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EMBODIMENT, IDENTITY, AND GENDER REGIMES IN THE UNITED STATES:

FINDINGS FROM POPULATION SURVEYS

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ABSTRACT

While qualitative research provides many insights into how gendered interactions operate at the level of interpersonal interactions and institutions, gender regimes, or political economic structures that shape inequality operate at the population level. It is now possible to look at the gender differences between the health of subpopulations beyond simple markers of "male" and "female," and to see how sex assignment at birth, identity at adulthood, and differences in embodied expression factor into the advantages and disadvantages mediated by the gender regime through social determinants of health. Using a general health surveys of adults in the United States, I begin by analyzing the general patterns in self-rated health in a population-level sample of cisgender men and women, transgender men and women, and gender nonconforming respondents 31 U.S. states and Guam collected between 2014 and 2016. This research is the focus of Essay I, which is a rather straightforward survey-weighted regression analysis of the original data, forthcoming in *Demography* in December 2018. In Essay II, I exploit a significant shortcoming in the same survey's design, in which the phone-based survey interviewers impute respondents' sex based on the sound of their voices without confirming it in any manner throughout the rest of the survey (Riley, Blosnich, Bear, and Reisner 2017). This shortcoming provides quasi-experimental conditions in which phone interviewers have recorded their own overall voice-based assumptions about the sex of transgender respondents without first knowing that respondents are transgender. Key differences are discernable between transgender men who are rated consistently with their gender identity, and those who are not, as well as among transgender women. Essay III builds on the findings of Essay II about embodied characteristics, and explores how gender presentation may influence rates of identifying as transgender, and finds that racial/ethnic differences factor into the likelihood of identifying as transgender, after controlling for gender presentation. This essay uses

data from the 2016 Minnesota Student Survey, a general survey of 9th and 11th graders in Minnesota Public schools.

CHAPTER 1: INTRODUCTION

For decades, transgender and gender nonconforming experiences have been used as axiomatic sociological examples of how gender conformity and gender nonconformity operate in the broader social world, informing concepts such as 'passing' (Garfinkel 1967) and 'performance' (West and Zimmerman 1987). More recent research approaches transgender individuals, communities, and populations as active participants in the constitution of their own identities, rather than simply conforming to monolithic conceptions of masculinity and femininity (Schilt 2018; Schilt and Lagos 2017). Transgender and gender nonconforming individuals face high levels of social marginalization, discrimination, and violence (Grant et al. 2011; Miller and Grollman 2015; James et al. 2016; Schilt 2010; Schilt and Westbrook 2009) in comparison to the general population, but not all members of this group experience social disadvantages in identical ways. The ways in which transgender and gender nonconforming individuals differ, including differences in embodiment and identity, has been studied extensively at the level of individuals, communities, and institutions in qualitative research, but there is little known about how these differences are reflected in nationally-bounded transgender populations. A better understanding of this variation may shift paradigms about the relationship between sex and gender, but also between sex and embodiment, giving demographers and gender scholars a more precise account of how gender dynamics work in populations.

As transgender individuals and communities have begun to receive greater attention in media and politics, a growing number of large-scale surveys include measures of transgender identity (Baker and Hughes 2016), however imperfect and imprecise (Westbrook and Saperstein 2015). Large-scale surveys are often criticized for failing to capture more nuanced observations typical of qualitative research on transgender and gender nonconforming individuals (Compton

2015), including information on individuals' identities, embodiment, self-presentation, and perceptions by others. It may seem that the relatively flat, single-dimension information gleaned from the few surveys that ask about transgender identity cannot adequately speak to the rich body of ethnomethodological, ethnographic, and in-depth interview data typical of qualitative studies of transgender individuals. In this three-essay dissertation, I contend that this is not the case. Large-scale surveys hold a great deal of underutilized potential for theoretically rich findings, which can be harnessed through innovative uses of existing meta-data, and their unparalleled value to informing the sampling methods for experimental research with richer qualitative aspects that will hopefully prove useful to digging deeper into the social mechanisms that shape inequalities in the transgender population.

Using a general health survey of adults and adolescents in the United States as a starting point, I begin by analyzing the general patterns in self-rated health in a population-level sample of cisgender men and women, transgender men and women, and gender nonconforming respondents 31 U.S. states and Guam collected between 2014 and 2016. Essay I is a rather straightforward survey-weighted regression analysis of the original data. In Essay II, I exploit a significant shortcoming in the same survey's design, in which the phone-based survey interviewers impute respondents' sex based on the sound of their voices without confirming it in any manner throughout the rest of the survey (Riley, Blosnich, Bear, and Reisner 2017). This shortcoming imperils the connections that can be drawn between sex and gender when referring to cisgender and gender nonconforming respondents. However, this same shortcoming actually provides quasi-experimental conditions in which phone interviewers have recorded their own overall voice-based assumptions about the sex of transgender respondents without first knowing that respondents are transgender. Key differences are discernable between transgender men who are rated consistently

with their gender identity, and those who are not, as well as among transgender women. Essay III builds on the findings of Essay II about embodied characteristics, and explores how gender presentation may influence rates of identifying as transgender, and whether racial/ethnic differences factor in to the likelihood of identifying as transgender, after controlling for gender presentation. This essay uses data from the Minnesota Student Survey, a general survey of 9th and 11th graders in Minnesota Public schools. Although these data are not representative, the survey includes multiple measures of gender that provide a useful starting point for future work and data collection.

Background

Population-level studies of gender and health and qualitative research on transgender health disparities have developed concurrently, but seldom speak to each other. When not attempting to reduce gender differences to biological roots (Udry 1994), population-level studies of the intersection of gender and health remain mostly concerned with the categories of "men" and "women," without distinguishing between cisgender and transgender men and women. Furthermore, they do not consider the health of gender nonconforming individuals at all. Population scholars often assume that deviation from gender norms stems from concrete conflicts within a delimited set of external goals, such as career progress (Park, Nawyn, and Benetsky 2015; Watkins 1993), and that these differences are mainly a conflict between biological factors and behavior, rather than a broader set of factors that include external perceptions related to sex and gender by others. Furthermore, few of these studies consider that deviation from gender norms may stem from an individual's wholescale conflict with the gendered identity they are expected to adopt based on their sex, rather than only a few points of tension. This results in work that overemphasizes slight variations in gender role patterns that nevertheless remain firmly rooted in

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an overarching preference for gender conformity, and largely ignores transgender and gender nonconforming identities (Deutsch 2007; Miller and Grollman 2015; Risman 2009).

This dissertation attempts to move population-level studies beyond the conformity-focused paradigms, and to look more closely at the roles that variations in embodied characteristics and identities play in gendered political economy of health. Here, gender is assumed neither to be the social expression of purely biological underlying factors nor purely subjective and individualized. Instead, gender is acknowledged as a mutable, variable social process in which identities and forms of embodiment are imbued with social meanings, over which individuals negotiate with and are held "accountable" by others in both daily interactions and in broader society (Connell 2009), often leading to negative consequences (Schilt and Westbrook 2009). Gender is also a deeply political arena, and is an individualized, embodied aspect of life by which states and political economies mediate the distribution of power and advantage, such as in the case of patriarchal gender regimes (Bambra 2009; Connell 1990; Strandh et al. 2013). While qualitative research provides many insights into how gendered interactions operate at the level of interpersonal interactions and institutions, gender regimes operate at the population level, particularly within populations that are bounded within a state or series of states. It is now possible to look at the gender differences between the health of subpopulations beyond simple markers of "male" and "female," and to see how sex assignment at birth, identity at adulthood, and differences in embodied expression factor into the advantages and disadvantages mediated by the gender regime through social determinants of health.

The larger scale of population-level studies does come with the hazard of missing or homogenizing the nuanced variation in transgender and gender nonconforming identities and experiences found in qualitative work (Compton 2015; Westbrook and Saperstein 2015). However,

limited data does not always have to be employed in a reductive and uncritical manner. As an analogous example, sexual orientation has become a more commonly studied facet in research on gender and health at the population level (Gorman et al. 2015), and the inclusion of lesbian, gay, and bisexual (LGB) subjects in this research provides some degree of precedent for including transgender, gender nonconforming, and nonbinary identities. While the constitutive LGB categories are not exhaustive or complete descriptions of how sexual orientation functions in the social world (Budnick 2016; Ela and Budnick 2017), they do provide a starting point from which to evaluate the intersection of gender (male, female) and some common forms of sexual identity, attraction, and behavior (straight, gay or lesbian, bisexual). While greater nuance can often yield insights that inform later data collection, abstraction and parsimony can also be useful to developing sophisticated social theory (Healy 2017). In this dissertation, I work with data that are similarly non-exhaustive approximations of gender identities and biological sex, reflecting the stated interests of the state agencies that collect this data. However, I also look at these incomplete data critically to form inferences that may not be intuitive or intended by the survey designers, but reveal key assumptions that prevail in how states and scholars think about populations.

Data

Behavioral Risk Factor Surveillance System, 2014-2016

Since 2014, the Centers for Disease Control's Behavioral Risk Factor Surveillance System (BRFSS) has included a series of questions that ask whether a respondent is transgender, gender nonconforming, or cisgender (non-transgender) (Baker and Hughes 2016; Centers for Disease Control and Prevention 2014 to 2016; Herman 2014). The term *transgender* refers to individuals who were assigned a sex at birth that does not correspond to their lived gender identity. A transgender woman, for example, was assigned male at birth, and identifies as a woman; a

transgender man was assigned female at birth, and identifies as a man. *Gender nonconforming* refers to individuals who do not exclusively identify as either men or women, regardless of their sex assigned at birth (male or female). Gender nonconforming identities can intersect with various expressions of cisgender or transgender identity (Miller and Grollman 2015), but the BRFSS does not ask respondents if they identify as gender nonconforming unless they identified as transgender during the interview, and the survey does not allow gender nonconforming individuals to select multiple gender identities that may reflect their experience (see Appendix A). Therefore, this study makes claims only about gender nonconforming respondents who explicitly identify as transgender, and who identify more closely with a gender nonconforming identity than with an identity as a transgender man or woman. *Cisgender* refers to individuals who identify as men or women and were assigned a sex at birth that corresponds to their lived identity. A cisgender man was assigned male at birth and identifies as a man; a cisgender woman was assigned female at birth and identifies as a woman.

In the BRFSS, the following questions are used to collect information on gender identity: First, the survey interviewer asks: "Do you consider yourself to be transgender?" If the respondent answers "No," the survey administrator moves on to other questions. If the respondent answers "Yes," the administrator asks, "Do you consider yourself to be male-to-female, female-to-male, or gender nonconforming?" If a respondent needs help defining "transgender" or "gender nonconforming" to understand the questions, interviewers provide a definition according to a uniform script (see Appendix A). Answers to this question are combined to produce unweighted samples of cisgender men ($n = 218{,}362$), cisgender women ($n = 298{,}391$), transgender women ($n = 1{,}078$), transgender men ($n = 701$), and gender nonconforming respondents who do not primarily identify as transgender women or transgender men ($n = 450$).

The ability of the BRFSS' gender identity questions to provide information about respondents' sex has recently come under scrutiny when identifying transgender respondents. Survey interviewers initially assess respondents' sex based on their interpretation of the timbre of a respondent's voice (Riley, Blosnich, Bear, and Reisner 2017). However, the main concerns that arise from this method correspond to the accuracy of findings regarding sex-specific medical tests, such as exams for prostate cancer. The majority of research based on the BRFSS considers this measure of sex to be sufficient for studying sex-based differences among cisgender populations. By definition, cisgender individuals identify with a gender that corresponds to the sex they were assigned at birth. Therefore, it is reasonable to assume that cisgender women were assigned female at birth, and cisgender men were assigned male at birth. Along the same lines, it is possible to infer that people who identify as transgender men were assigned female at birth, and people who identify as transgender women were assigned male at birth, based on the definitions of these terms provided to respondents by the interviewers (see Appendix A).

These limitations also have implication for findings based on gender nonconforming respondents. Data on gender nonconforming respondents can be used to analyze the overall influence of gender nonconforming identity, but they do not offer insight into the relative role of specifically male or female sex assignment at birth. Furthermore, as mentioned earlier, the BRFSS does not ask gender nonconforming respondents whether they also identify as a transgender man or transgender woman, even though these identities often overlap, and the survey does not allow respondents to identify as gender nonconforming if they do not first tell the interviewer that they identify as transgender. Among the sample, 79,657 respondents (13.3%) refused to answer, did not know, or were not asked the question regarding their gender identity. There is little information

Table 1: State samples using gender identity modules in BRFSS 2014 to 2016

State	Years Sampled	Pooled *n* =
West		
California	2016	11,382
Colorado	2015	13,487
Hawai'i	2014, 2015 & 2016	22,896
Idaho	2014, 2015 & 2016	16,500
Montana	2014	7,474
Nevada	2014, 2015 & 2016	11,009
Washington	2016	14,232
Wyoming	2014	6,393
Midwest		
Illinois	2015 & 2016	10,049
Indiana	2014, 2015 & 2016	28,514
Iowa	2014 & 2016	15,355
Kansas	2014 & 2015	36,887
Minnesota	2014, 2015 & 2016	49,894
Missouri	2015 & 2016	14,407
Ohio	2014, 2015 & 2016	35,176
Wisconsin	2014, 2015 & 2016	18,475
Northeast		
Connecticut	2015 & 2016	22,896
Massachusetts	2015 & 2016	17,650
New York	2014, 2015 & 2016	53,150
Pennsylvania	2014, 2015 & 2016	23,448
Rhode Island	2016	5,444
Vermont	2014 & 2016	12,984
South		
Delaware	2014, 2015 & 2016	12,393
Georgia	2015 & 2016	10,020
Kentucky	2014 & 2016	21,422
Louisiana	2014 & 2016	12,001
Maryland	2014 & 2015	25,117
Mississippi	2016	5,115
Texas	2015 & 2016	26,196
Virginia	2014, 2015 & 2016	27,035
West Virginia	2015	5,940
Guam	2014, 2015 & 2016	5,757
Total:	**2014, 2015 & 2016**	**598,286**

Note: Table presents unweighted sample sizes. Analyses adjust for population sampling and complex survey design using weights.

on why this information is missing in particular. However, for a relatively recently added question this degree of missingness is to be expected (Little and Rubin 2014), particularly given the level of stigma associated with transgender and gender nonconforming identities. These missing cases are imputed in all estimations, but results do not vary significantly when compared to models that exclude missing observations.

Table 2: Data and measures used in this dissertation, by essay

	Essay 1	Essay 2	Essay 3
Data Source(s):	BRFSS 2014-2016	BRFSS 2014-2016	MSS 2016
Sample Source(s):	Adults in 31 U.S. States	Adults in 31 U.S. States	9th and 11th Graders in Minnesota
Outcome Variable(s):	Self-Rated Health	Self-Rated Health	Transgender identity
Gender Identity Measure(s):	Imputed sex. If transgender, asked if female-to-male, male-to-female, or gender nonconforming.	Imputed sex. If transgender, asked if female-to-male, male-to-female, or gender nonconforming.	Asked for sex assigned at birth, asked if transgender.
External Perception Measures(s):	None used.	Voice-based rating of respondent sex by survey interviewer.	Self-reported scale of gender presentation: very or mostly feminine, somewhat feminine, equally feminine and masculine, somewhat masculine, and very or mostly masculine.

Minnesota Student Survey 2016

An ideal follow-up study to the first two studies would involve asking the recruited sample more questions, and obtaining various markers related to embodiment not collected by the BRFSS. These would help narrow down what factors within the broad categories of identity and

embodiment are most salient to shaping transgender health. However, it can be prohibitively expensive and time-consuming to replicate the BRFSS' methodology in order to obtain a comparable sample. In order to inform future data collection efforts, I have looked at the 2016 Minnesota Student Survey, which includes multiple measures of gender that I see as interesting for future research. These data are not representative, but they are sufficient to enable an initial exploratory study of how gender presentation may or may not relate to transgender identity.

CHAPTER 2:

ESSAY I: LOOKING AT POPULATION HEALTH BEYOND 'MALE' AND 'FEMALE':

IMPLICATIONS OF TRANSGENDER IDENTITY AND GENDER NONCONFORMITY

FOR POPULATION HEALTH[1]

Abstract

Looking beyond binary measurements of "male" or "female" can illuminate health inequality patterns that correspond to gender identity, rather than to biological sex. This study examines disparities in overall health between transgender men, transgender women, gender nonconforming adults, and cisgender (non-transgender) men and women in the U.S. population. Behavioral Risk Factor Surveillance System (BRFSS) data from 32 U.S. states and territories between 2014 and 2016 yield an analytic sample that identifies 2,229 transgender and gender nonconforming adults, and 516,753 cisgender adults. Estimates from logistic regression models, using cisgender men as a reference group, show that gender nonconforming respondents have significantly higher odds of reporting poor self-rated health than any other gender identity group. Transgender men also display higher odds of reporting poor health in some models, corresponding to their relative socioeconomic disadvantage. I find no apparent health disadvantage among transgender women, and a persistent, if slight, disadvantage among cisgender women. Gender nonconforming respondents' predicted probabilities of reporting poor health remain nearly twice as high as those of cisgender men after adjustments for demographic, socioeconomic, and behavioral factors. Their persistent patterns of health-related disadvantage underscore the need for higher-quality data on gender nonconforming respondents that accounts for sex assigned at birth.

Introduction

Most population-level studies of the relationship between gender and health evaluate differences between two groups: *men* and *women,* typically differentiated through biological, social, and behavioral characteristics (Case and Paxson 2005; Courtenay 2000; Read and Gorman 2006; Rogers, Everett, Saint Onge, and Krueger 2010; Udry 1994). However, scholars often conceptualize characteristics of men and women using distinct theoretical categorizations. *Sex* is typically assigned at birth as *male* or *female* based on physical characteristics, whereas *gender* consists of social identities and lived experiences (Butler 1986; West and Zimmerman 1987), including the traditional categories of men and women, and boys and girls. Individuals' gender identities may or may not correspond to the gender others attribute to their birth-assigned sex or physical characteristics (Krieger 2003). Moreover, sex and physical characteristics at birth do not always reflect binary classifications (Fausto-Sterling 2000), and aspects related to them may change during the life course. If this theoretical distinction is truly meaningful, research that compares only men versus women may fail to account for population-level health patterns that arise from social expectations or experiences linked to gender identity.

