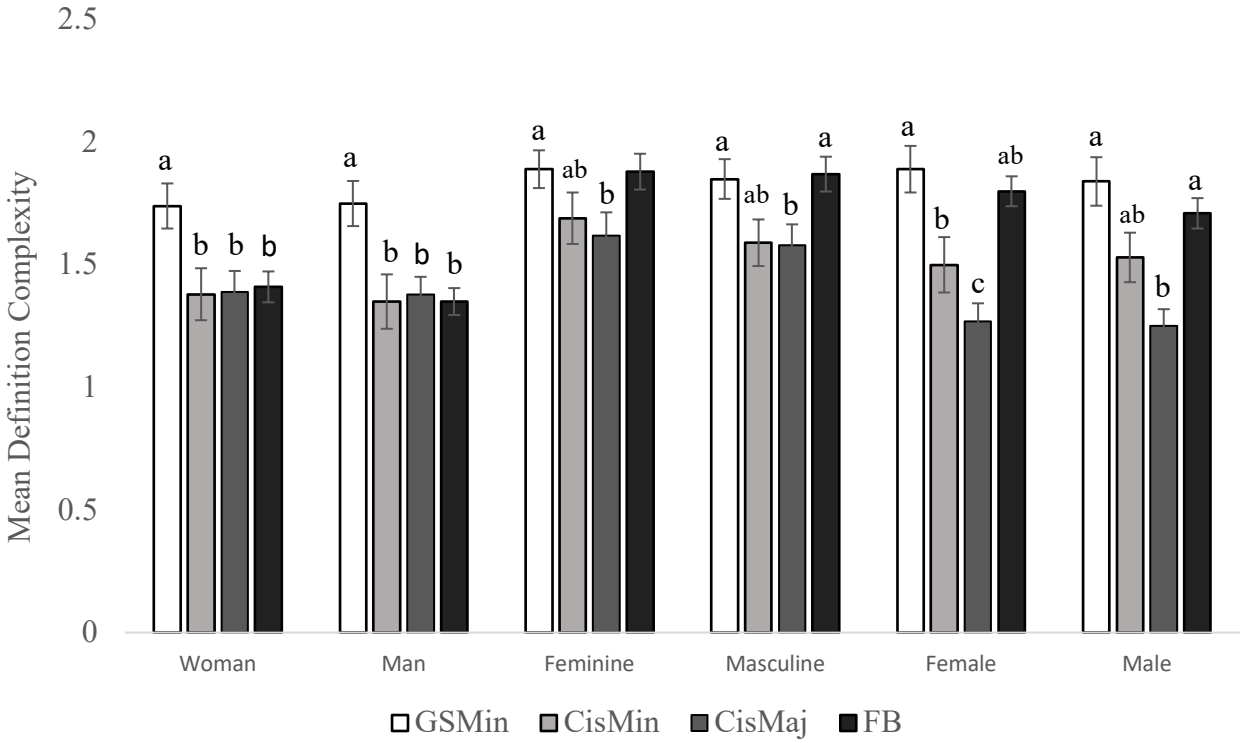

Figure 2.1. Mean definition complexity ratings for GSMin, CisMin, CisMaj, and FB for each gender/sex category. Different letter superscripts indicate significant differences between groups in post-hoc comparisons following Kruskal-Wallis tests (Benjamini-Hochberg adjusted $p < 0.05$). Complexity ratings differed across groups for all gender/sex categories – although for *feminine*, only when excluding the FB group (therefore, no letter superscript is included for FB in this analysis).