Most large-scale surveys do not measure sex and gender distinctly from each other. These surveys usually code respondents as simply male or female, conflating sex and gender as one and the same (Reisner et al. 2015). This practice reflects common shortcomings in large-scale survey data, which rarely capture gender identities with the same level of precision emphasized in theoretical work (Compton 2015; Dinno, Franks, Burleton, and Smith 2014; Schilt and Lagos 2017; Westbrook and Saperstein 2015). However, it is possible to identify and utilize certain existing measurements as proxies for biological sex and lived gender identities using population-level data, including by identifying transgender and gender nonconforming respondents.

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Figure 1. Conceptual diagram, sex and gender identity categories captured or inferable from Behavioral Risk Factor Surveillance System surveys from 2014 to 2016
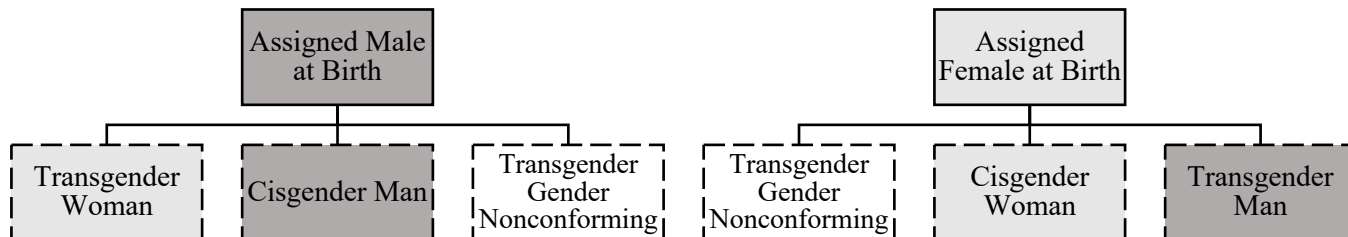
Note: Sex categories are outlined with solid lines, while gender identity categories are outlined with dashes.

Since 2014, the Centers for Disease Control's Behavioral Risk Factor Surveillance System (BRFSS) has included a series of questions that ask whether a respondent is transgender, gender nonconforming, or cisgender (non-transgender) (Baker and Hughes 2016; Centers for Disease Control and Prevention 2014 to 2016; Herman 2014). The term *transgender* refers to individuals who were assigned a sex at birth that does not correspond to their lived gender identity. A transgender woman, for example, was assigned male at birth, and identifies as a woman; a transgender man was assigned female at birth and identifies as a man. *Gender nonconforming* refers to individuals who do not exclusively identify as either men or women, regardless of their sex assigned at birth (male or female). Gender nonconforming identities can intersect with various expressions of cisgender or transgender identity (Miller and Grollman 2015), but the BRFSS does not ask respondents if they identify as gender nonconforming unless they identified as transgender during the interview, and the survey does not allow gender nonconforming individuals to select multiple gender identities that may reflect their experience (see Appendix A). Therefore, this study only makes claims about gender nonconforming respondents who explicitly identify as transgender, and who identify more closely with a gender nonconforming identity than with an identity as a transgender man or woman. *Cisgender* refers to individuals who identify as men or

women and were assigned a sex at birth that corresponds to their lived identity. A cisgender man was assigned male at birth and identifies as a man; a cisgender woman was assigned female at birth and identifies as a woman.

A person's relationship to prevailing gender roles, and the social expectations that come with them, may shape social opportunities and challenges that influence health in ways that are not primarily associated with one's sex assignment at birth. This study examines whether there are significant differences in overall self-rated health between five distinct gender identity groups: cisgender men, cisgender women, transgender women, transgender men, and gender nonconforming individuals. These groups represent intersecting axes of sex (male, female, etc.), gender identity (man, woman, gender nonconforming), and whether one is transgender or cisgender (See Figure 1).

Transgender and gender nonconforming individuals face pervasive social and health-related disadvantages (Bockting et al. 2013; Bradford, Reisner, Honnold, and Xavier 2013; Brennan et al. 2012; Connell 2010; Hughto, Reisner, and Pachankis 2015; James et al. 2016; Lombardi 2011; Schilt 2010), but few studies have corroborated these findings with samples that are not based on convenience or community-based recruitment methods until recently. Research based on a population sample from Massachusetts suggests that the patterns identified in convenience samples do not reflect a transgender health disadvantage at the population level (Conron, Scott, Stowell, and Landes 2012), but these findings are limited in generalizability because they rely on data collected from a single U.S. state. Research based on the first multi-state sample of the BRFSS in 2014 finds that transgender and gender nonconforming individuals, evaluated together as a broad group, have higher odds of reporting poor physical and mental health when compared to cisgender individuals (Meyer, Brown, Herman, Reisner, and Bockting 2017),

but no significant difference in alcohol consumption or rates of breast cancer screening (Blosnich, Lehavot, Glass, and Williams 2017; Narayan, Lebron-Zapata, and Morris 2017). Although the 2014 BRFSS' larger sample and more diverse sampling frame of 19 states inspires more confidence, these studies still do not include enough observations of transgender and gender nonconforming respondents (n = 691) to compare subpopulation health patterns between transgender women (n = 363), transgender men (n = 212), and gender nonconforming respondents (n = 116). Newer studies have used a slightly larger 27-state sample based on pooling the 2014 and 2015 BRFSS, which includes 724 transgender women, 449 transgender men, and 270 gender nonconforming adults. These studies have been able to establish some insights into differences in barriers to health care and HIV testing between transgender men, transgender women, and gender nonconforming adults, but still do not use these categories to compare differences in overall health between these groups (Gonzalez and Henning-Smith 2017; Pitasi, Oraka, Clark, Town and DiNenno 2017). In this study, I leverage a much larger sample pooled from 31 U.S. states and one U.S. territory in 2014, 2015, and 2016 that includes 1,075 transgender women, 699 transgender men, and 450 gender nonconforming respondents.

Do Gender Identity and Sex Contribute Differently to Health?

Gender role expectations for men and women vary across different cultures and socioeconomic strata, and they change over time (Furtado, Marcén, and Sevilla 2013; Kalmijn 2013). This suggests that gender roles are not uniformly predetermined by biology even among the cisgender majority, despite strong patterns of similarity across contexts. Nevertheless, population scholars still tend to assume that deviation from gender norms stems from concrete conflicts within a delimited set of external goals, such as career progress (Park, Nawyn, and Benetsky 2015; Watkins 1993). Few of these studies consider that deviation from gender norms

may stem from an individual's wholescale conflict with the gendered identity they are expected to adopt based on their sex, rather than only a few points of tension. This results in work that overemphasizes slight variations in gender role patterns that nevertheless remain firmly rooted in an overarching preference for gender conformity, and largely ignores transgender and gender nonconforming identities (Deutsch 2007; Miller and Grollman 2015; Risman 2009).

Indeed, wholescale tensions between individuals' gender identities and social expectations based on sex may shape health outcomes through minority stress processes (Meyer 1995), in which social marginalization can produce elevated levels of psychosomatic stress. In a large number of social settings, such as public restrooms, medical appointments, and educational institutions, transgender and gender nonconforming individuals often experience forms of stigma, discrimination, and alienation that can lead to elevated levels of psychological distress and poor health (Herman 2013; Miller and Grollman 2015; Reisner, Greytak, Parsons, and Ybarra 2015; shuster 2016). These sources of stress can manifest in a variety of ways among transgender and gender nonconforming individuals, including through experiences of gender dysphoria, anti-transgender violence, and complications related to seeking medical treatment (Lombardi 2009). With these patterns of inequality in mind, I formulate five hypotheses (Appendix B). I begin by hypothesizing an overall health disadvantage for transgender and gender nonconforming respondents in contrast to cisgender respondents:

Hypothesis 1: Transgender and gender nonconforming respondents will have higher odds of reporting poor health than will cisgender respondents.

Some scholars contend that differences between men and women are largely explained by biological and genetic factors unique to each population, rather than socially-driven factors related to gender roles and identity (Udry 1994). Studies that focus on sex-based health differences find

that cisgender women generally live longer than cisgender men, but that they experience worse self-rated health and higher incidence of hospitalization later in life (Case and Paxson 2005; Read and Gorman 2006). The picture of how sex influences health is less clear when comparing transgender women, transgender men, and gender nonconforming individuals. To evaluate biological and genetic factors versus social factors, the second hypothesis examines differences in the odds of reporting poor self-rated health between individuals who were presumably assigned female or male at birth. This hypothesis evaluates whether there are detectable disparities in self-reported health that correspond to sex assigned at birth, rather than a common identity as men or women:

> *Hypothesis 2: Respondents who were assigned female at birth (cisgender women and transgender men) will have higher odds of reporting poor health than will respondents who were assigned male at birth (cisgender men and transgender women).*

Differences in behavioral expectations for men and women regarding household roles, education, seeking medical treatment, and smoking shape health disparities between cisgender men and women (Courtenay 2000; Rogers et al. 2010; Ross, Masters, and Hummer 2012; Saltonstall 1993; Springer and Mouzon 2011; Stroope 2015). It is difficult to predict how closely patterns of behavioral and social difference, such as differences in smoking rates and marital status between transgender men and women, will resemble established differences between cisgender men and women. Many health stressors may have different degrees of salience for transgender men versus transgender women, including risk patterns for anti-transgender harassment and violence, complications due to different hormonal and surgical processes related to transitions (Bockting et al. 2013; Lombardi 2009), and different forms of discrimination in daily life (Schilt 2010). Transgender women have higher risk of experiencing psychosocial distress and HIV

positive status than do transgender men (Brennan et al. 2012; Clements-Nolle, Marx, Guzman, and Katz 2001). Transgender men may experience more discrimination in health settings and delayed access to medical procedures, compared to transgender women (Bradford 2013; Grant, Mottet, Tanis, Harrison, Herman, and Keisling 2011; James, Herman, Rankin, Keisling, Mottet, and Anafi 2016). Other studies find no statistically significant difference in instances of transgender-related hostility between transgender men and women (Bockting et al. 2013; Lombardi 2009). Hypothesis 3 thus evaluates gender identity–based differences between men and women, both cisgender and transgender:

> *Hypothesis 3: Cisgender women will have higher odds of reporting poor health than cisgender men, and transgender women will have higher odds of reporting poor health than transgender men.*

Research on gender nonconforming individuals suggests they are more likely to be disadvantaged than transgender men and women due to the social costs of not fitting into a commonly recognized gender category (Connell 2009; James et al. 2016; Harrison, Grant, and Herman 2012; Lombardi 2009; Schilt and Westbrook 2009). Many social settings and structures assume distinct and rigid roles for men and women, including transgender men and women, such as the workplace (Connell 2010; Schilt 2010), the doctor's office (Bradford et al. 2013; shuster 2016), and the law (Meadow 2010; Westbrook and Schilt 2014). Even if some gender nonconforming individuals may have more success than transgender men or women in concealing their identities from stigma, gender nonconformity can lead to diminished social status, higher rates of violence (Schilt and Westbrook 2009), and social isolation (Westbrook and Saperstein 2015). While transgender men and women are more likely to not have health insurance, gender nonconforming adults are more likely to have skipped medical treatment due to cost (Gonzalez

and Henning-Smith 2017). Some evidence suggests that gender nonconforming individuals experience poorer overall health patterns than do transgender men and women (Miller and Grollman 2015), but this relationship remains understudied at the population level using non-convenience sampling methods (Institute of Medicine 2011; Schilt and Lagos 2017). Hypothesis 4 thus evaluates the relevance of identifying as gender nonconforming to overall health:

Hypothesis 4: Gender nonconforming respondents will have the highest odds of reporting poor health of any group.

Gender identities, and their influence on health, do not occur in isolation from other important social factors, such as age, race/ethnicity, socioeconomic status (SES), social support, and behavioral factors. Gender differences in mortality often differ widely by age cohort, for example, due to differences in behavioral risk factors among men versus women in a given cohort (Preston and Wang 2006). Racial disparities in overall health between black, Hispanic, and white men are more pronounced than those between black, Hispanic, and white women (Read and Gorman 2006; Umberson, Williams, Thomas, Liu, and Thomeer 2014). Education, which often corresponds to broader socioeconomic patterns, has a larger association with self-rated health for women than for men (Ross, Masters, and Hummer 2012), and lower levels of poverty among women play a significant role in the gender health gap (Rogers et al. 2010). Marriage, as a form of social support, is associated with a health advantage (Rendall, Weden, Favreault, and Waldron 2011; Waite 1995), whereas divorce and separation often lead to loss of health insurance coverage for lower-SES women (Peters, Simon, and Taber 2014). Smoking rates are typically higher among men than among women, but they may be narrowing in more recent cohorts as gendered behavioral trends become more egalitarian (Case and Paxson 2005; Preston and Wang 2006; Rogers et al. 2010).

Evidence for whether these gender differences are reflected among transgender and gender nonconforming populations is sparse, but different patterns between these groups can be inferred from existing research. Elderly transgender adults report poorer overall health than do elderly cisgender adults, perhaps due to the greater stigma and lack of social support faced by elderly transgender individuals (Frederiksen-Goldsen et al. 2014). Black, Hispanic, and lower-SES transgender individuals face more transgender-related stigma and discrimination than do white and wealthier transgender individuals (Lombardi 2009), as well as higher risk of HIV and sexually transmitted infections (Nuttbrock et al. 2009; Sevelius 2013). Transgender and gender nonconforming children, adolescents, and young adults may face heavy discrimination and hostility in educational settings, from primary school through college (Bradford et al. 2013; Reisner, Greytak, Parsons, and Ybarra 2015), which could lead to differences in educational attainment and socioeconomic positions later in life. Transgender men report higher smoking rates than transgender women, and gender nonconforming individuals have a higher smoking rate than any other group (Miller and Grollman 2015). Very little is known regarding marriage patterns, and particularly their implications for health patterns, among transgender and gender nonconforming populations (Biblarz and Savci 2010). However, convenience-based studies suggest that transgender individuals have lower rates of marriage than does the general U.S. population (Herman et al. 2016). Adjusting for socioeconomic factors situates comparisons between gender identity groups in a broader social context:

> *Hypothesis 5: Adjustments for socioeconomic status, marital status, and smoking rates will reduce the overall risk of reporting poor health for all groups, but transgender and gender nonconforming individuals will still face significantly higher odds of reporting poor health than cisgender men.*

Data and Methods

Data used in this study come from the Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance System (BRFSS) between 2014 and 2016, gathered from 31 states and one U.S. territory (see Appendix C). The BRFSS is a nationwide health survey of non-institutionalized U.S. adults conducted by each U.S. state and territory's public health department. The survey uses household-based probability sampling and random digit dialing of landlines and cellular phones to recruit respondents. Since 2014, the BRFSS has adopted a standardized sexual orientation and gender identity module that asks respondents whether they identify as transgender, and if so, whether they identify as male-to-female transgender (transgender women), female-to-male transgender (transgender men), or gender nonconforming (see Appendix A). This module is optional, and 32 U.S. state and territory health departments implemented it in all or some administrations of the BRFSS since 2014, producing a final analytic sample that includes 598,286 respondents (see Appendix C). Pooling the data in this manner greatly expands the breadth and representability of previous samples on transgender health, and it provides more information about health-related trends in the transgender population than what is available through convenience samples. Survey weighting ensures that analyses of the pooled sample are adjusted to reflect the state's actual population and the number of years of data available from each state.

Measures

Following prior demographic work on intercategorical gender differences in self-rated health (Gorman et al. 2015), I use a dichotomous outcome classification of self-rated health as the dependent variable. "Poor" and "fair" self-rated health are combined as one outcome, categorized as "poor health." "Good," "very good," and "excellent" self-rated health are combined as another outcome, categorized as "good health." Self-rated health is a robust predictor of mortality in

populations (DeSalvo, Bloser, Reynolds, He, and Mutner 2006; Idler and Benyamini 1997; Jylhä 2009), irrespective of socioeconomic status (Frankenberg and Jones 2004; Gorman and Sivanganesan 2007; Quesnel-Valée 2007). I also evaluate potential factors that may indicate stressors and may intersect with gender identity, such as socioeconomic status, race/ethnicity, marital status, and smoking (Denney, Gorman, and Barrera 2013; Rendall, Weden, Favreault, and Waldron 2011; Waite 1995). Because self-rated health is in the core module of the BRFSS asked by every state public health agency, very few cases are missing answers to this question (353, or >0.01%); the few cases missing answers are excluded from regression models and predicted probabilities.

In the BRFSS, the following questions are used to collect information on gender identity: First, the survey interviewer asks: "Do you consider yourself to be transgender?" If the respondent answers "No," the survey administrator moves on to other questions. If the respondent answers "Yes," the administrator asks, "Do you consider yourself to be male-to-female, female-to-male, or gender nonconforming?" If a respondent needs help defining "transgender" or "gender nonconforming" to understand the questions, interviewers provide a definition according to a uniform script (see Appendix A). Answers to this question are combined to produce unweighted samples of cisgender men ($n = 218,362$), cisgender women ($n = 298,391$), transgender women ($n = 1,078$), transgender men ($n = 701$), and gender nonconforming respondents ($n = 450$).

The ability of the BRFSS' gender identity questions to provide information about respondents' sex has recently come under scrutiny when identifying transgender respondents, because survey interviewers initially assess respondents' sex based on their interpretation of the timbre of a respondent's voice (Riley, Blosnich, Bear, and Reisner 2017). However, the main concerns that arise from this method correspond to the accuracy of findings regarding sex-specific

medical tests, such as exams for prostate cancer. The majority of research based on the BRFSS considers this measure of sex to be sufficient for studying sex-based differences among cisgender populations. By definition, cisgender individuals identify with a gender that corresponds to the sex they were assigned at birth. While sex is indeed a multidimensional trait combining multiple physical characteristics, as well as various medical and legal classifications (Fausto-Sterling 2000), it is possible to assume that in the vast majority of cases, cisgender women were assigned female at birth, and cisgender men were assigned male at birth. Along the same lines, it is possible to infer that people who identify as transgender men were assigned female at birth, and people who identify as transgender women were assigned male at birth, based on the definitions of these terms provided to respondents by the interviewers (see Appendix A).

These limitations also have implication for findings based on gender nonconforming respondents. Data on gender nonconforming respondents can be used to analyze the overall influence of gender nonconforming identity, but they do not offer insight into the relative role of specifically male or female sex assignment at birth. Furthermore, as mentioned earlier, the BRFSS does not ask gender nonconforming respondents whether they also identify as a transgender man or transgender woman, even though these identities often overlap, and the survey does not allow respondents to identify as gender nonconforming if they do not first tell the interviewer that they identify as transgender. Among the sample, 79,657 respondents (13.3%) refused to answer, did not know, or were not asked the question regarding their gender identity. For a relatively recently added question, this degree of missingness is to be expected (Little and Rubin 2014), particularly given the level of stigma associated with transgender and gender nonconforming identities. These missing cases are imputed in all estimations, but results do not vary significantly when compared to models that exclude missing observations.

To account for the influence of aging on self-rated health, I include being *65 years old or older at the time of interview* as a ditchotomouws measure. I also account for *racial and ethnic categories*, divided into the following groups: non-Hispanic whites, non-Hispanic blacks, Hispanics of any race, and non-Hispanic respondents who are multiracial or identify with a race or ethnicity not encompassed by the above categories. Socioeconomic status is evaluated through *level of education attained* (no high school degree, having a high school diploma or GED, having attended college). These distinctions correspond to distinct categorical differences in lifetime earnings (Kane and Rouse 1995; Tyler and Lofstrom 2009). In addition to education, I use respondents' *income* to account for the broader relationship between general access to material resources and health (Benzeval and Judge 2001; Deaton and Paxson 1998); this is a dichotomous measure of *whether the respondent's household income is greater than $50,000.* In order to account for the number of potential earners and dependents living on this level of income, I also include two measures for whether there are *any children* or *any other adults* living in the respondent's household in all analyses that include income.

I use respondents' *marital status and history* as a measure of social support, as marriage has well-established links to overall health (Rendall, Weden, Favreault, and Waldron 2011; Waite 1995). Respondents are classified as being currently married or in an unmarried couple, having ever been married (including respondents who are widowed, divorced, or separated), and have never been married. BRFSS surveys occasionally collect measures of overall emotional support, which may come from relationships outside marriage and partnership, but at this time only a few states administer that module. I thus do not use those measures here, even though they may be useful for evaluating whether transgender and gender nonconforming individuals benefit from different forms of social support than does the general population (Pfeffer 2012). Finally, I

consider *smoking* as a behavioral risk factor that often differs between men and women (Preston and Wang 2006), as well as between transgender and cisgender populations in both patterns of use and marketing (Amos, Greaves, Nichter, and Bloch 2012; Smith, Thomson, Offen, and Malone 2007); it is measured through groupings of respondents who are current smokers, former smokers, and have never smoked.

Analysis

To optimize each step of the data preparation and analysis process with the best computational resources available, I used both R and Stata. Data were pooled and recoded using R 3.4.0. Then, I imputed missing data using an expectation-maximization with bootstrapping (EMB) algorithm using the *Amelia* package, version 1.7.4 in R (Honaker, King, and Blackwell 2011), using a total of five imputations, as recommended by the program developers. Self-rated health is included in the imputation model, but after imputation I deleted observations that originally had missing outcome variables, following the "multiple imputation, then deletion" (MID) process (Gorman et al. 2015; Von Hippel 2007).

For the estimation of models, I combined multiple imputation estimations with survey weighting (using first-order Taylor linear approximation), which accounts for the complex design of the BRFSS, using the *mi* and *svy* functions in Stata 15.0 (StataCorp 2017). I evaluate odds ratios and confidence intervals obtained from logistic regression models to examine whether particular factors are associated with disparities in self-rated health. Logistic regression is suitable for analyzing binary outcomes, but comparing odds ratios across models can be problematic (Mood 2010). To compare gender identity groups to each other individually, I used logistic regression parameters to calculate predicted probabilities; this produces mean estimates for the probability of reporting poor health, comparing the baseline model with the fully adjusted model (Bartus 2005;

Table 3: Descriptive overview, survey weighted percentages from analytic sample of Behavioral Risk Factor Surveillance System, 2014 to 2016

Poor Health (%)	17.12	[8.27,8.31]
Gender Identity		
Cisgender Man (%)	47.68	[47.40,47.95]
Cisgender Woman (%)	51.82	[51.54,52.09]
Transgender Man (%)	0.25	[0.22,0.29]
Transgender Woman (%)	0.15	[0.13,0.17]
Gender Nonconforming (%)	0.11	[0.09,0.13]
65+ Years Old (%)	19.39	[19.22,19.55]
Race / Ethnicity		
White (%)	64.36	[64.10,64.62]
Black (%)	11.70	[11.52,11.88]
Hispanic (%)	14.13	[13.91,14.35]
Other (%)	9.81	[9.63,9.98]
Education		
Less than high school (%)	13.74	[13.52,13.95]
High School / GED (%)	28.90	[28.67,29.13]
Any College (%)	57.37	[57.11,57.63]
Income > $55,000/year (%)	48.55	[48.28,48.83]
Household Composition		
Any Children (%)	37.49	[37.24,37.75]
Any Other Adults (%)	92.02	[91.95,92.10]
Marital Status		
Currently Married / Partnered (%)	55.53	[55.27,55.78]
Ever Married (%)	19.78	[19.60,19.97]
Never Married (%)	24.69	[24.45,24.93]
Smoking Status		
Current Smoker (%)	58.95	[58.70-59.21]
Former Smoker (%)	24.27	[24.06-24.49]
Never Smoked (%)	58.95	[58.70-59.21]

Gorman et al. 2015). The *mimargins* function in Stata generates predicted probabilities, which can be used to make pairwise comparisons based on the average marginal effect (AME) of belonging to each gender identity group. All significance tests were evaluated by applying the Benjamini-Hochberg control for the false discovery rate (0.05) for multiple comparisons (Benjamini & Hochberg 2000).

Table 4: Sample characteristics: percentages. Pooled analytic sample from Behavioral Risk Factor Surveillance System, 2014 to 2016

	Cisgender Men (n = 217,857)	Cisgender Women (n = 297,748)	Transgender Men (n = 701)	Transgender Women (n = 1,078)	Gender Nonconforming (n = 450)
Poor Health (%)	16.64	18.16	23.32	18.42	30.28
	[16.34,16.95]	[17.87,18.45]	[18.06,29.58]	[14.91,22.53]	[23.15,38.50]
65+ Years Old	18.63	22.49	15.79	15.84	14.61
	[18.36,18.90]	[22.23,22.76]	[12.44,19.83]	[12.67,19.63]	[9.99,20.88]
Race / Ethnicity					
White (%)	66.22	66.22	50.85	58.01	51.88
	[65.80,66.65]	[65.83,66.61]	[43.34,60.30]	[51.32,64.41]	[43.34,60.30]
Black (%)	10.41	11.83	12.80	14.34	13.92
	[10.13,10.69]	[11.58,12.09]	[8.98,17.92]	[9.75,20.60]	(8.65,21.65]
Hispanic (%)	13.96	13.50	24.22	15.99	20.79
	[13.60,14.32]	[13.18,13.82]	[17.47,32.56]	[10.58,23.43]	[13.77,30.12)
Other (%)	9.41	8.45	10.59	13.20	13.42
	[9.15,9.68]	[8.19,8.72]	[6.05,17.89]	[9.52,18.03]	[8.68,20.15]
Education					
< HS (%)	13.93	13.04	27.65	27.12	16.49
	[13.58,14.28]	[12.73,13.36]	[20.83,35.72]	[20.91,34.38]	[10.39,25.16]
HS/GED (%)	30.52	27.76	39.74	34.51	30.02
	[30.14,30.89]	[27.43,28.09]	[32.58,47.36]	[29.41,39.99]	[23.06,38.05]
Any College (%)	55.56	59.20	32.60	38.37	53.49
	[55.14,55.97]	[58.82,59.57]	[26.36,39.53]	[32.58,44.50]	[44.96,61.82]
Household Size					
Any Children (%)	34.96	39.01	46.62	30.89	28.13
	[34.56,35.37]	[38.63,39.39]	[39.04,54.36]	[24.86,37.65]	[21.26,36.20]
Any Other Adults (%)	93.96	88.79	91.21	94.00	92.97
	[93.85,94.07]	[88.64,88.94]	[88.48,93.34]	[92.43,95.26]	[90.28,94.96]
Income > $55,000/year (%)	52.68	45.65	26.93	31.64	37.23
	[52.25,53.12]	[45.24,46.05]	[19.91,35.35]	[26.45,37.33]	[28.79,46.53]
Marital Status					
Curr. Married / Partnered (%)	58.20	54.67	43.56	52.71	44.48
	[57.79,58.61]	[54.29-55.04]	[36.17,51.25]	[46.51,58.83]	[36.27,53.00]
Ever Married (%)	15.44	24.52	22.12	18.15	17.22
	[15.16,15.72]	[24.23-24.82]	[17.13,28.08]	[14.67,22.24]	[12.62,23.06]
Never Married (%)	26.36	20.81	34.32	29.14	38.30
	[25.97,26.75]	[20.47-21.16]	[27.21,42.21]	[23.92,34.98]	[30.08,47.24]
Smoking Status					
Current Smoker (%)	19.00	14.85	23.78	21.65	16.47
	[18.68,19.33]	[14.59-15.10]	[17.70,31.17]	[17.10,27.01]	[11.66,22.74]
Former Smoker (%)	28.46	21.79	15.72	23.96	16.44
	[28.10,28.82]	[21.50-22.07]	[11.82,20.60]	[19.71,28.79]	[12.04,22.05]
Never Smoked (%)	52.54	63.37	60.50	54.40	67.09
	[42.13,52.95]	[63.02-63.71]	[53.01,67.52]	[48.23,60.43]	[59.55,73.84]

Results

Sample Characteristics

Table 3 presents characteristics of the entire analytic sample, and Table 4 presents bivariate relationships between gender identity and all sample characteristics, and shows that gender nonconforming respondents have the highest prevalence of reporting poor health (30.28%), followed by transgender men (23.32%), transgender women (18.42%), cisgender women (18.16%), and finally cisgender men (16.64%). As a group, cisgender respondents have lower overall rates of poor self-reported health than do transgender and gender nonconforming respondents. Cisgender women have a higher prevalence of poor self-reported health than cisgender men, and transgender men have a higher prevalence than transgender women. Gender nonconforming adults have the highest proportion of respondents reporting poor health of any group. Transgender men, transgender women, and gender nonconforming respondents have lower proportions of white respondents than cisgender men and women, with higher proportions of black, Hispanic, and other ethnic/racial groups. Compared to transgender men and women, gender nonconforming respondents have higher rates of college attendance and yearly household incomes over $55,000, and far lower rates of not having completed high school. Gender nonconforming respondents also have the lowest rate of ever having smoked compared to all other groups.

Logistic Regression Models for Poor Self-Rated Health

Table 5 presents the odds ratios from a series of logistic regression models predicting self-reported poor health. All tests that are rejected in the original models are also rejected after applying the Benjamini-Hochberg adjustment (Benjamini & Hochberg 2000), and are indicated in the shaded cells. Model 1 compares the cisgender and transgender samples. As a group, the transgender sample has a significant overall health disadvantage compared to the cisgender group

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Table 5: Estimated odds ratios from logistic regressions predicting poor self-reported health. Pooled analytic sample from Behavioral Risk Factor Surveillance System, 2014 to 2016

	Model 1	Model 2	Model 3	Model 4
Transgender / Gender Nonconforming	1.37** [1.14,1.63]			
Gender identity *(Ref. = Cisgender man)*				
Cisgender Woman		1.11*** [1.08,1.15]	1.08*** [1.05,1.11]	1.09*** [1.05,1.13]
Transgender Man		1.53* [1.11,2.11]	1.45* [1.05,2.01]	1.06 [0.71,1.59]
Transgender Woman		1.13 [0.88,1.46]	1.12 [0.86,1.47]	0.81 [0.59,1.11]
Gender Nonconforming		2.18*** [1.51,3.15]	2.10*** [1.42,3.13]	2.06** [1.25,3.40]
65 Years Old +			1.96*** [1.90,2.02]	1.26*** (1.21,1.31)
Race/Ethnicity *(Ref. = White)*				
Black			1.57*** [1.50,1.64]	1.33*** [1.26,1.40]
Hispanic			2.14*** [2.04,2.24]	1.46*** [1.37,1.54]
Other			1.13*** [1.06,1.20]	1.21*** [1.13,1.30]

Notes: Table 5 is continued on the next page. 95% confidence intervals for all estimates provided in brackets. Shaded odds ratios and confidence intervals indicate test rejected after adjustment for false discovery rates.

(odds ratio [OR] = 1.37, 95% confidence interval [CI] = 1.14,1.63), replicating the findings of past research (Meyer et al. 2017), and confirming Hypothesis 1. Model 2 compares each gender identity group separately in reference to cisgender men. The odds of reporting poor health among transgender women do not differ significantly from cisgender men, but gender nonconforming respondents (OR = 2.18, CI = 1.51,3.15) transgender men (OR = 1.53, CI = 1.11,2.11), and cisgender women (OR = 1.11, CI = 1.08,1.14) report significantly higher odds of reporting poor health than do cisgender men.

Table 5 (cont.): Estimated odds ratios from logistic regression predicting poor self-reported health. Pooled analytic sample from Behavioral Risk Factor Surveillance System survey, 2014 to 2016

	Model 1	Model 2	Model 3	Model 4
Education				
(Ref. = Less than HS)				
High School / GED				0.51***
				[0.49,0.54]
Any College				0.37***
				[0.36,0.39]
Income > $50,000/ year				0.36***
				[0.35,0.38]
Household Composition				
Any Children				0.68***
				[0.66,0.71]
Any Other Adults				0.94
				[0.91,0.98]
Marital status				
(Ref. = Curr. married				
/partnered)				
Ever Married				1.24***
				[1.19,1.29]
Never Married				0.73***
				[0.69,0.77]
Smoking				
(Ref. = Never smoked)				
Former Smoker				1.51***
				[1.45,1.57]
Current Smoker				1.85***
				[1.77,1.93]

Notes: Table 5 is continued from previous page. 95% confidence intervals for all estimates provided in brackets. Shaded odds ratios and confidence intervals indicate test rejected after adjustment for false discovery rates.

When controls for age and race/ethnicity are included in Model 3, cisgender women (OR = 1.08, CI = 1.05,1.11), transgender men (OR =1.45, CI = 1.05,2.01), and gender nonconforming respondents (OR = 2.10, CI = 1.41,3.13) retain a statistically significant overall health disadvantage in comparison to cisgender men. Ultimately, there are no major differences in direction or significance between Models 2 and 3, and the odds of reporting poor health remain insignificant among transgender women in reference to cisgender men. Model 4 further adjusts for socioeconomic and behavioral factors, including levels of education and income, household size,

Figure 2: Predicted probabilities of reporting poor health by gender identity and misclassification in BRFSS 2014-2016
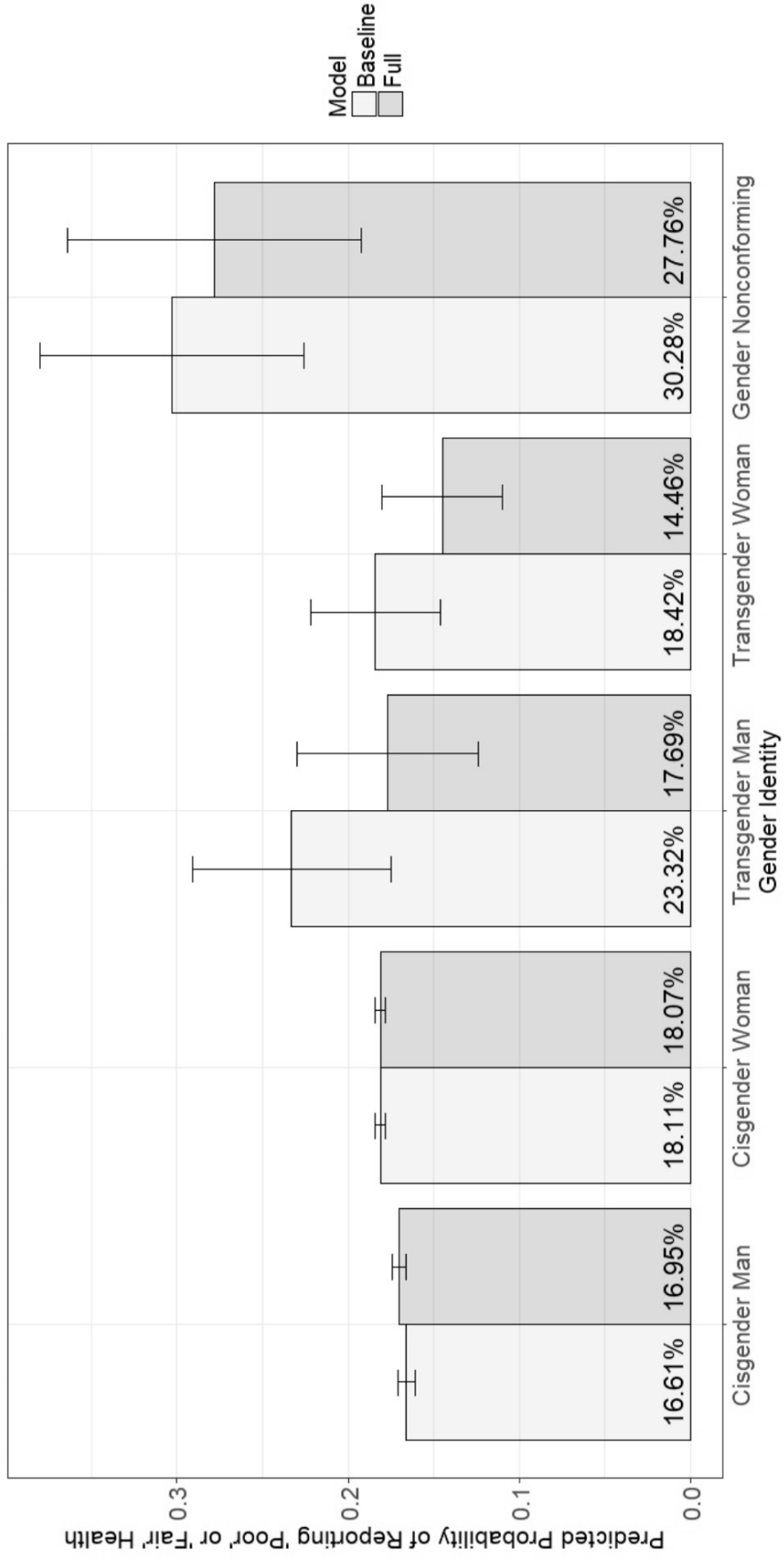
marital status, and lifetime smoking history. Cisgender women (OR = 1.09, CI = 1.05,1.13) and gender nonconforming respondents (OR = 2.06, CI = 1.25,3.40) continue to have statistically significant higher odds of poor self-rated health in comparison to cisgender men. However, transgender men no longer display any statistically significant differences in comparison to cisgender men in this model, and neither do transgender women.