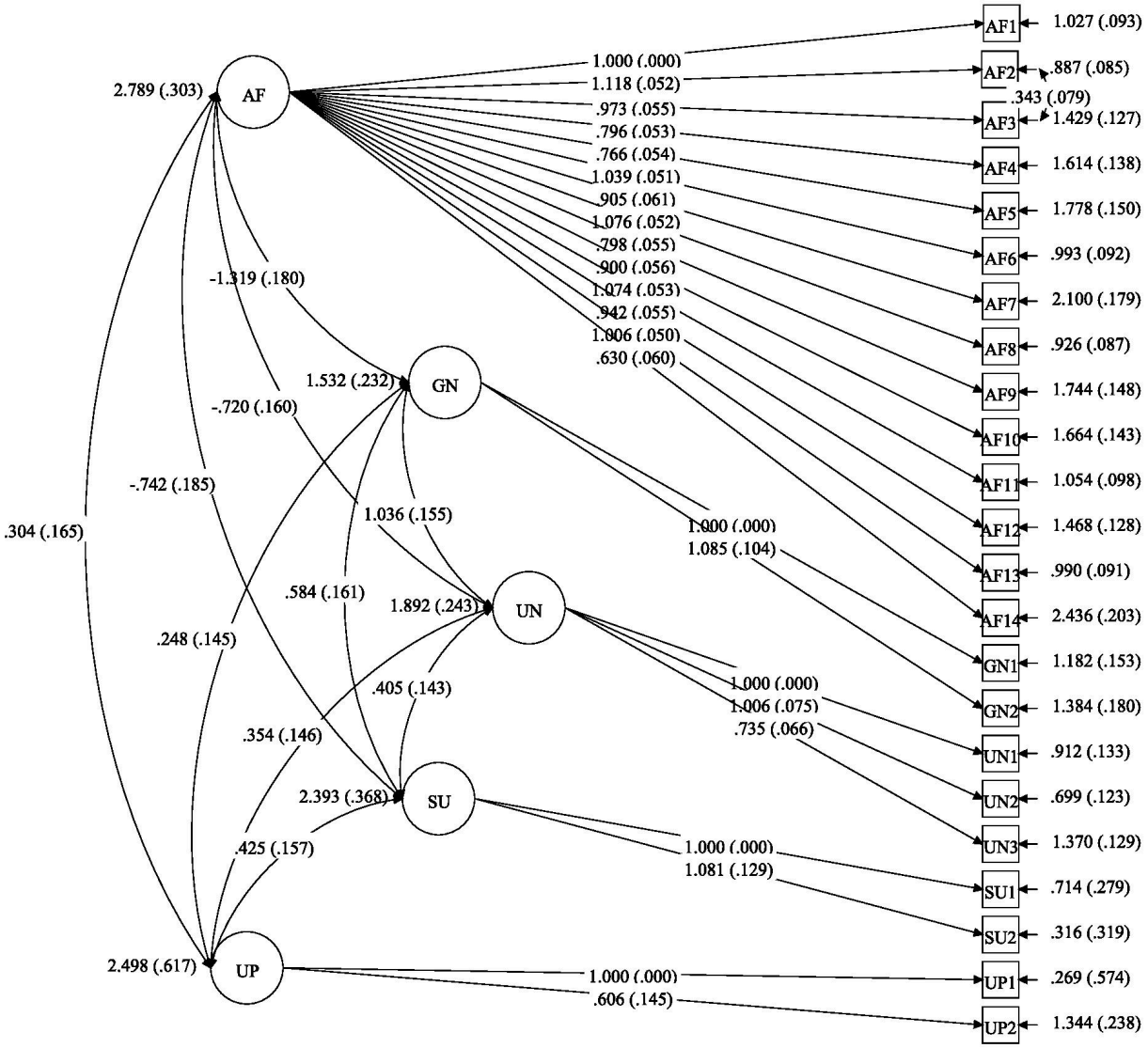

Figure 3.1. Five-factor model of the final, 23-item GSDB. See Appendix B for final item list.