A central finding here is that a discernable disadvantage persists among the gender nonconforming subpopulation: their odds of reporting poor health remain over twice as high as cisgender men even after adjusting for demographic, socioeconomic, and behavioral factors. Even in the fully adjusted model, the association between gender nonconforming identity and reporting poor health is stronger than the association between poor self-rated health and being a current smoker (OR = 1.85, CI = 1.77,1.93). Another significant finding is that there is no discernably significant disadvantage among transgender men after I adjust for key demographic, socioeconomic, and behavioral factors in Model 4. Transgender men have the lowest proportions of having attended college or having an income over $55,000 per year, and have the highest proportion of having any children in their households, as well as the highest rate of current smokers of any group, suggesting that these factors are closely related to their overall health (see Table 2). Surprisingly, in comparison to cisgender men, transgender women are not disadvantaged in terms of their self-rated health.

To make comparisons between the gender identity groups, Figure 2 presents the average predicted probabilities derived from the baseline and fully adjusted models (Models 2 and 4, respectively), and a table of significant pairwise comparisons between these predicted probabilities is presented in Appendix D. Consistent with findings from the logistic regression models, cisgender women have a significant and slightly higher predicted probability of reporting poor

health than do cisgender men (0.181 in both models). Transgender men have a significant health disadvantage compared to cisgender men in the baseline model (0.233), but this pairwise comparison is not significant after adjusting for demographic, socioeconomic, and behavioral factors in Model 4 (0.177), consistent with findings from the logistic regression estimates. Gender nonconforming respondents have a significantly higher probability of reporting poor health compared to cisgender men, cisgender women, and transgender women in both models (0.303 in the baseline model and 0.278 in the fully adjusted model). However, gender nonconforming respondents' probabilities of poor health do not differ significantly compared to transgender men in the baseline or fully adjusted models.

While Hypothesis 1, which asserts that transgender respondents will have an overall health disadvantage compared to cisgender respondents, is confirmed by the logistic regression results, the predicted probabilities reveal serious heterogeneity within this group: transgender women do not have a significant health disadvantage compared to cisgender men in the predicted probabilities from either model. Gender nonconforming respondents are the only non-cisgender group with a consistently significant health disadvantage compared to both cisgender men and cisgender women. Transgender men only have a significant disadvantage in comparison to cisgender men in the baseline model. Hypothesis 2, testing the influence of being assigned female or male at birth, posits that cisgender women will have higher odds of poor self-rated health than cisgender men, and transgender men will have higher probabilities of poor self-rated health than transgender women. Cisgender women's predicted probabilities of poor self-rated health are only slightly higher than those of cisgender men, and transgender men's predicted probabilities of poor self-rated health are only higher than cisgender men's in the baseline model, and never higher than those of transgender women in a significant pairwise comparison. Given the difference between

cisgender women's predicted health disadvantage in comparison to cisgender men, and the lack of a discernable disadvantage between transgender men and women, these predicted probabilities suggest that being assigned a woman at birth does not necessarily predict a health disadvantage among transgender men.

Hypothesis 3, which posits that individuals who identify as women will have a health disadvantage compared to individuals who identify as men, does not have much evidence in its favor either: I do not find significant differences in predicted probabilities of poor self-rated health between transgender men and transgender women, nor between cisgender men and cisgender women. I do find support for Hypothesis 4, which posits that gender nonconforming respondents will have the highest health disadvantage of any group. Gender nonconforming respondents had high probabilities of reporting poor health in both models (0.303 in the baseline model, 0.278 in the fully adjusted model), and significant contrasts in pairwise comparisons to cisgender men, cisgender women, and transgender women. Among all gender identity groups, predicted probabilities of reporting poor health are lower after adjusting for demographic, socioeconomic, and behavioral factors, except among cisgender men, whose probabilities of reporting poor health are slightly higher.

Conclusion

Through an intercategorical approach adapted from past research (Gorman et al. 2015), this study tests whether different configurations of sex categories, such as male or female assignment at birth, in conjunction with gender identities such as man or woman and whether one is transgender, cisgender, or gender nonconforming correspond to significant health differences that can be detected at the population level. Instead of testing for one basic association between cross-gender identification and self-rated health, grouping all transgender and gender nonconforming

identities together, I evaluated whether patterns of disadvantage are different for transgender women, transgender men, and gender nonconforming individuals.

My findings suggest that gender nonconforming individuals face significantly higher odds of reporting poor health compared to cisgender men, and transgender men and cisgender women also face some forms of this disadvantage. The estimates of reporting poor health among transgender men are sensitive to adjustments for socioeconomic factors, suggesting that transgender men's health disparities may be driven by social exclusion and socioeconomic marginalization. Cisgender women have a persistent self-rated health disadvantage compared to cisgender men in all models, but transgender women's odds of reporting poor health are not higher than those of transgender men. In fact, transgender women's probabilities of poor health do not differ significantly from those of any other group, with the exception of a marked advantage in comparison to gender nonconforming respondents in both baseline and fully adjusted models. I do not find evidence of a health disadvantage explicitly based on identifying as a woman, which cisgender women and transgender women share in common; however, in the fully adjusted model, compared to all groups, transgender women have the lowest odds of reporting poor health.

The persistence of the health disadvantage among gender nonconforming individuals presents strong evidence of a significant association between identifying outside of a binary gender identity (man or woman) and a higher risk of reporting poor health, at least among gender nonconforming individuals who identify as transgender. This association between gender nonconformity and higher odds of reporting poor health persists even after adjusting for demographic and socioeconomic factors, marital status, and rates of ever having smoked: this group remains over twice as likely as cisgender men to report poor health in all regression estimates, and almost twice as likely in the fully adjusted predicted probabilities. Past research on

the unique social position of gender nonconforming individuals emphasizes the challenges of navigating social and clinical spaces in a cultural context in which belonging to the categories of "man" or "woman" is often treated as an essential requirement, and in which instances of gender misclassification often cause stress or violent victimization for such individuals (Connell 2009; James et al. 2016; Harrison, Grant, and Herman 2012; Lombardi 2009; Schilt and Westbrook 2009). Gender nonconforming respondents' pronounced overall health disadvantage in comparison to all other gender identity groups underscores the need for the BRFSS and other health surveys to modify their data collection methods to be able to identify the sex respondents were assigned at birth. This is essential to understanding transgender and gender nonconforming health at the population level.

The BRFSS sheds new light on questions related to the health of transgender and gender nonconforming respondents, but several key limitations are relevant to this study. Because the data are cross-sectional, and social changes in gender identity can happen at any point in life, it is not possible to make causal claims about the relationship of gender identity to self-rated health, and this study focuses on establishing a predictive relationship. Furthermore, samples drawing from 31 states and one U.S. territory allow for larger generalizations about the U.S. transgender and gender nonconforming populations than previously possible, but addition of the 19 remaining states, the District of Columbia, and four other U.S. territories, as well as ensuring a lower percentage of missing observations in future survey administrations, would inspire more confidence in the national representability of the sample. In addition to a more complete sample of U.S. states, a larger overall sample size would be advantageous to future work. The present sample size also does not permit an analysis of meaningful interactions between different categories of race/ethnicity and gender identity, even though it is crucial to approach gender

identity with an intersectional lens that accounts for race/ethnicity (Nuttbrock et al. 2009; Sevelius 2013).

Another limitation of these data is that between and beyond the poles of identifying as transgender, gender nonconforming, or cisgender lie so many ways of identifying and living with gender that cannot be fully encompassed by these categories. There is also reason to believe that among respondents who do not identify as cisgender, some might not identify themselves as transgender or gender nonconforming to a survey interviewer (Westbrook and Saperstein 2015). Furthermore, as mentioned previously, there are serious shortcomings in the BRFSS's methodology used to ascertain respondent sex (Riley, Blosnich, Bear, and Reisner 2017). Future research could deepen what we know about gender identities and life processes by using methods that explicitly ask respondents about the sex they were assigned at birth, and how they presently identify their gender (Reisner et al. 2015). However, this study pools samples from three years of data collection, consistent with the recommendations of the Gender Identity in U.S. Surveillance (GenIUSS) Group for mitigating bias from random and non-random error (Reisner et al. 2015).

To conclude, this article lays the groundwork for research at the population level that can distinguish between transgender men, transgender women, and gender nonconforming individuals. I compared all three groups to the cisgender population, just as more research is starting to operationalize distinct forms of sexual orientation, race/ethnicity, and class as important social dimensions. This inclusion of expanded gender identity classification complicates what population health scholars talk about when we talk about "men" and "women." I found that gender nonconforming identity is associated with a marked health disadvantage compared to any other gender identity group. This highlights the need for future data collection efforts to collect sex assigned at birth separately from respondents' gender identity, to further differentiate the roles of

sex and gender in shaping health patterns. Furthermore, the findings on transgender men's health disadvantages suggest a need for more detailed research on their socioeconomic and social marginalization, and its relationship to family composition. This study produces findings that appear to contradict qualitative and convenience sample-based studies that identify significant patterns of social and health disadvantages among transgender women (Brennan et al. 2012; Clements-Nolle, Marx, Guzman, and Katz 2001; James et al. 2016; Schilt 2010). However, the lack of a discernable disadvantage in overall health does not mean that transgender women do not experience other significant disadvantages at the population level that could be identified through other health-related measurements, such as HIV status and ability to access adequate health care, in future work.

Overall, these findings complicate facile claims about the relationships among the social norms that govern male or female assignment at birth, identifying as a man or woman, and identifying outside of these identities or experiences. As more large-scale social survey research captures these gender identities, future studies ought to consider the impact of gender nonconforming identity in shaping overall health, since it is apparent that this subpopulation experiences significant disadvantages. Future work should also more closely examine the roles of gender assignment at birth versus gender identity and delve more deeply into how these relationships change when they intersect with demographic, socioeconomic, and behavioral factors. Major health surveys such as the BRFSS need to make serious changes to their data collection methodologies in order for this future work to be possible, but the evidence available from existing data already indicates that transgender and gender nonconforming populations face significant health disadvantages that require greater attention.

CHAPTER 3:

ESSAY II: IMPLICATIONS OF VOICE-BASED GENDER

MISCLASSIFICATION FOR TRANSGENDER HEALTH DISPARITIES

Abstract

This study examines associations between self-rated health and two aspects of gender identity: an individual's gender identity, and whether strangers classify their voice as male or female. In a phone-based general health survey, interviewers classify the sex of transgender men (n = 724) and transgender women (n = 449), drawing from assumptions that interviewers make based on the sounds of respondents' voices. The flawed design of the original survey produces inconsistent sex classification between respondents within both groups of transgender men and women. This study repurposes these discrepancies to look more closely at the implications of voice-based gender classification for the health of transgender men and women. Logistic regression results suggest that transgender men who are classified as female based on their voices are over six times more likely to report poor self-rated health in comparison to transgender men who are classified as male. Conversely, transgender women who are classified as male are less than half as likely to report poor self-rated health than transgender women who are classified as female. Additionally, black transgender men are more likely to be classified inconsistently with their gender identity than any other group, suggesting a link between race/ethnicity and gender perception.

Introduction

As a group, transgender people in the United States experience many systematic disadvantages (Grant et al. 2011; Hughto, Reisner, and Pachankis 2015; James et al. 2016), including higher odds of reporting poor health than the general population (Fredriksen-Goldsen et

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al. 2014; Meyer et al. 2017; Reisner et al. 2016). Despite this overall pattern, the U.S. transgender population features notable within-group differences in terms of types of embodied characteristics and expressions of gender identity (Bockting et al. 2013; Cruz 2014). Some of these within-group differences correspond strongly to health disparities within different parts of the transgender population. Transgender people who identify as gender nonconforming are particularly disadvantaged; they face worse health outcomes than both cisgender (non-transgender) and transgender people who primarily identify as men or women (Lagos 2018; Miller and Grollman 2015). Beyond the role that identity plays in these disparities, the heightened scrutiny that people face in everyday interactions when their physical appearances do not meet normative gender expectations may also play an important role (Hollander, Renfrow, and Howard 2011; Schilt and Westbrook 2015; shuster 2017; Westbrook and Schilt 2014). This scrutiny of appearances often involves gender misclassification of transgender and gender-nonconforming people, often referred to as misgendering, which can negatively affect mental and physical health (McLemore 2015, 2018). If certain members of the transgender population experience gender misclassification more than others based on their physical appearance, it may be important to examine how embodied characteristics related to gender shape health disparities, rather than simply comparing patterns based on self-reported identities.

For people of all genders, embodied characteristics play a vital role in how sex is first assigned to individuals and how gender continues to be ascribed to individuals throughout their lives. Through these patterns of sex assignment and gender ascription, embodied characteristics can shape health outcomes by situating individuals within social structures that reproduce gender-related social inequality. Even before birth, physicians and parents frequently associate fetuses with the gendered roles they are expected to fill as potential sons or daughters through prenatal sex

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detection, which relies on the classification of various embodied characteristics in utero (Bhatia 2018; Bongaarts 2013; Echávarri and Ezcurra 2010). Once born, individuals are typically assigned a sex at birth based on genital appearance, which is recorded on vital documents such as birth certificates (Davis, Dewey, and Murphy 2016). The sex recorded on one's birth certificate often shapes how one is treated in a variety of institutional contexts throughout one's life, and there are numerous barriers to changing these records, even if one's gender identity does not conventionally correspond to this sex designation, as is the case for transgender people (Currah and Moore 2009; Meadow 2010; Nanney and Brunsma 2017; Westbrook and Schilt 2014). Outside of institutional contexts, people typically ascribe gender to others during social interactions by using cues from embodied characteristics associated with sex differences, such as voices, body shape, and hair growth patterns (Friedman 2013; Kessler and McKenna 1978). The widespread social reliance on these cues to form basic judgments about who people are may present challenges to transgender individuals whose appearance and presentation do not fall within conventional gender expectations (Schilt and Westbrook 2009). Given the importance of embodied characteristics in the overall lived experience of gender, it is crucial to examine how health inequalities related to transgender identity may be compounded by social scrutiny of embodied characteristics that challenge gender boundaries.

For decades, sociological research approached transgender and gender-nonconforming experiences as either illustrative deviant cases or axiomatic examples of how gender operates in the broader social world, while ignoring the subjective experiences and patterns of inequality that affect the lives of transgender people (Namaste 1996; Rubin 1999; Schilt and Lagos 2017). However, recent changes to gender measurement in many social surveys have extended the available empirical parameters for looking at gender and population health patterns by

distinguishing between gender identity, embodied characteristics, and lived experience (Baker and Hughes 2016; Lagos 2018). These expanded parameters complicate the tendency of gender theorists to elide questions of embodiment in favor of purely behavioral or identity-based accounts of how gender operates in the social world, such as the emphasis on gender simply being "done" by individuals, transgender and cisgender alike (West and Zimmerman 1987), rather than negotiated in an embodied context (Messerschmidt 2009). In these approaches to gender, embodied characteristics are largely taken for granted as subordinate to practices and behaviors. However, just as "color blind" approaches to racial inequality elide persistent social patterns related to race and embodiment (Bonilla-Silva 2009, 2017; Fox and Guglielmo 2012), a "body blind" approach to gender inequality might not tell the whole story either.

In this study, I examine the salience of an important embodied characteristic—the human voice—in the relationship between gender and health inequality. Voices and speech patterns are often recognizable indicators of group membership, and they often correspond to patterns of discrimination and social stratification (Schwartz 2015; Showers 2015), including in health-related contexts (Smith-Morris 2017). For the transgender population, vocal and speech patterns are often crucial to how gender identities are perceived and whether they are validated in social and institutional settings (Davies, Papp, and Antoni 2015; shuster 2017; Stewart, Oates, and O'Halloran 2018). For transgender individuals, being satisfied with how others associate their voice with a gender plays an important role in overall quality of life (Hancock 2017; Hancock, Krissinger, and Owen 2011). Voice and speech patterns may also affect the overall physical health patterns of transgender individuals at the population level, and few studies, if any, have examined this relationship beyond the context of convenience-based or clinical samples. To explore this relationship further, I exploit an informative error in the design of a population-based general

health survey in which phone interviewers were asked to classify respondents' sex based on how they perceived the sound of respondents' voices instead of explicitly asking for respondents to identify their sex. During administration of this survey, there was a large degree of inconsistency in how the sex of transgender individuals was classified based on their voices, with over 60% of transgender men being classified as women, and over 70% of transgender women being classified as men. By comparing within-group health differences between transgender respondents based on whether they were classified consistently or inconsistently with their gender identities, I isolate the relevance of voice-based gender misclassification to patterns of health inequality within the transgender population. This has potential implications for the broader relationship between gender and health inequality.