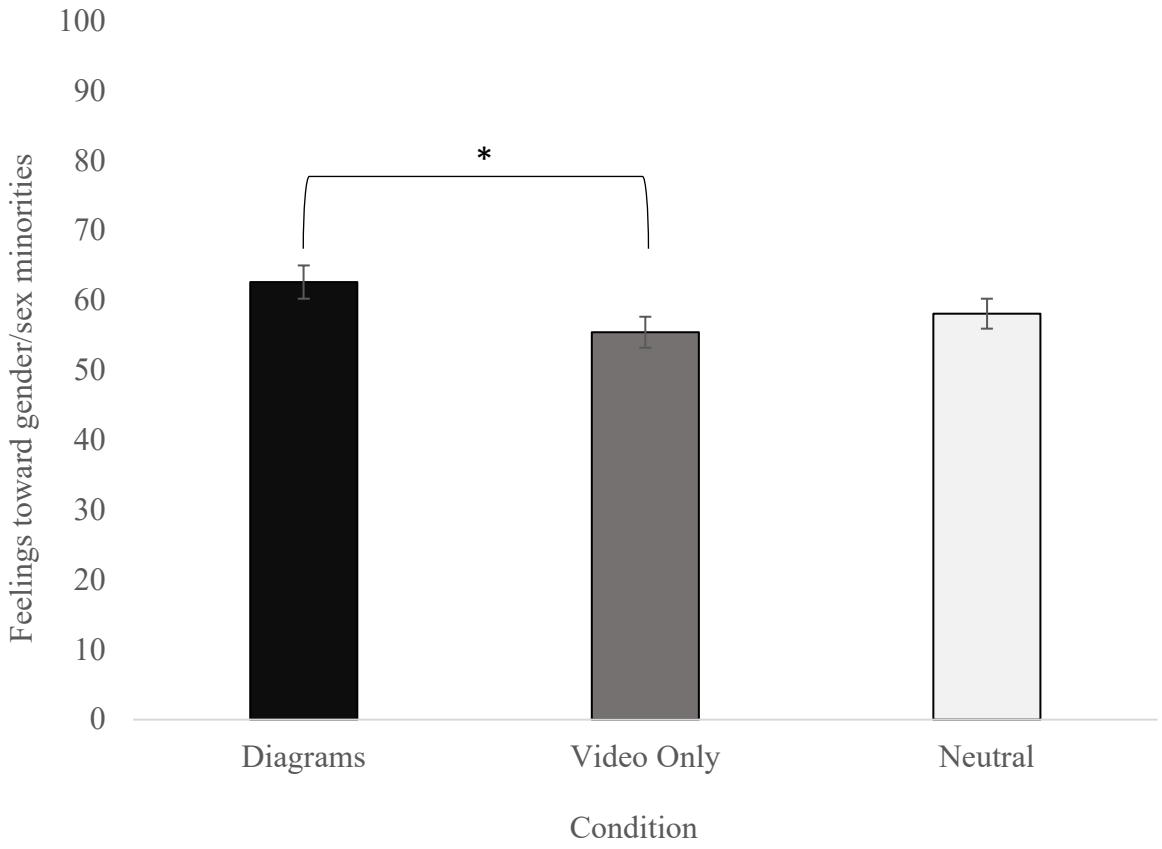

Figure 4.1. Effect of SCT intervention on feelings toward gender/sex minorities at baseline. * = $p < .05$; all other pairwise comparisons are non-significant.

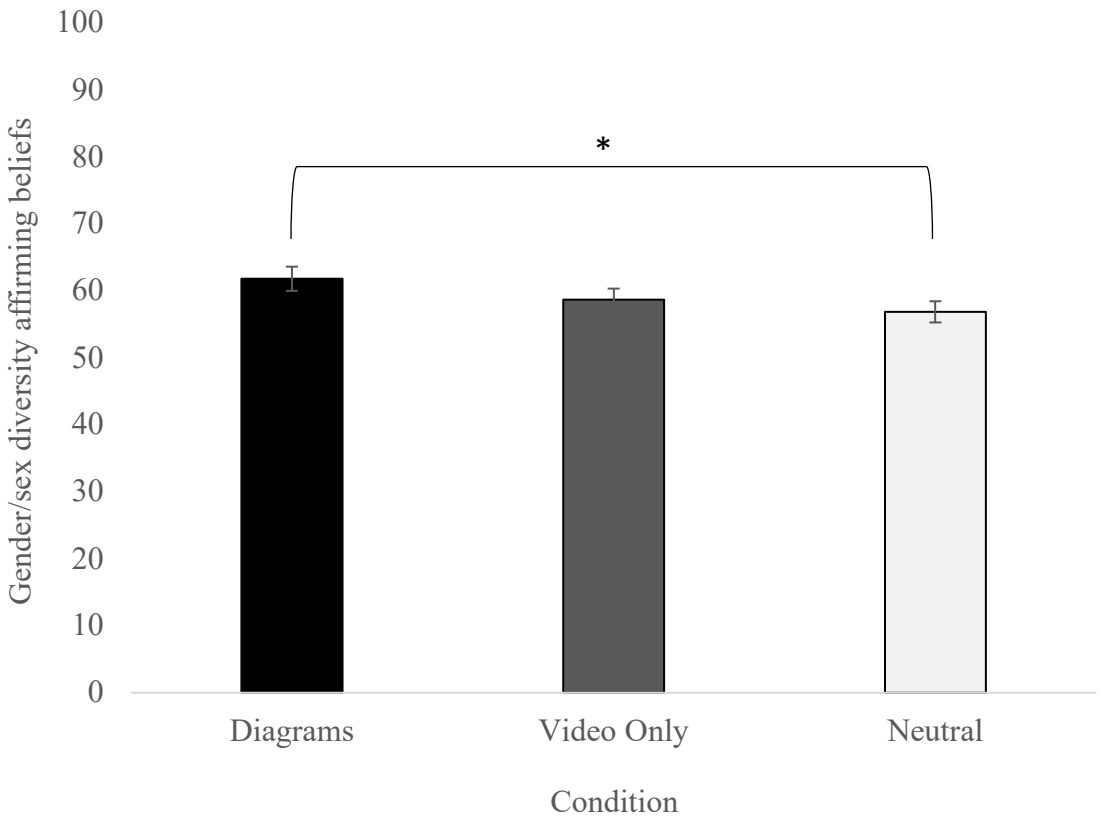

Figure 4.2. Effect of SCT intervention on gender/sex diversity affirming beliefs at baseline. * = $p < .05$; all other pairwise comparisons are non-significant.

Appendix A: Gender/Sex Diversity Beliefs Scale, Preliminary Item List

Please rate your level of agreement with the following statements about gender and sex.

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

1. Biological sex can never truly be changed.
2. A person's gender can change over time.
3. A person's genes determine their gender.
4. Gender identity is affected by how a person is raised.
5. A person's experiences growing up determine whether they will be feminine or masculine.
6. A person's gender identity depends on their experiences growing up.
7. No one can change their gender identity.
8. No one can control whether their gender identity changes over time.
9. A person can change their gender identity if they want to.
10. It is not possible for someone to choose whether they are transgender or cisgender (i.e., non-transgender).
11. How feminine or masculine a person feels is outside their control.
12. If someone is raised as a boy, their behavior will always be somewhat masculine even if they identify as a different gender as an adult

13. If someone is raised as a girl, their behavior will always be somewhat feminine even if they identify as a different gender as an adult.
14. A person with a penis can only ever be a woman if they have surgery to have a vagina instead.
15. A person with a vagina can only ever be a man if they have surgery to have a penis instead.
16. If someone self-identifies as a woman, it doesn't matter whether she has a vagina – she is still a woman.
17. If someone self-identifies as a man, it doesn't matter whether he has a penis – he is still a man.
18. Non-binary gender identities (i.e., identities other than "woman" and "man") are valid.
19. People who have a non-binary gender identity (i.e., identity other than "woman" or "man") only identify that way to get attention.
20. A person's gender identity is an expression of their true self.
21. Men who behave in feminine ways are looking for attention.
22. Women who behave in masculine ways are looking for attention.
23. People who express their gender in ways that go against society's norms are just being their true selves.
24. People who have non-binary gender identities (i.e., identities other than "woman" or "man") are just part of a fad that will go away eventually.
25. Transgender women can only truly be women if they look and behave in feminine ways.
26. Transgender men can only truly be men if they look and behave in masculine ways.
27. Being feminine is a defining part of being a woman.

28. A real man needs to be masculine.
29. Gender is about how you express yourself (e.g., how you dress or act).
30. There is more to being a man than having a penis.
31. There is more to being a woman than having a vagina.
32. The main thing that determines if someone is a woman or a man is whether they have a vagina or a penis.
33. Whether someone is a woman or a man depends on whether they have ovaries or testicles.
34. Hormones determine whether someone is a woman or a man.
35. A person's gender depends on whether their body produces eggs or sperm.
36. Whether someone is a woman or a man depends on their physical features like breasts, hips, facial hair, or muscularity.
37. Having the ability to bear children at some point in your life is necessary for being a woman.
38. Being a man means having the ability to make a woman pregnant.
39. Being a woman or a man has nothing to do with what genitals you have.
40. The only thing that determines whether someone truly is a woman or a man is whether they identify as a woman or a man.
41. A masculine woman is not truly a woman.
42. A feminine man is not truly a man.
43. Non-binary gender identities (i.e., identities other than woman or man, such as genderqueer or agender) are unnatural.
44. Transgender identities are natural.