The Perception of Identities and the Persistence of Health Inequalities

Embodiment, Classification, and the Perception of Identities

In social interactions, individuals often perceive and classify each other through a combination of senses, including sight (Monk 2015, 2016; Obasogie 2013), sound (Kugelmass 2016; Kushins 2014; Schwartz 2015), and scent (Cerulo 2018). People rely on these senses, which are rooted in embodied characteristics, to sort others into groups according to identity and place in society, such as race/ethnicity and gender (Hollander, Renfrow, and Howard 2011). Although no person's perception of an individual is identical to that of another, these judgments based on sensory information draw heavily from a set of basic cognitive and behavioral expectations that ground these interactions (Goffman 1959; Mead 1934). At most points, external judgments about a person's identity take place quickly, neatly, and undetected, with the assistance of external cues such as physical appearance and social contexts. These everyday social processes reflect what Alfred Schütz (1967:108, 122) and other phenomenologists call the "natural attitude," the most

common type of observational context, in which the majority of individuals and objects are experienced according to common interpreted schemes of social meanings, generally without much questioning or interruption (see also Husserl 1913).

The natural attitude that Schütz describes is constituted by two dimensions: expressive movements and expressive acts. *Expressive movements* consist of behaviors that are not intended to convey any particular meaning to oneself or to outsiders, such as gestures, expressions, or patterns of speech that generally come unreflectively to the individual who is conducting them (p. 116). Schütz distinguishes expressive movements from *expressive acts,* in which an actor intentionally uses gestures, expressions, or patterns of speech to convey particular meanings to others (p.116). For instance, if someone regularly slouches without thinking about it, this would be an example of an expressive movement. If this person who typically slouches were to consciously sit upright, this would be an example of an expressive act, and so would someone consciously attempting to slouch if they normally sit upright. However, Schütz (1967:116–17) contends that an outsider cannot typically distinguish between another person's expressive movements and expressive acts when they are taking place. This distinction between expressive movements and expressive acts is crucial to understanding how classification can be influenced by unreflective patterns, as well as by intentional modification or modulation of embodied behavior, even if the difference between the two goes unnoticed. An individual does not always have to be intentionally performing an identity in order to express embodied movements that others can interpret as indicative of an identity. Moreover, there is no guarantee that an intentional performance of identity will be understood by observers in the way the performer intends. Therefore, external classification processes will often not reflect the intentions and self-understandings of the people who are being classified by outside observers.

Embodiment, Classification, and the Persistence of Health Inequalities

Identity can be consequential to inequality, as patterns of social stratification often correspond strongly to classification boundaries between social groups (Lamont and Molnár 2002; Ridgeway 2014), such as race/ethnicity (Massey 2007; Pager and Shepherd 2008; Wimmer 2013) and gender (Read and Gorman 2010; Ridgeway 1997, 2011). However, membership in these groups can be significantly mediated by embodied interactions that are laden with culturally-ingrained expectations, and others' classification of individuals into these groups is not always consistent with how these individuals identify themselves (Khanna 2004, 2010; Pfeffer 2014; Roth 2016). The classification and perception of particular identities can vary based on social contexts, as well as individual characteristics of observers (Herman 2010; Hill 2002) and the observed (Porter, Liebler, and Noon 2016; Willer et al. 2013). Discrepancies in classification may shape differences in how individuals relate to systematic benefits or disadvantages that correspond to particular social groups. Among young Native Americans, having one's ethnic identity routinely misclassified by others is associated with a higher incidence of psychological distress (Campbell and Troyer 2007), and multiracial and Hispanic adults can experience differences in status and discrimination depending on how others perceive and classify their ethnicity (Curington, Lin, and Lundquist 2015; Vargas et al. 2016). Given the close relationship between social status and health inequality (Marmot 2004, 2005; Seeman et al. 2014), it stands to reason that any change in a person's status based on how others interpret their embodied characteristics might also be reflected in health patterns.

The Role of Sound in the Perception of Identities

Sensory experiences have different roles in social interactions, with sound having a particularly strong connection to language and classification (Herder 1772). In their review of

sociological research involving music, Roy and Dowd (2010) point to the role of particular sounds and experiences of sound in shaping identity and identity distinctions through deliberate choices related to meaning-making, or expressive acts, as well as coincidental and unreflective processes, or expressive movements. Major parts of identities, including gender identity (Salamon 2018), are often apprehended entirely through patterns in sound without needing to refer to other cues, such as visual characteristics (Merleau-Ponty 1964). With this in mind, it is important to consider that not all interactions take place in settings where all of these phenomenological cues are available at once, and that sound may often be the only indicator of identity available in particular interactions. The importance of voice to identity perception in social interactions may thus be amplified in the context of interactions that take place over the telephone, or in other situations (David 2014; Fischer 1992) where other sensory information is not available (Friedman 2013). Although visual cues are typically the first type of sensory information that comes to mind when considering physical "appearance," voices and other sounds also play important roles in how people perceive and classify each other.

The Role of Sound in the Persistence of Health Inequalities

Voice-based perceptions can shape relative social advantage and disadvantage. For example, "sounding Black" or having a foreign accent are linked to discrimination when seeking jobs (Kushins 2014), accessing health care (Kugelmass 2016; Smith-Morris 2017), and applying for housing (Fischer and Massey 2004; Massey and Lundy 2001). Voices, particularly gendered voices, are often regulated and commodified in the workplace, with feminine voices, including those of transgender women, often associated with subservience (David 2014; Rajan-Rankin 2018; Ridgeway 1997; Williams and Connell 2010). Masculine voices, on the other hand, correspond to elevated workplace status and authority (Klofstad, Anderson, and Peters 2012), including among

transgender men (Schilt 2010). This suggests that even the basic act of speaking can situate individuals in a particular relationship to social structures such as race and gender, and the salience of stereotypes related to gender and speech in reproducing status inequalities can potentially influence health patterns by altering individuals' status based on how others perceive their gender presentation.

Embodiment, Classification, and Transgender Health Inequality

Overview of Transgender Health Inequality

Transgender and gender-nonconforming people are estimated to comprise 0.39% to 0.6% of the U.S. population (Flores et al. 2016; Meerwijk and Sevelius 2017). Both the transgender population in general (Fredriksen-Goldsen et al. 2014; Meyer et al. 2017) and the gender-nonconforming subpopulation in particular are characterized by worse overall health patterns than the cisgender population (Lagos 2018; Miller and Grollman 2015). When describing the broader population (usually referring exclusively to the cisgender majority), health scholars often explain gender disparities in health through a combination of biological, social, and behavioral differences (Perry 2016; Rogers et al. 2010), as well as structural disadvantages faced by women in comparison to men (Denton, Prus, and Walters 2005; Risman 2004; Stroope 2015). Much of the existing literature on transgender health inequality also reflects a focus on structural barriers and behavioral factors along these lines (Fredriksen-Goldsen et al. 2014). However, transgender people's experiences are also constituted through embodiment and through social processes that mediate the salience of embodiment in a variety of social contexts (Connell 2012). It is therefore important for research on transgender populations to pursue questions related to embodiment even if they are not typically taken up in studies that focus on cisgender populations.

The Role of Passing

A central concern of the early ethnomethodological literature on transgender subjects focused on what Garfinkel (1967) and others refer to as "passing," or successfully concealing that one is transgender and appearing to be cisgender. In many cases, passing is assumed to contribute to a lower degree of marginalization for transgender people (Bockting et al. 2013; Jauk 2013; Schilt 2010; Schilt and Westbrook 2009). Because identity is constituted through a multifaceted process involving the presentation and recognition of social and embodied cues, individual identity processes are subject to interruptions and inconsistencies in which people are not recognized by others in the way they wish to be recognized. These interruptions and inconsistencies may lead to social stress, or individualized anxiety related to one's position in society (Burke 1991; McLemore 2015, 2018). To avoid these ruptures, transgender individuals may modify embodied characteristics in order to be more readily recognized and treated by others in a way that reflects their own subjective gender identity, such as through hormonal or surgical treatments, as well as speech therapy (Bockting et al. 2013; Dozier 2005; Eyre, de Guzman, and Donovan 2004; Hancock 2017; Hancock, Krissinger, and Owen 2011). In some cases, undergoing these procedures is required to receive legal recognition, such as changing one's birth certificate (Johnson 2015; Meadow 2010). Gatekeepers in various institutions and the medical profession often demand a commitment to permanence (Currah and Moore 2009) and focus on achieving resemblance to idealized cisgender bodies (Schilt and Windsor 2014). These institutional demands may go beyond what transgender individuals would desire for their own individual fulfillment, which can make passing seem like a requirement for transitioning.

While "passing" is a commonly emphasized theme in studies of both transgender men and transgender women, there are significant differences in the embodied processes involved in producing masculine and feminine features, as well as significant differences in how much passing matters to different people. Transgender men are generally able to achieve a fuller degree of "passing" in the eyes of the general public than transgender women because current hormonal therapies are more effective in producing masculinizing results for transgender men than in producing feminizing results for transgender women (Bockting et al. 2013). Furthermore, men tend to face less exacting appearance-based scrutiny than women (Kessler and McKenna 1978), including transgender men, which suggests an important role of cultural norms for these differences in passing (Schilt 2010). More recent scholarship acknowledges that transgender individuals, like cisgender individuals, perform aspects of gender due to a wide range of motivations that cannot be entirely reduced to concealment, including the basic desire to live in accordance with one's subjective identity (Schilt and Lagos 2017). Gender presentation and recognition can also have differential effects on the lives of transgender people depending on the gender category with which they identify. Transgender men can experience an elevation of status, rather than a demotion, when they become recognized as men, whereas transgender women often experience pervasive misogyny and anti-transgender discrimination upon transitioning (Schilt 2010). Given the many variations of embodied characteristics and identity factors found in the transgender population (Lombardi 2009), the role of passing in shaping transgender health patterns does not correspond to a one-size-fits-all approach.

The Role of Violence and Confrontation

Classification processes also contribute more directly to health through the heightened risk of conflicts and confrontation based on transgender people's perceived transgression of gender

boundaries. Transgender and gender-nonconforming individuals are often accused of engaging in "threatening" or "shocking" sexual behaviors and communications based on characteristics that relate more closely to the expression of gender than to any sexual intentions, and are more likely expressive movements than expressive acts, such ways of walking (Salamon 2018). Some perpetrators of anti-transgender violence even accuse their victims of operationalizing their gender expression as a form of deception, prompting a "panic" response (Bettcher 2007) often fueled by homophobic attitudes focused on sexual orientation rather than gender identity (Salamon 2018; Schilt and Westbrook 2009, 2015). Although not typically successful in court, discussions of the "trans panic defense" in legal literature (Lee and Kwan 2014; Wodda and Panfil 2014) provide evidence that transgender and gender-nonconforming individuals may face additional risks of being targeted for violence due to gender-related classification processes. Experiences of violent victimization can have lasting effects on overall health (Vives-Cases et al. 2011), and gender-based violence against transgender people may exacerbate their health disparities at the population level.

The Minority Stress Process

Passing and the potential for violent victimization may explain some aspects of the role of embodiment in transgender health inequality, but the minority stress process model may provide a more holistic account that situates these factors in the broader experience of being a member of a marginalized group. This model was originally used to describe the cumulative detrimental effect on gay men's physical and mental health due to internalized homophobia, stigma, and experiences of discrimination and violence, and it establishes a connection between social marginalization and poor physical health (Meyer 1995, 2003). As a group, transgender individuals face persistent forms of marginalization, discrimination, and stigma in everyday interactions, such as at the workplace, at the doctor's office, and in family life (Bradford et al. 2013; James et al. 2016; Meadow 2018;

Paine 2018). Based on these factors, it is reasonable to believe that some portion of transgender health inequality can be explained through minority stress. Furthermore, individuals can experience multiple sources of minority stress: the disadvantages associated with belonging to one marginalized identity can be compounded by additional marginalized identities and social conditions (Balsam et al. 2015; Choo and Ferree 2010; Diaz et al. 2010; Gorman et al. 2015). Within the transgender population, gender misclassification may function as a cumulatively detrimental form of minority stress in which the basic level of marginalization due to transgender identity is compounded by the additional stress of being misgendered, in addition to any other intersecting factors, such as race, class background, and sexual orientation.

Exploring Voice-Based Classification Patterns and Within-Group Transgender Health Inequality

Focusing on embodied characteristics and measuring them empirically can be a useful way to identify health disparities within and between stratified groups that cannot be identified by looking at broad, self-reported identity categories. Measurements of skin tone gradations have proven to be robust predictors of racial and ethnic social stratification, and they have helped identify stark social and health advantages experienced by lighter-skinned, compared to darker-skinned, Black individuals (Dixon and Telles 2017; Monk 2015, 2016; Telles and Paschel 2014; Villarreal 2010). Measuring gradations in skin tone, as opposed to using broad self-reported categories such as "Black," "White," or "biracial," has lent more precision to accounts of inequalities between and within racial and ethnic groups, and it has revitalized inquiries into relationships between health, colorism, and the social construction of race. In examining gender-based inequalities, categories such as "man" and "woman," or even "transgender man" and "transgender woman," are also imprecise when measuring gender stratification (Smith 2009; Westbrook and Saperstein 2015), but most research on gender inequality continues to be based on

them. Even though research on race/ethnicity and gender inequality both tend to draw from social constructivist theories that deny the biological determination of identities (Brubaker 2016; West and Fenstermaker 1995), there is a major difference in empirical paradigms that limits the use of embodied measurements in the study of gender inequalities. Gender scholars tend to be uncomfortable with the essentialist connotations of immutability that come with a focus on embodiment, even though they suggest it may be fruitful to look more closely at embodiment if one can frame and examine these differences without defaulting to a binary understanding of sex and gender (Connell 2012; Lane 2016). By situating the empirical study of embodied characteristics and gender-based health inequality in the context of transgender populations, it is not only possible, but necessary, to operate beyond binary sex and gender frameworks. With this in mind, the study of transgender populations provides a germane setting in which to begin empirical explorations of how embodied characteristics relate to gender-related health inequality.

Empirical measurements of embodied characteristics are not yet a common feature in research on gender, but existing surveys may unintentionally provide information on respondents' embodied characteristics. Using data from a population-level general health survey that indicates how randomly assigned phone-based interviewers classified the sex of transgender respondents, I assess whether there are disparities in overall self-rated health that correspond to the match or mismatch between respondents' gender identity and how phone-based interviewers classify their sex. In this survey, over 60% of transgender men and transgender women were classified inconsistently with their gender identity by phone-based interviewers (Riley et al. 2017). This discrepancy makes it possible to compare health patterns between transgender individuals who are misclassified and those who are not, and also to compare whether these health disparities are larger within groups of transgender men or transgender women. Comparing differences between

transgender men and transgender women may indicate an overall difference in how much embodiment and misclassification are relevant to health disparities. Based on existing literature that shows a social benefit for transgender men compared to transgender women (Schilt 2010; Westbrook 2020), one would expect transgender men who are perceived to be men to have better overall health than transgender men who are classified as women, leading to the following hypothesis:

> *Hypothesis 1: Transgender men who are initially classified as women on the basis of vocal timbre by survey interviewers are more likely to report poor self-rated health than transgender men who are initially classified as men.*

For transgender women, being readily perceived as women might not be as advantageous as being readily perceived as men is for transgender men, because being seen as a woman comes with its own set of gender-based disadvantages. Femininity is devalued in U.S. society (Kane 2006), for both cisgender and transgender women, and many of the patterns of violence and disadvantage faced by transgender women correspond to general social hostility toward femininity (Serano 2007). Voice-based gender misclassification may thus be yet another situation in which transgender men and transgender women do not experience the same patterns of disadvantage. Nevertheless, in light of the minority stress process literature that shows an overall negative association between misclassification and health (Campbell and Troyer 2007; McLemore 2015, 2018), and to be able to compare transgender men and transgender women, the second hypothesis posits the following:

> *Hypothesis 2: Transgender women who are initially classified as men on the basis of vocal timbre by survey interviewers are more likely to report poor self-rated health than transgender women who are initially classified as women.*

This study focuses on transgender adults, but it may shed light for future analyses of health differences in the broader cisgender population by detangling the roles of self-identification and embodied characteristics in shaping gender differences in health. If both transgender men and transgender women who are miscategorized by phone-based interviewers tend to experience relative health disadvantages compared to transgender men and women who are categorized consistently with their gender identity, this would support the broad claim that gender identity misrecognition is related to poor health (McLemore 2015, 2018). If the directions of these trends are different for transgender men and women, then this presents evidence that misrecognition may operate differently depending on one's gender identity, further corroborating the need for quantitative studies that distinguish between transgender men and transgender women (Lagos 2018; Worthen 2013). Recognizing this possibility, the third hypothesis posits that the gap in self-rated health will be more significant among transgender men than among transgender women, because passing provides a larger advantage for transgender men than for transgender women:

> *Hypothesis 3: The gap in the likelihood of reporting poor self-rated health between transgender men who are initially classified as women versus men will be larger than the gap between transgender women who are initially classified as men versus women.*

DATA AND METHODS

The Behavioral Risk Factor Surveillance System (BRFSS) is a phone-based general health survey of the U.S. adult population administered by the Centers for Disease Control and Prevention (CDC) in conjunction with state and territory health departments. The 2014 and 2015 BRFSS questionnaires did not directly ask respondents to identify their sex or sex assigned at birth at any

point in the survey; instead, interviewers were asked to identify respondents as male or female[1] based on the sound of their voices over the phone (McCullough 2012; Riley et al. 2017). This methodology is clearly flawed: phone-based interviewers may have misclassified respondents based on limited information and subjective perceptions of how voice corresponds to sex. Administrations of the survey from 2016 onward now explicitly ask all respondents to indicate their sex (CDC 2016).