45. Cisgender (i.e., non-transgender) identities are natural.
46. When a baby is born with genitals that are not clearly a vagina or a penis, it is because of a mistake of nature.
47. Gender identity is set at birth.
48. Transgender people were born the way they are.
49. If someone has a non-binary gender identity (i.e., identity other than "woman" or "man"), it is because of their biology.
50. Feminine men are feminine because of their biology.
51. Masculine women are masculine because of their biology.
52. Many different factors affect whether someone is feminine or masculine; there is no single cause.
53. People choose their gender identity.
54. People of the same gender tend to be similar to each other.
55. People of different genders are different from one another in many ways.
56. People who have the same biological sex are mostly similar to each other.
57. Feminine people are similar to other feminine people, and masculine people are similar to other masculine people.
58. There are many different ways to be feminine or masculine.
59. A person's gender is a reflection of who they are deep down.
60. Gender identity is a deeply important part of who people are.
61. Knowing someone's gender tells you a lot about them.
62. Knowing whether someone is biologically female or male does not tell you much about who they are.

63. Knowing whether someone is transgender or not tells you a lot about who they are as a person.
64. You can understand a lot about someone based on whether their behavior is feminine or masculine.
65. “Feminine” and “masculine” are not useful ways to describe people.
66. As a society, we should stop labeling people based on their gender.
67. It would be best if society stopped labeling people based on whether they are female or male.
68. It is important to divide certain spaces (e.g., bathrooms) based on gender.
69. For society to run smoothly, people need to be labeled on the basis of their gender.
70. There are many different gender identities people can have.
71. There are many possible gender identities beyond just woman or man.
72. Biological sex is not just female or male; there are many possibilities.
73. There are only two genders.
74. Every person is either female or male.
75. People are either women or men.
76. There aren’t many people who totally fit the labels “woman” or “man”.
77. Almost nobody is completely feminine or masculine; most people are a mix of both.
78. It is possible to have more than one gender identity at the same time.
79. Some people do not have a gender identity at all.
80. Transgender people have always existed in some form, regardless of what they were called.

81. Non-binary gender identities (i.e., gender identities other than “woman” and “man”) have always existed.
82. There have only been two genders throughout history.
83. Not all cultures have the same gender identities.
84. There have always been people who defied society’s expectations for their gender.
85. More and more people are identifying as transgender or non-binary (i.e., gender identity other than “woman” or “man”) because of greater societal tolerance.
86. The fact that more and more people are identifying as transgender or non-binary (i.e., gender identity other than “woman” or “man”) is a trend that will pass eventually.

Appendix B: Gender/Sex Diversity Beliefs Scale

Instructions: Indicate your level of agreement with the following statements about gender and sex.

Also, please note these definitions for terms some people might be unfamiliar with:

Transgender - a person whose gender identity is different from the gender they were assigned at birth. Example: "Michael is a transgender man. He was labeled a girl at birth and currently identifies as a man."

Cisgender - a person whose gender identity is the same as the gender they were assigned at birth. Example: "Alyssa is a cisgender woman. She was labeled a girl at birth and currently identifies as a woman."

Non-binary - a person whose gender identity exists beyond woman or man or involves both. Non-binary identities include genderqueer, agender, etc. Example: "Taylor is non-binary. Taylor was labeled a boy at birth but is now agender, and does not identify with man or woman, or any gender."

1. A person's gender can change over time. (AF1)
2. Non-binary gender identities are valid. (AF2)
3. Non-binary gender identities have always existed. (AF3)
4. People who express their gender in ways that go against society's norms are just being their true selves. (AF4)
5. Gender is about how you express yourself (e.g., how you dress or act). (AF5)
6. Being a woman or a man has nothing to do with what genitals you have. (AF6)
7. The only thing that determines whether someone truly is a woman or a man is whether they identify as a woman or a man. (AF7)
8. Transgender identities are natural. (AF8)
9. Transgender people were born the way they are. (AF9)

10. It would be best if society stopped labeling people based on whether they are female or male. (AF10)
11. There are many different gender identities people can have. (AF11)
12. Biological sex is not just female or male; there are many possibilities. (AF12)
13. It is possible to have more than one gender identity at the same time. (AF13)
14. Not all cultures have the same gender identities. (AF14)
15. Men who behave in feminine ways are looking for attention. (GN1)
16. A real man needs to be masculine. (GN2)
17. People of the same gender tend to be similar to each other. (UN1)
18. People who have the same biological sex are mostly similar to each other. (UN2)
19. Feminine people are similar to other feminine people, and masculine people are similar to other masculine people. (UN3)
20. A person with a penis can only ever be a woman if they have surgery to have a vagina instead. (SU1)
21. A person with a vagina can only ever be a man if they have surgery to have a penis instead. (SU2)
22. Gender identity is affected by how a person is raised. (UP1)
23. A person's experiences growing up determine whether they will be feminine or masculine. (UP2)

Appendix C: Sexual Configurations Theory – Gender/Sex Diagram

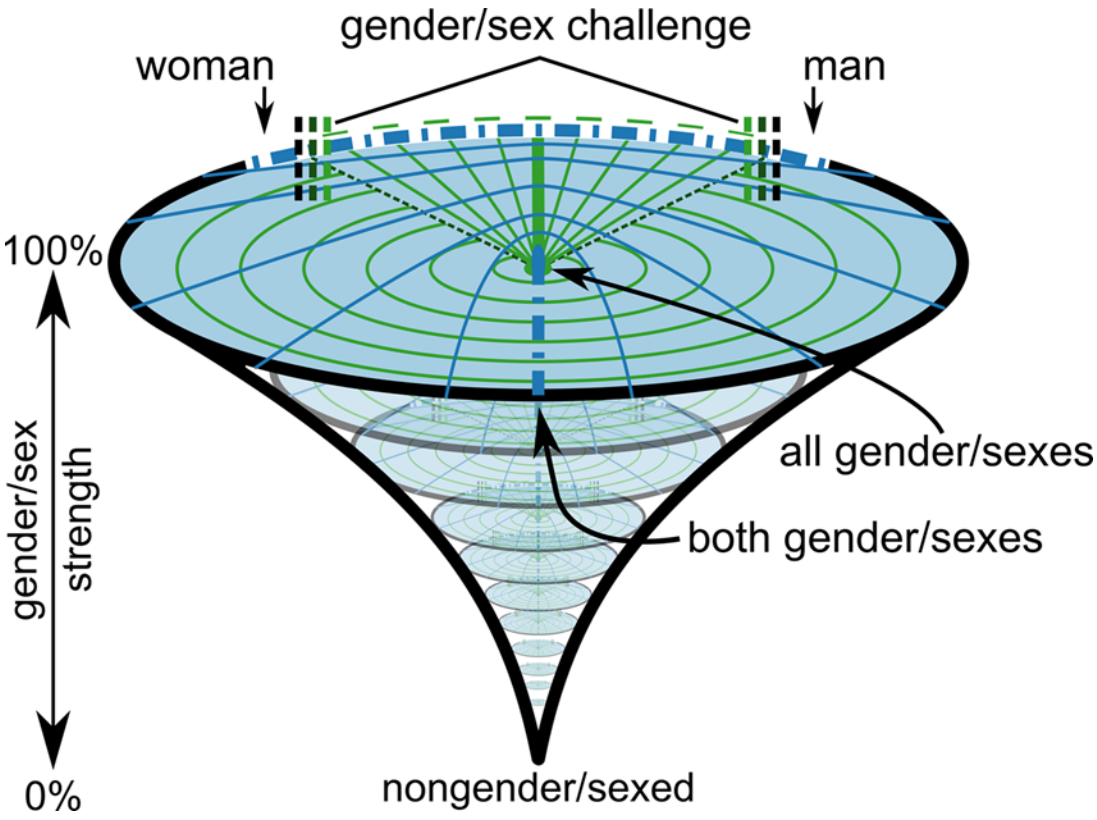

Figure C-1. A gender/sex SCT diagram.

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