In 27 states and one U.S. territory, two additional questions in the 2014 and 2015 surveys first identified whether a respondent was transgender, and then asked transgender respondents whether they identify as male-to-female (transgender woman), female-to-male (transgender man), or gender nonconforming. This produced a probability sample of 724 transgender women and 449 transgender men. Because of how these questions were worded, it is possible to infer the sex assigned at birth of people who identified as male-to-female or female-to-male. However, these questions do not provide any way to infer the sex assigned at birth for respondents who did not identify as transgender or identified as gender nonconforming. Both cisgender and gender-nonconforming respondents may have been miscategorized by the phone-based survey interviewers, but there is no way to verify this after the fact (McCullough 2012). Ideally, we would examine patterns of gender misclassification among cisgender and gender-nonconforming populations to enable a full comparison, but transgender respondents are the only group whose relationship to gender misclassification can be studied and compared with these data.

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[1] The BRFSS uses the terms "male" and "female" in their questionnaires to refer to sex. Throughout this paper, I will use these terms to refer to their specific use in the survey. Otherwise, I will refer to the classification of individuals by the BRFSS interviewers by using the terms "men" and "women," since these terms are more indicative of the social role of gender as opposed to sex.

The methodological shortcomings in the 2014 and 2015 BRFSS surveys unintentionally provide a proxy measure for a survey interviewer's external assessment of a respondents' gender based on voice-based interactions. Phone survey interviewers and respondents were nearly randomly assigned to each other through the survey's raking-based sampling of landlines and cell phones (CDC 2014, 2015). Without any visual context, such as physical features, interviewers were tasked with coding respondents reached through random digit dialing as male or female based on the sound of their voice. In 77.9% of cases in which a respondent was a transgender man, and

Table 6: Raw frequencies and survey weighted proportions of transgender respondents categorized as male or female by phone-based interviewers, BRFSS 2014 and 2015

	Transgender Men	Transgender Women
Categorized as Male	133	510
- Survey Weighted Proportion	(36.4%)	(77.9%)
Categorized as Female	316	214
- Survey Weighted Proportion	(63.6%)	(22.1%)
n	449	724

in 63.6% of cases in which the respondent was a transgender woman, the survey interviewer initially miscoded the respondent's gender, for example, coding a transgender man as female (Table 6). By comparing health patterns between groups of transgender men and women who were correctly categorized with their gender to those who were miscategorized, we can evaluate whether there is observational evidence for differences in self-rated health related to gender-coded vocal patterns.

Measures

In this study, I use a dichotomous measure of self-rated health as the central dependent variable. I classify "poor" and "fair" self-rated health as the outcome of interest; "good," "very good," and "excellent health" are the other potential outcomes. I use self-rated health as the main

outcome, rather than more specific health-related outcomes, because it serves as a reliable predictor of mortality (Idler and Benyamini 1997; Jylhä 2009) and is useful in identifying the overall burden of minority stress processes. Furthermore, self-rated health forms a part of the core module in the BRFSS, so very few cases in the sample lack answers to this question (5 out of 1,173, or <0.01%; these are excluded through listwise deletion [Allison 2001]).

The BRFSS introduced a question about gender identity in 2014: "Do you consider yourself to be transgender?" If a respondent answered "no," the survey administrator moved on to other questions. If the respondent answered "yes," the interviewer followed up with an additional question: "Do you consider yourself to be male-to-female, female-to-male, or gender nonconforming?" Interviewers were allowed to explain these terms based on a standardized script if respondents needed a more precise definition.[2] Based on the definitions of male-to-female and female-to-male transgender identities used in the BRFSS 2014/2015, one can reasonably infer that respondents who identified as transgender men were assigned female at birth, and respondents who identified as transgender women were assigned male at birth. However, because cisgender and gender-nonconforming respondents were not asked about their identities in these terms, it is not possible to ascertain the sex they were assigned at birth with much confidence, and it is impossible to detect whether their sex was misclassified during these interviews. To determine *whether a respondent was misclassified*, I constructed a variable based on whether a respondent's sex was identified as male or female at the beginning of the survey, and whether a respondent

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[2] The 2014 and 2015 BRFSS Questionnaires include the following definition: "Some people describe themselves as transgender when they experience a different gender identity from their sex at birth. For example, a person born into a male body, but who feels female or lives as a woman would be transgender. Some transgender people change their physical appearance so that it matches their internal gender identity. Some transgender people take hormones and some have surgery. A transgender person may be of any sexual orientation—straight, gay, lesbian, or bisexual." (CDC 2014, 2015).

identified as male-to-female or female-to-male transgender later on in the survey. Respondents are considered misclassified if they are a transgender man whose sex was classified as female, or if they are a transgender woman whose sex was classified as male.

Unfortunately, the 2014 and 2015 BRFSS surveys do not provide information about whether cisgender and gender-nonconforming respondents were also misclassified, because these respondents were never asked any questions that would directly indicate their sex. Cisgender women and gender nonconforming individuals face an overall disadvantage in self-rated health in comparison to cisgender men (Lagos 2018), and it would be helpful to know whether experiences of gender misclassification are related to these disadvantages, in addition to whether misclassification presents health disadvantages for cisgender men that have not captured in past research. However, in order to be able to compare patterns of misclassification and overall health between these groups to those of transgender men and transgender women, cisgender and gender-nonconforming respondents would have to be initially classified according to sex by a phone-based interviewer and then later asked to indicate their gender identity. This information could help identify whether any findings on gender-based misclassification and health found by this study also reflect patterns in the general population, or whether these patterns are specific to transgender men and transgender women. Although it is not possible to establish whether this is a pattern in the general population with these data, some research suggests that gender miscategorization may present stressful situations for cisgender individuals, including cisgender women who are frequently perceived to be men (Devor 1989). Any findings that support a transgender-specific relationship between gender misclassification and self-reported health would suggest it is important for future data collection efforts to consider the broader roles of embodiment and gender misclassification in the general population.

After looking at the associations between gender misclassification and self-rated health among transgender men and women, a second set of analyses account for individual and socioeconomic characteristics that may also contribute to differences in overall health. To consider the relationship between aging and poor health, the second set of models adjusts for *whether a respondent is over age 65*. Respondent race is also considered, with non-Hispanic White respondents classified as *White*, non-Hispanic Black respondents classified as *Black*, and Hispanics of any race classified as *Hispanic*. Respondents who are not White, Black, or Hispanic, or who are multiracial, are classified as *other*. A respondent's level of education is used as a proxy to account for socioeconomic status, including having *less than a high school diploma*, having obtained a *high school diploma*, and having *attended any form of college*. Gender transition procedures are often not covered by insurance, and individuals often face financial barriers to paying for them out of pocket (Bradford et al. 2013; James et al. 2016), so the second set of models also includes a measure of whether a respondent *had to skip medical treatment in the past year due to cost*, since the ability to afford transition-related medical treatments may affect whether individuals are more likely to be classified correctly.

Analytic Plan

Data were pooled and recoded using R 3.4.0. Analyses were conducted with survey weighting (using first-order Taylor linear approximation), which accounts for the complex design of the BRFSS, using *svy* function in Stata 15.0 (StataCorp 2017). Through odds ratios and confidence intervals obtained from logistic regression models, I look at whether misclassification is a significant predictor for overall self-rated health. Using logistic regression parameters, I calculated predicted probabilities of the binary outcomes using the margins function in Stata. This allows me to appropriately compare results across models (Mood 2010) and make pairwise

comparisons based on the average marginal effect (AME) of whether respondents' sex was classified consistently with their gender identity.

RESULTS

Sample Characteristics

Table 7 displays the survey weighted characteristics of the sample of transgender men, broken down by whether the phone-based interviewer categorized their sex consistently with their gender identity. Transgender men who were miscategorized as women reported far higher rates of poor overall health (33.42%, versus 7.79% of transgender men who were categorized as men). These two groups of transgender men have some variation in terms of demographics, socioeconomic status, and ability to pay for medical treatment. However, there is significant overlap between the two groups in these categories when one looks at the 95% confidence intervals, suggesting the very disparate rates of reporting poor overall health are the defining difference between the two groups.

Table 8 presents characteristics of the sample of transgender women, also broken down by whether phone-based interviewers categorized these respondents' sex consistently with their gender identity. In contrast to the trends found among transgender men, a higher proportion of transgender women who were categorized as women—consistent with their gender identity— reported poor overall self-rated health (29.68%) than transgender women who were miscategorized as men (16.77%). There is significant overlap, however, in the 95% confidence intervals for these estimates of self-reported overall health, along with the estimates for demographic and socioeconomic characteristics, as well as respondents' ability to pay for medical treatment. From a cursory glance at the sample characteristics, there seems to be a weaker overall relationship between voice-based gender misrecognition and overall health among transgender

Table 7: Survey weighted sample characteristics, pooled analytic sample of transgender men from Behavioral Risk Factor Surveillance System Survey, 2014 and 2015

	Categorized as Male n = 133	Categorized as Female n = 316
% Reporting poor health	7.79 [3.92-14.89]	33.42 [23.52-45.03]
% 65+ years old	16.83 [9.31-28.51]	13.73 [9.81-18.90]
Race/ethnicity:		
% White	52.47 [33.26-70.98]	45.45 [34.85-56.78]
% Black	3.54 [1.24-9.68]	15.86 [9.29-25.76]
% Hispanic	18.20 [5.94-43.93]	31.69 [21.33-44.25]
% Other	25.78 [10.44-50.86]	7.00 [3.80-12.55]
Education:		
% No high school diploma	28.98 [13.78-51.02]	34.39 [23.67-46.76]
% High school diploma, no college	47.63 [29.32-66.60]	39.26 [28.93-50.65]
% Attended college	23.38 [13.43-37.53]	26.35 [19.42-34.68]
% Could not afford treatment	14.53 [4.10-40.33]	25.40 [15.81-38.15]

Notes: 95% confidence intervals provided in brackets; n = 446.

women than among transgender men. Furthermore, the direction of the correlation between gender miscategorization and overall health appears to be opposite that of transgender men: transgender women who were miscategorized as men actually appear to have better overall health than transgender women who were categorized as women.

Logistic Regression

Table 9 presents odds ratios obtained from two logistic regressions of reporting poor health among the sample of transgender men. Model 1 only tests for an association between whether they were classified as women or men; Model 2 accounts for age, race/ethnicity, education, and history

of skipping treatment due to cost. According to Model 1, transgender men who were misclassified as women by the survey interviewers were 5.94 times as likely to report poor health as transgender men who were perceived to be men. This pattern, consistent with the association between poor self-rated health and misclassification seen in the sample characteristics, persists in Model 2, even after adjusting for age, racial background, and ability to afford health care. In Model 2, the odds of reporting poor health are 7.03 times higher among transgender men perceived to be women based on voice than among transgender men perceived to be men. The only other correlation found in Model 2 corresponds to lower odds of poor overall health associated with having attended college (OR = 0.30). In both models (Models 1 and 2, Table 9), transgender men had significantly

Table 8: Survey weighted sample characteristics, pooled analytic sample of transgender women from Behavioral Risk Factor Surveillance System Survey, 2014 and 2015

	Categorized as Female n = 214	Categorized as Male n = 510
% Reporting poor health	29.68 [19.56-42.29]	16.77 [12.14-22.71]
% 65+ years old	17.51 [9.97-28.91]	17.08 [12.95-22.19]
Race/ethnicity:		
% White	61.07 [48.22-72.54]	62.98 [54.81-70.47]
% Black	13.70 [7.27-24.31]	13.01 [8.66-19.10]
% Hispanic	12.45 [6.23-23.33]	10.82 [6.11-18.45]
% Other	12.79 [5.45-27.16]	13.18 [8.32-20.25]
Education:		
% No high school diploma	18.56 [11.53-28.51]	22.99 [16.08-31.74]
% High school diploma, no college	30.71 [20.79-42.81]	39.68 [32.74-47.06]
% Attended college	50.73 [38.80-62.57]	37.33 [30.40-44.82]
% Could not afford treatment	24.49 [14.81-37.71]	16.36 [10.96-23.70]

Notes: 95% confidence intervals provided in brackets; n = 722.

Table 9: Estimated odds ratios from survey weighted logistic regression predicting poor self-reported health among transgender men. Pooled analytic sample from Behavioral Risk Factor Surveillance System survey, 2014 and 2015

	Model 1	Model 2
Misclassified by Interviewer	5.94***	7.03***
	[2.47-14.27]	[2.53-19.57]
65+ years old		1.59
		[0.67-3.75]
Race/ethnicity		
(Ref. = White)		
Black		1.27
		[0.36-4.46]
Hispanic		1.88
		[0.60-5.92]
Other		2.07
		[0.64-6.66]
Education		
(Ref. = No high school diploma)		
High school diploma, no college		1.18
		[0.39-3.53]
Attended college		0.30*
		[0.11-0.80]
Could not afford to see doctor		0.97
		[0.33-2.87]

Notes: 95% confidence interval for all estimates provided in brackets.

higher odds of reporting poor health if the phone interviewer misclassified them as women than if they were classified as men.

Table 10 presents odds ratios from logistic regressions of reporting poor health for the sample of transgender women. In Model 3, transgender women who were misclassified as men over the phone were nearly half as likely to report poor health (odds ratio of 0.48) as transgender women who were classified as women. This pattern persists in Model 4 after adjustments for demographic factors, education level, and having skipped medical treatment due to cost. For

transgender women, being misclassified as men over the phone, compared to being classified as women, is actually associated with significantly lower odds of poor health in both the baseline and the fully adjusted models (Models 3 and 4, Table 10). These models show a trend toward poorer health among transgender women if they are classified as women, which is consistent with the distribution of poor health and classification patterns found in the sample characteristics. It is important to note that this association suggests that being misclassified as men is actually associated with better health among transgender women than being classified as women, and this

Table 10: Estimated odds ratios from survey weighted logistic regression predicting poor self-reported health among transgender women. Pooled analytic sample from Behavioral Risk Factor Surveillance System survey, 2014 and 2015

	Model 3	Model 4
Misclassified by Interviewer	0.48*	0.44*
	[0.25-0.93]	[0.21-0.94]
65+ years old		1.98*
		[1.02-3.88]
Race/Ethnicity		
(Ref. = White)		
Black		1.67
		[0.61-4.56]
Hispanic		0.26
		[0.07-1.02]
Other		1.24
		[0.36-4.28]
Education		
(Ref. = No high school diploma)		
High school diploma, no college		0.43
		[0.18-1.03]
Attended college		0.41
		[0.15-1.12]
Could not afford to see doctor		1.70
		[0.57-5.07]

Notes: 95% confidence interval for all estimates provided in brackets.

Table 11 Estimated odds ratios from survey weighted logistic regression predicting gender misclassification. Pooled analytic sample from Behavioral Risk Factor Surveillance System survey, 2014 and 2015

	Model 5 Transgender Men	Model 6 Transgender Women
65+ years old	0.88 [0.40-1.95]	0.88 [0.42-1.82]
Race/Ethnicity *(Ref. = White)*		
Black	6.21** [1.73-22.27]	0.91 [0.37-2.22]
Hispanic	1.87 [0.49-7.17]	0.69 [0.26-1.85]
Other	0.39 [0.11-1.39]	1.15 [0.37-3.61]
Education *(Ref. = No high school diploma)*		
High school diploma, no college	0.82 [0.29-2.31]	0.91 [0.38-2.17]
Attended college	1.26 [0.46-3.44]	0.52 [0.23-1.21]
Could not afford to see doctor	1.52 [0.33-6.88]	0.55 [0.24-1.24]

Notes: 95% confidence interval for all estimates provided in brackets.

is opposite the pattern found among transgender men, where being classified inconsistently is associated with sharply higher odds of poor health.

As a sensitivity test, two additional logistic regression models test whether the same personal characteristics adjusted for in the previous analyses may be associated with higher odds of having one's gender misclassified by a survey interviewer (Table 11). Among transgender men, Model 5 demonstrates that being Black is associated with far higher odds of being classified as a woman based on the sound of one's voice: over 6.21 times higher than the odds for White respondents. Phone interviewers appear far more likely to misclassify Black transgender men as

women than respondents of any other race/ethnicity. This suggests race/ethnicity might play a significant role in gender perception among transgender men—at least for Black transgender men. In Model 6, no covariates predict higher odds of being miscategorized among transgender women. Differences in age, race/ethnicity, education, and ability to afford care do not seem to shape patterns of being miscategorized among transgender women. Although this sensitivity test suggests that socioeconomic status is not a major contributor to the odds of misclassification, poor health itself may contribute to the odds of misclassification by preventing individuals from utilizing transition-related treatment. These data do not provide information on the causal order of the relationship between gender misclassification and poor health, but they do support a strong association between the two that is independent of socioeconomic factors.

Predicted Probabilities

To compare the results of these models between transgender men and transgender women, Figure 3 presents the average predicted probabilities derived from the adjusted Models 2 and 4. Transgender men who were classified as men based on the sound of their voice had a far lower probability of reporting poor self-rated health (3.97%) than did transgender men who were classified as women (22.52%). The average predicted probability of reporting poor self-rated health is lower among transgender women who were misclassified as men based on the sound of their voice (13.26%) than among transgender women who were classified as women (25.57%). However, there is significant overlap between the 95% confidence intervals in the predicted probabilities of the two groups of transgender women, meaning that these differences are not statistically significant. Therefore, while there appears to be a significant health disadvantage among transgender men who are classified as women in comparison to transgender men who are classified as men, I do not find evidence of a health disparity related to voice-based classification

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Figure 3: Predicted probabilities of reporting poor or fair health among transgender men and transgender women by gender classification, adjusted for age, race/ethnicity, education, and ability to pay for medical coverage. Behavioral Risk Factor Surveillance System 2014 and 2015
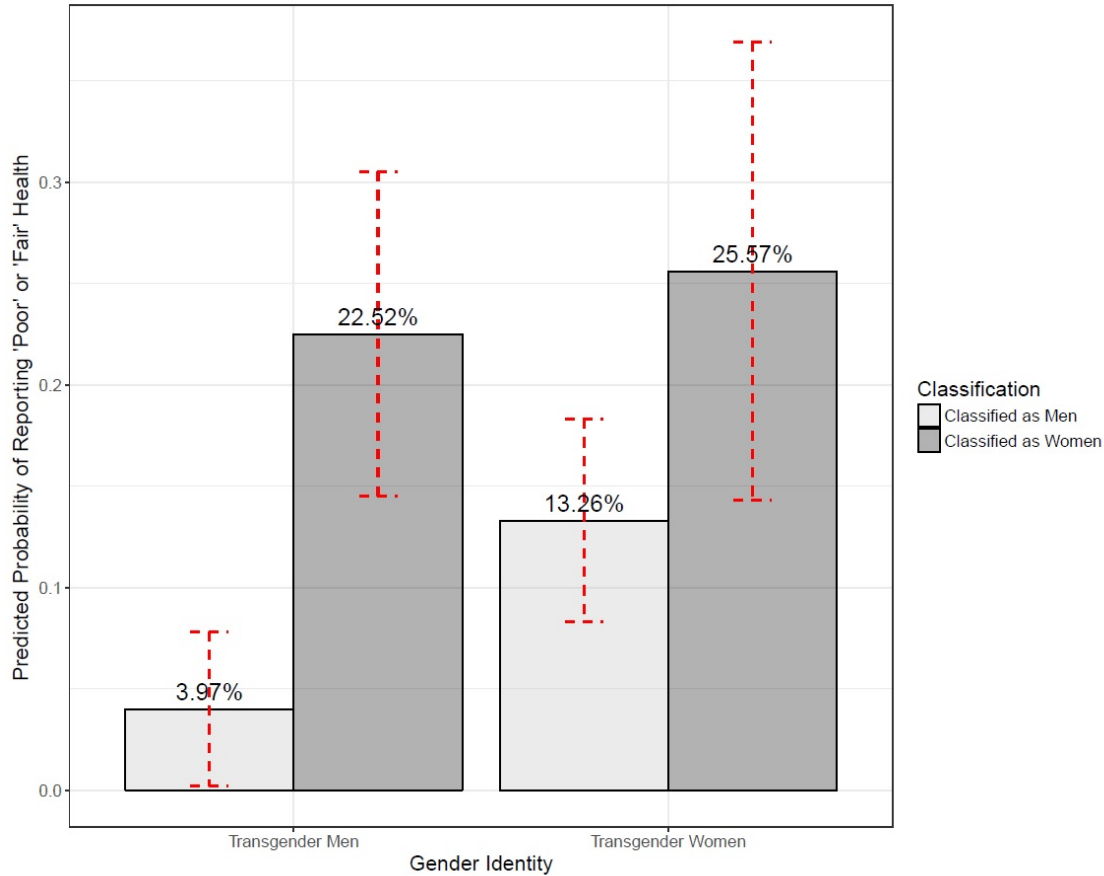
among transgender women.

Conclusions

Survey researchers strive to develop and work with empirical measurements that are as accurate as possible, and ideally endeavor to improve inaccurate or inadequate data collection practices. However, many errors from past data collection efforts can still be informative by providing useful meta-data that reveal, for example, the assumptions and social processes that go into how people classify each other. By looking at how randomly assigned interviewers classified

respondents' sex based on the sound of their voice, it is possible to repurpose this mistake as an indicator of whether someone is likely to be misclassified over the phone, and then link these instances to concrete measures of how these respondents fare in overall self-rated health. By looking at this combination of unintentionally and intentionally gathered information, I find a straightforward pattern among transgender men that is consistent with past research on the relationship between misclassification and disadvantage: transgender men who are classified as women have strikingly increased odds of reporting poor self-rated health. However, I do not find statistically significant evidence to make any conclusions about the relationship between voice-based classification and health among transgender women. The evidence of a substantial health disadvantage based on transgender men and the absence of any comparable pattern among transgender women suggests that misclassification may not always be associated with social disadvantages.

Among transgender men, being classified as a man over the phone corresponds to an overall health advantage, whereas transgender men who are classified as women over the phone are over seven times more likely to report poor overall self-rated health. Results from logistic regression-based analyses and predicted probabilities are robust to adjustments for age, race/ethnicity, and ability to afford medical treatment, suggesting that differences in voice-based classification correspond to significant inequalities within the population of transgender men. These findings are consistent with the emphasis in past work on the importance of "passing" (Bockting 2013; Schilt and Westbrook 2009) as well as work on other forms of identity that shows an association between experiences of misclassification and worse overall health (Burke 1991; Campbell and Troyer 2007). This study also corroborates research finding that social rewards accrue to transgender men who display more conventionally masculine characteristics, compared

to transgender men who do not (Schilt 2010), in this case showing how these inequalities manifest through substantial differences in physical health. Although this study makes no causal claims, it finds robust observational evidence for a correlation between the self-rated health of transgender men and a distinct embodied gendered characteristic, the human voice, in a similar way to the operationalization of gradations in skin tone used in studies of within-group ethnic/racial health disparities.

Conversely, I do not find a discernable disadvantage between transgender women that corresponds to voice-based gender classification. In light of the research on the importance of passing among transgender women (Bockting 2013; Sevelius 2013), as well as the harmful health implications of gender misclassification (McLemore 2014, 2018), this finding is surprising: it appears that transgender women who do not "pass" over the phone are better off than those who are classified in a way that matches their gender identity. These results, which are based on cross-sectional and observational regression, should not be interpreted to suggest that being misclassified does not matter to transgender women, or to anyone else. Instead, these results suggest that the relationship between health and voice-based misclassification may operate differently among transgender men than it does among transgender women, and that other factors might contribute to health inequalities among transgender women. While this study identifies a more straightforward connection between voice-based misclassification and self-rated health among transgender men, there are several potential explanations for the lack of a clearly discernable pattern among transgender women: It may be the case that misclassification truly does not have a significant relationship to transgender women's health. Alternatively, it may be the case that voice-based gender misclassification is not as salient to transgender women's health, while other embodied interactions related to gender classification may in fact be important, such as visual

appearance. Another possibility is that misclassification may influence other aspects of health among transgender women that are not encompassed by this study's focus on overall self-rated health. Ideally, future research will expand the use of embodied characteristics and study other potential ways in which transgender women's health relates to embodiment and gender classification.

Looking at the findings among transgender men and transgender women together illuminates another key social mechanism that may be at play: the unifying pattern among these two groups is that being perceived as a woman based on one's voice is associated with a distinct health disadvantage. These results suggest a significant penalty for expressions of femininity among both groups, even if gender misclassification is only particularly salient among transgender men. This is consistent with research that identifies patterns of devaluation, punishment, and social control aimed at femininity (Rubin 1975), among both transgender and cisgender women (Schilt 2010; Serano 2007). This pattern of devaluing and punishing femininity is also evident among sexual minorities, particularly in differences between gay men who present in feminine or gender nonconforming ways versus gay men who present in conventional masculine ways (Glick et al. 2007; Skidmore, Linsenmeier, and Bailey 2006), as well as among young gender-nonconforming children (Kane 2006) and cisgender adolescents (Pascoe 2011). Transgender men and transgender women who are perceived to sound like women might face social disadvantages that are primarily related to their presentation of feminine gender characteristics, and not necessarily based on whether they experience gender misclassification.

Another potential explanation for these findings is that transgender women may face more danger when they are recognized as women due to the homophobia and sexism that drive elevated experiences of violence against them when cisgender sexual partners are "surprised" or "shocked"

during sexual encounters (Bettcher 2007; Lee and Kwan 2014; Schilt and Westbrook 2009). Still another explanation might be tied to differences in the effects of hormone treatments related to transitioning. Research on the long-term effects of transition-related hormone use has found no major risks for transgender men or transgender women if treatment is supervised by medical professionals (Weinand and Safer 2015), but due to the lack of randomized trials and ethical concerns, this research is not conclusive (Irwig 2017). Furthermore, some transgender people pursue nonprescribed hormone therapy regimens outside of doctors' supervision, particularly if treatment costs are prohibitive (Rotondi et al. 2013). The BRFSS does not have enough information to suggest whether one of these ideas is better at explaining the differences between transgender men and transgender women when it comes to gender classification processes. Given these surprising findings, future research should take a closer look at the dynamics of transgender women's identity processes and explore the social and embodied factors that reproduce this dynamic of disadvantage among transgender women compared to the relatively straightforward benefits of recognition enjoyed by transgender men.

Returning briefly to the topic of transgender men's health, it is important to consider the other surprising results gleaned from the sensitivity test for the odds of being misclassified. These results (Table 6) suggest Black transgender men are more likely to be perceived as women than are other transgender men. Some research suggests that Black transgender men experience discrimination and gender policing at high rates (Davis 2018), but Black transgender men continue to be an understudied population, and future research should look at how differences can arise within this group. Building on the potential link between transgender women's disadvantages and a general disadvantage for femininity, it might be important to look at how Black women are singled out in society for discrimination and marginalization, a phenomenon described as

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"misogynoir" (Bailey 2016). Black transgender women experience high rates of transmisogyny (Krell 2017), and more research could shed light on the similarities and differences in their experiences compared to Black transgender men. Further attention should also be paid to how interviewers' characteristics in the BRFSS might shape their patterns of classification (Hill 2002; Herman 2010; Porter, Liebler, and Noon 2016), and how racial/ethnic differences may play a role in these processes of gender classification.

Furthermore, while research shows that transgender individuals who identify as gender-nonconforming have elevated health risks compared to transgender people who identify as men and women (Lagos 2018; Miller and Grollman 2015), my findings suggest that transgender people who identify as men and women also contend with the pressures and inequality processes related to performing gender. This corroborates qualitative and theory-oriented work that pushes back against the reduction of transgender men and women as any less transgressive of gender norms due to their "binary" identities (Garrison 2018). This study's findings should not be interpreted as suggesting that misclassification is advantageous for any particular group, but they do suggest that identity itself does not necessarily dictate a particular path for the role of gender ascription and gender advantage. Future research ought to explore how others ascribe gender to people who do not identify as transgender, including cisgender and gender-nonconforming individuals. This research should carefully investigate how embodied characteristics, such as voice, may influence patterns of misclassification, whether sex assigned at birth makes a difference in rates of gender misclassification, and how patterns of gender ascription might correspond to health patterns among non-transgender populations.

Beyond their significance to transgender health inequality and the potential opening for new ways of theorizing broader gender inequality, these findings also complicate the association

between identity attribution and the distribution of advantage and disadvantage related to other types of social status, such as race/ethnicity, class, and religion. While these findings offer some support to a connection between misclassification and poorer self-rated health among one group, transgender men, the lack of the same trend among transgender women suggests a mismatch between individuals' subjective identities and classification by others does not necessarily connote negative health outcomes in and of itself. Furthermore, if the misclassification examined here does not have a uniform relationship to inequality, it stands to reason that effects of misclassification based on other phenomenological cues, such as skin color (Monk 2015, 2016), might also vary widely. The use of embodied characteristics such as skin tone, and now voice, offers promising leads in the study of inequality and identity, and findings based on other characteristics might surprise researchers and not fit existing paradigms. If theorists and methodologists can collaborate more closely to shape more reflective approaches to collecting and repurposing empirical data, an increase in the use of empirical measurements of embodied characteristics might improve our understanding of social inequality.

CHAPTER 4:

ESSAY III: HOW RACE AND ETHNICITY SHAPE THE RELATIONSHIP BETWEEN GENDER PRESENTATION AND GENDER IDENTITY AMONG MINNESOTAN ADOLESCENTS

Abstract

In this study, I explore whether race/ethnicity is a salient factor in shaping whether individuals who have a gender presentation that does not conventionally correspond to the sex they were assigned at birth identify as transgender. I identify individuals in a 2016 general survey of Minnesota high school students who report that their gender presentation does not traditionally correspond to the sex they were assigned at birth, and I compare this to their reported gender identities to see if they identify as transgender. After adjusting for race/ethnicity, I find that Black, Hispanic, Native American, Asian teens have higher odds of identifying as transgender in comparison to white adolescents. Among Hispanic adolescents who were assigned male at birth, as well as among Native American and Asian respondents who were assigned female at birth, a test for interactions between ethnicity and gender presentation in shaping transgender identity appears to be more common for individuals whose gender presentation does not correspond to their sex to not necessarily identify as transgender. For members of these groups, there may be other identities that are more salient to their experience that are not encompassed by transgender, genderqueer, genderfluid, or questioning identities.

Introduction

Over 1.4 million adults identify as transgender in the United States (Flores et al. 2016) and an increasing amount of research is beginning to include transgender perspectives in a wide range of sociological discussions (Schilt and Lagos 2017). However, many individuals whose lived experiences and gender presentation do not meet normative sex-based gender assumptions may not necessarily identify as transgender, and their perspectives are not captured when surveys use "transgender" as a catch-all measure for non-normative gender identities and experiences (Lagos 2018; Westbrook and Saperstein 2015). In order to evaluate gender in a more thorough manner, it is important to measure gender identity and gender presentation separately, in addition to looking at how these facets of gender may or may not correspond to sex assigned at birth (Hart et al. 2019). With information on these three facets, it is possible to better understand the experiences of individuals who do not conform to conventional gender expectations even if they do not identify as transgender. It may be quite possible that many of the same patterns observed among transgender people are also experienced by people who do not identify as transgender, and identifying these individuals may lead us to revisit assumptions that hinge on identity, as opposed to other configurations of lived experience, embodiment, and sex assigned at birth.

In this study, I identify individuals in a 2016 general survey of Minnesota high school students who report that their gender presentation does not traditionally correspond to the sex they were assigned at birth. For example, an individual respondent may have been classified as female at birth, but may report that others see them as "equally feminine and masculine," "somewhat masculine," and "very or mostly masculine" based on the ways they act, dress, look, or sound (Minnesota Department of Education 2016). Although many of these individuals identify as transgender, the vast majority do not. Some research exists on cultural categories that are marked

by "cross-sex role behavior" rather than identity particularly among children, such as "tomboys" (Carr 2007; Paechter 2010), used to describe girls who behave in masculine ways, and "sissy boys," used to describe boys who behave in feminine ways (Evans and Davies 2000). While some of these children may identify as transgender, or come to identify as transgender later in life, this research tends to assume that these children do not. Other research also looks at cases in which adults, such as drag performers, may behave and be perceived as a gender that does not conventionally correspond to the sex that they were assigned at birth without necessarily identifying as transgender (Baker and Kelly 2016; Egner and Maloney 2016). Just as expanding research on transgender populations can be beneficial to the scholarly understanding of gender, it is important to continue exploring patterns among non-transgender groups and individuals, and learning more about why they may not identify as transgender, while perhaps updating the priors that inform past research based on what is known about transgender people. In this study, I explore whether race/ethnicity is a salient factor in shaping whether individuals with unconventional gender presentation identify as transgender.

Background

Distinguishing Between Gender Identity, Gender Presentation, and Sex Assigned at Birth

In *Ethnic Options: Choosing Identities in America*, Mary Waters describes how individuals from similar ancestral backgrounds may identify more strongly with particular ethnic identities, or choose to emphasize their ties to their immigrant roots in different ways, including behavior, depending on social conditions and individual choices (1990). Beyond maintaining or abandoning ethnic ties based on ancestry and immigration, new ethnic categories can also arise and become salient to population dynamics due to a variety of factors, including political, economic, and cultural change, in effect creating new groups of people (Mora 2014). In this paper, I argue that

gender is similarly diffuse and subjective in terms of how individuals may or may not identify with particular identities such as being transgender, even if they share similar patterns in behavior and expression with others who identify differently. Given the long-lasting legacy of a binary, sex-based approach to gender, it may be less obvious to consider gender to be an "option" that one can choose to identify with. However, in this study, I make the case that, gender identity can be subject to cultural differences that are more salient than any deterministic factor related to behavior, sex at birth, or embodiment patterns. In order to be able to differentiate these factors, it is important to clarify how gender identity, gender presentation, and sex assigned at birth relate to each other and how they are different.

Recent health-related research has found that multiple measures of gender that include gender identity, gender behavior, and sex assigned at birth can reveal more complex gender patterns than what is available through simpler measures (Hart et al. 2019). Just as sexual orientation can be analyzed through separate measures of identity, behavior, and attraction (Budnick 2016; Rust 1992; Ward 2015), gender identity, gendered behavior, and sex assigned at birth all factor in separately to shape how gender operates in society (West and Zimmerman 1987). Gender identity, like other forms of identity, consists of how one understands oneself and places oneself within broader society (Stets and Burke 2000). One may identify as a woman, as a man, or neither, just like one may identify as transgender or gender nonconforming in addition to or instead of these categories (Lagos 2018), in addition to many other gender-related identities with which one may identify. Gender presentation, or gender expression, consists of the behaviors, appearances, and attitudes that are employed by individuals to convey or express their gender identity to others and structure social interactions (Moore 2006; Willer et al. 2013). Finally, sex is assigned at birth and typically profound effects on how one is categorized and treated throughout

at least one's early life (Davis, Dewey, and Murphy 2016), and influences many expectations surrounding identity and behavior, including by defining what roles and identities are considered conventional. Identities such as transgender are predicated upon a particular relationship between identity, lived experience, and sex assigned at birth, even though these three components can differ widely depending on societal and individual factors.

Transnormativity, Race/Ethnicity, and Varieties of Gender Presentation

One important reason for which it is important to look at gender nonconformity and unconventional gender presentation beyond transgender identity is that transgender identities, like other identities such as gay (d'Emilio 1983) and Hispanic (Mora 2014), are historically and socially contingent constructs, rather than biologically determined facts, even if they are very important parts of many people's lives. Definitions and terminologies that surround transgender identities have changed over time (Schilt and Lagos 2017), and they may not fit the lived experiences of people who still face challenges and present challenges in contexts that assume gender binaries. Because transgender identity is associated with the expansion of medical and legal recognition of a wide range of gendered experiences and expressions, identifying as transgender may be contingent on accepting and pursuing particular aims in relation to medicalization and state recognition (Johnson 2015). For those seeking access to medical, legal, and some forms of social recognition, their individual patterns of gender expression may be expected to be "accountable" to particular expectations surrounding transgender identity, a phenomenon known as transnormativity (Catalano 2015; Johnson 2016).

Another reason for why research on gender should look beyond transgender identity is that transgender as a category is rooted in Western and colonial cultural contexts, and should not be considered to be a universal definition of gender nonconforming lived experiences (Aizura et al.

2014; Chiang, Henry and Leung 2018). There is a tendency to see non-white identities, such as *hijra* identities, as "local" variations of transgender (Chatterjee 2018; Dutta and Roy 2014), which risks erasing and ignoring a wider set of frameworks for types of gender identity and gender presentation (Snorton 2017). Furthermore, even in Western contexts, gender identities and expression can have different meanings and nuances that correspond to racial/ethnic differences (Moore 2006). Although transgender populations are important to study, it is important to also look at how non-normative gender presentations may also be racially and ethnically coded outside of transgender identity. In doing so, studies of gender diversity in populations can more accurately speak to experiences that may not be captured by existing terminologies, and can contribute to paying closer attention to the relationship between race/ethnicity and gender. In this study, I evaluate the following hypotheses in order to further examine the relationship between race/ethnicity, gender presentation, sex assigned at birth and transgender identity:

> *Hypothesis 1:* Among individuals who report having a sex-unconventional gender presentation, the majority will not identify as transgender, reflecting the proportion of cisgender to transgender individuals in the general population.

> *Hypothesis 2:* Non-white individuals will be less likely to identify as transgender than white individuals.

> *Hypothesis 3:* Among individuals who report having a sex-unconventional gender presentation, non-white individuals will be less likely to identify as transgender than white individuals.

Data and Methods

In this study, I use data from the 2016 Minnesota Student Survey, which is a general survey of 9th and 11th grade students from public schools throughout the state of Minnesota by the state's

department of education. These data are not anywhere near representative of the United States'
population, and are therefore limited in generalizability, but they are notable for featuring multiple
gender measures that are useful for studying gender identity separately from gender presentation
and sex assigned at birth (Minnesota Department of Education 2016). Students were given these
surveys to administer on-site schools, resulting in a sample of 78,614 respondents who identified
whether they considered themselves to be transgender, genderqueer, genderfluid, or unsure about
their gender identity, and self-reported their gender presentation on a spectrum from very feminine
to very masculine.

Measures

The Minnesota Student Survey captures three distinct gender measures: gender identity,
gender presentation, and sex assigned at birth. In order to measure *gender identity*, the survey asks
students to indicate a binary "Yes" or "No" response to the following question: "Do you consider
yourself transgender, genderqueer, genderfluid, or unsure about your gender identity?" (Minnesota
Department of Education 2016, 2). Notably, the phrasing of this question leaves some room for
respondents to identify as genderqueer, genderfluid, or as unsure about their gender identity in
addition to identifying as transgender, but otherwise does not allow students to indicate that they
hold any other gender identities. While it is impossible to include every gender identity as an option
in a survey (Westbrook and Saperstein 2015), it is important to note that this limited set of answers
leaves many potential openings for individuals with sex-unconventional gender presentations to
say that they do not identify with any of these categories. For this reason, I do not refer to
individuals who did not answer "Yes" to this question as cisgender, since there is not enough
information in this survey to inform that designation. Instead, I mainly distinguish between

individuals who identified as transgender (along with the three other associated identities), and individuals who *did not identify as transgender*.

In order to measure *gender presentation*, the Minnesota Student Survey asks respondents the following question: "A person's appearance, style, dress, or the way they walk or talk may affect how people describe them. How do you think other people at school would describe you?" (Minnesota Department of Education 2016, 2). Respondents are given the following options, presented in sequence: "Very or mostly feminine," "somewhat feminine," "equally feminine and masculine," "somewhat masculine," and "very or mostly masculine," and asked to select one of these options. In this study, I code answers "Very or mostly feminine," "somewhat feminine," and "equally feminine and masculine" as indicators of unconventional gender presentation for individuals who were assigned male at birth, which the survey asks respondents to indicate by selecting between male and female as their "biological sex" (Minnesota Department of Education 2016, 2). For respondents who were assigned female at birth, I the code the answers "Very or mostly masculine," "somewhat masculine," and "equally feminine and masculine as indicators of unconventional gender presentation. Both of these codes are based on the conventional correspondence of assignment as male at birth with masculinity, and assignment as female at birth with femininity, and associate being equally feminine and masculine with unconventional gender presentation for both groups. In order to maintain a distinction between transgender identity and non-conventional gender presentation, I use the term *sex-conventional gender presentation* as shorthand in order to refer to individuals whose gender presentation conventionally corresponds to the sex they were assigned at birth, and the term *sex-unconventional gender presentation* in order to refer to those whose gender presentation does not conventionally correspond to the sex they were assigned at birth.

In order to account for *race/ethnicity*, I include measures for the following groups: Non-Hispanic Whites, Non-Hispanic Blacks, Hispanics of any Race/Ethnicity, Non-Hispanic Native Americans, Non-Hispanic Asians, and a group called "Other" that includes Non-Hispanic multiracial respondents, as well as Non-Hispanic Native Hawai'ians, and Pacific Islanders. In order to account for the socioeconomic association between race/ethnicity and poverty, I also include an indicator of *whether an individual respondent receives free or reduced lunch* as a control variable in the logistic regresson models.

Analytic Approach

I begin the analysis by analyzing the proportion of respondents who are cisgender and transgender, genderqueer, genderfluid, or unsure about their gender identity, broken down by sex assigned at birth. I then analyze the proportion of respondents whose gender presentation is sex-conventional, or sex-unconventional, also broken down by sex assigned at birth. This puts the two different categories in the context of their prevalence in the sample. I then look at the overlap between gender identity and gender presentation, and then break it down further by looking at the proportions of gender identity and gender presentation by race/ethnicity and sex assigned at birth. Finally, I use logistic regression to predict the odds of an individual identifying as transgender, with sex-unconventional gender presentation as the main predictor variable of interest. I also test for the relationship between race and transgender identity, adjust for socioeconomic status, and also look at the interaction between sex-unconventional gender presentation, race/ethnicity, and whether an individual identifies as transgender. Looking at these interactions helps account for any particular racial/ethnic patterns that may moderate the salience of transgender identity.

Table 12: Gender identity and gender presentation of Minnesota high school students broken down by sex assigned at birth. Minnesota Student Survey 2016.

	Assigned Male at Birth	Assigned Female at Birth
Gender Identity		
% Not transgender	98.32	96.35
% Transgender, genderqueer, genderfluid, or unsure about gender identity	1.68	3.65
Gender Presentation		
% Sex-conventional gender presentation	95.89	96.64
% Sex-unconventional gender presentation	4.11	3.36
n =	39,283	39,331

Findings

Sample Characteristics

Table 12 displays the proportions of the samples based on the sex they were assigned at birth, whether they identify as transgender or an associated identity, and whether their gender presentation is sex-conventional or sex-unconventional. Among individuals who were assigned male at birth, over twice as many respondents report a sex-unconventional gender presentation (4.11%) than transgender identity (1.68%). Among respondents who were assigned female at birth, there is a slightly higher of respondents who identify as transgender (3.65) than those who report sex-unconventional gender presentation (3.36).

In order to put the potential overlap between gender identity and gender presentation in context, Tables 13 and 14 display the proportion of transgender and non-transgender identity, broken down by sex-conventional and sex-unconventional gender presentation. Table 13, which summarizes the patterns among respondents who were assigned male at birth, shows that a

Table 13: Gender identity broken down by differences in gender presentation among Minnesota high school students who were assigned male at birth. Minnesota Student Survey 2016.

	Sex-conventional gender presentation	Sex-unconventional gender presentation
Gender Identity		
% Not transgender	98.79	87.36
% Transgender, genderqueer, genderfluid, or unsure about gender identity	1.21	12.64
n =	37,669	1,614

significant majority of individuals who reported presenting as "very or mostly feminine," "somewhat feminine," and "equally feminine and masculine" do not identify as transgender (87.36%), even though 12.64% of these individuals do identify as transgender. Table 14 summarizes these patterns among respondents who were assigned female at birth. 74.36% of female-assigned individuals who reported presenting as "very or mostly masculine," "somewhat masculine," and "equally feminine and masculine" do not identify as transgender, while 25.64% do identify as transgender. Among both groups, the majority of respondents who reported sex-unconventional gender presentation do not identify transgender, which reflects the fact that only 1.68% of individuals assigned male at birth and 3.65% of individuals assigned female at birth identify as transgender. Therefore, while only a small percentage of respondents in this sample reported sex-unconventional gender presentation, these individuals are not predominantly transgender identified. It is important to note that small percentages of transgender individuals report sex-conventional gender presentation, meaning in these cases that they are perceived more closely to the gender conventionally associated with the sex they were assigned at birth.

Tables 15 and 16 provide the proportion of transgender and non-transgender respondents, as well as the proportion of sex-conventional and sex-unconventional self-reported gender presentation of these respondents, broken down by racial/ethnic groups. Even though I predicted

Table 14: Gender identity broken down by differences in gender presentation among Minnesota high school students who were assigned female at birth. Minnesota Student Survey 2016.

	Sex-conventional gender presentation	Sex-unconventional gender presentation
Gender Identity		
% Not transgender	97.12	74.36
% Transgender, genderqueer, genderfluid, or unsure about gender identity	2.88	25.64
n =	38,009	1,322

that a lower proportion of non-white respondents would identify as transgender in Hypothesis 2, it appears that white respondents have the lowest proportion of people who self-identify as transgender, as well as the lowest proportion of respondents who report sex-unconventional gender presentations. Among individuals who were assigned male at birth, the proportion of individuals who identify as transgender is twice as high among Black, Hispanic, Asian, and other adolescents than among Whites. Black individuals who were assigned male at birth also have significantly higher proportions of individuals who report sex-unconventional gender presentation than any other group. Among respondents who were assigned female at birth, there is a less pronounced difference in the proportions of transgender identity and sex-unconventional gender presentation between Whites and other racial/ethnic groups, with the exception of Native Americans, whose proportion of female-assigned individuals identify as transgender (7.16%) and report sex-unconventional gender presentation (6.07) at rates over twice as high as those of Whites (3.20% and 2.96%, respectively).

Logistic Regressions

Table 17 presents odds ratios obtained from logistic regressions that predict whether respondents identify as transgender, based on whether an individual reports a sex-unconventional gender presentation. Model 1 tests this association among respondents who were assigned male at

birth, while Model 2 tests this association among individuals who were assigned female at birth.

These odds ratios suggest a very significant correspondence of sex-unconventional gender

Table 15: Gender identity and gender presentation among Minnesotan adolescents who were assigned male at birth, broken down by race/ethnicity. Minnesota Student Survey 2016.

	White	Black	Hispanic	Native American	Asian	Other
Gender Identity						
% Not transgender	98.83	96.50	97.46	97.57	96.58	97.17
% Transgender, genderqueer, genderfluid, unsure of gender identity.	1.17	3.50	2.54	2.43	3.42	2.83
Gender Presentation						
% Sex-conventional gender presentation	96.79	90.92	94.24	94.57	93.62	95.76
% Sex-unconventional gender presentation	3.21	9.08	5.76	5.43	6.38	4.24
n =	27,892	2,314	3,388	1,769	2,365	1,555

Table 16: Gender identity and gender presentation among Minnesotan adolescents who were assigned female at birth, broken down by race/ethnicity. Minnesota Student Survey 2016.

	White	Black	Hispanic	Native American	Asian	Other
Gender Identity						
% Not transgender	96.80	96.93	95.53	92.84	95.72	94.13
% Transgender, genderqueer, genderfluid, unsure of gender identity.	3.20	3.07	4.47	7.16	4.28	5.87
Gender Presentation						
% Sex-conventional gender presentation	97.04	95.95	96.33	93.93	95.85	95.24
% Sex-unconventional gender presentation	2.96	4.05	3.67	6.07	4.15	4.76
n =	27,946	2,246	3,402	1,663	2,456	1,618

Table 17: Odds ratios from logistic regression predicting identifying as transgender, genderqueer, genderfluid, or being unsure about gender identity among Minnesota Adolescents. Minnesota Student Survey 2016.

	Model 1 Assigned Male at Birth	Model 2 Assigned Female at Birth
Sex-unconventional gender presentation	11.78*** [9.91-14.01]	11.63*** [10.13-13.34]
n =	39,238	39,331

presentation to the odds of identifying as transgender. Both individuals who were assigned male at birth and female at birth are over 11 times as likely to identify as transgender if they report sex-unconventional gender presentation, in comparison to those who report conventional gender presentations.

Table 18 presents odds ratios from logistic regressions that also predict whether respondents identify as transgender in relation to sex-unconventional gender presentation. However, these models also adjust for the respondents' race/ethnicity and socioeconomic status, as well as the interaction between sex-unconventional gender presentation and respondents' race/ethnicity. Among all respondents, regardless of whether they were assigned female or male at birth, sex-unconventional gender presentation is still highly correlated with identifying as transgender. Among individuals who were assigned male at birth, the odds of identifying as transgender are far higher among all Non-White groups in comparison to White respondents (Model 3). Among respondents who were assigned female at birth, the only difference is that Black respondents do not have higher odds of identifying as transgender than White Respondents, while the other non-White groups all display significantly higher odds of identifying as transgender (Model 4). Among both groups, receiving free or reduced lunch was also associated with higher odds of identifying as transgender, suggesting that lower socioeconomic status may be a contributing factor to

Table 18: Odds ratios from logistic regression predicting identifying as transgender, genderqueer, genderfluid, or being unsure about gender identity among Minnesota Adolescents, adjusting for socioeconomic status and interactions. Minnesota Student Survey 2016.

	Model 3 Assigned Male at Birth	Model 4 Assigned Female at Birth
Sex-unconventional gender presentation	12.40*** [9.61-16.01]	13.34*** [11.21-15.88]
Race/Ethnicity *(ref = White)*		
Black	2.39*** [1.72-3.31]	0.83 [0.67-1.21]
Hispanic	2.12*** [1.59-2.84]	1.25* [1.02-1.54]
American Indian / Native American	1.88** [1.27-2.78]	2.11*** [1.67-2.66]
Asian	2.32*** [1.68-3.20]	1.37** [1.08-1.72]
Other	2.12*** [1.43-3.16]	1.72*** [1.34-2.22]
Interaction of sex-unconventional gender presentation and Race/Ethnicity *(ref = Sex-conventional gender presentation x White)*		
Sex-unconventional gender presentation x Black	0.59 [0.34-1.00]	0.64 [0.33-1.20]
Sex-unconventional gender presentation x Hispanic	0.49* [0.27-0.86]	0.83 [0.52-1.33]
Sex unconventional gender presentation x Native American	0.78 [0.38-1.61]	0.52* [0.31-0.86]
Sex-unconventional gender presentation x Asian	0.95 [0.55-1.64]	0.38** [0.21-0.68]
Sex-unconventional gender presentation x Other	1.10 [0.52-2.32]	0.76 [0.43-1.35]
Received Reduced or Free Lunch	1.31** [1.09-1.56]	1.34*** [1.19-1.52]
n =	39,238	39,331

identifying as transgender, but that it does not entirely explain the relationship between race and transgender identity.

Models 3 and 4 also test for the interaction between sex-unconventional gender presentation and the race/ethnicity of individual respondents. Among individuals who were assigned male at birth, the only significant interaction is that of being Hispanic and reporting sex-unconventional gender presentation. This suggests that among Hispanics assigned male at birth whose gender presentation is unconventional in relation to the sex they were assigned at birth, there is a significantly reduced odds of identifying as transgender. Among respondents who were assigned female at birth, the significant interactions were found among Native American and Asian respondents. For Native American and Asian respondents, sex-unconventional gender presentation is less associated with transgender identity than it might be for other groups. These models suggest that there are three main groups in which transgender identity is not particularly common as a way for people with unconventional gender presentations to identify themselves: Hispanics who were assigned male at birth, Native Americans who were assigned female at birth, and Asians who were assigned female at birth.

Conclusions

Among Hispanic adolescents who were assigned male at birth, as well as among Native American and Asian respondents who were assigned female at birth, it appears to be more common for individuals whose gender presentation does not correspond to their sex to not necessarily identify as transgender. For members of these groups, there may be other identities that are more salient to their experience that are not encompassed by transgender, genderqueer, genderfluid, or questioning identities. Among members of Mexico's Zapotec indigenous population, individuals who were assigned male at birth come to adopt feminine characteristics may come to identify as

muxe, which is seen as a third gender rather than through transgender frameworks (Mirandé 2015, 2017). Throughout Latin America *travesti* identity is found among individuals who were assigned male at birth, but present their gender through feminine characteristics without necessarily identifying as transgender (Campuzano 2009; Jarrín 2016). Both *muxe* and *travesti* identities may be present among the Hispanic respondents who were assigned male at birth, potentially explaining the lower odds of identifying as transgender. Even if Hispanic individuals who were assigned male at birth do not explicitly identify as *muxe* or *travesti*, there may be more room for the expression of feminine traits in certain cultural contexts without the expectation to identify as transgender.

Among Native American populations, there are numerous examples of gender identities that exist outside of transgender categories, such as *nádleehi* identity among members of the Diné Nation (Epple 1998). Even across patterns of colonialism and historical discontinuity that have distorted understandings of *two-spirit* identities, they are still being reclaimed by contemporary Native Americans who find them to be a useful way to identify both outside and within the bounds of transgender identity (Pyle 2018). Some of the Native American respondents in this sample who were assigned female at birth may draw from indigenous framings of gender identity, which could explain why individuals sex-unconventional gender presentation are less likely to identify as transgender than white counterparts. Among Asian respondents who were classified as female at birth, their lower odds of identifying as transgender may also be related to competing identities, such as *tom* identity among Thais and the Thai U.S. diaspora (Ravine 2014), as well as *tomboy* and *T* identities in China, Singapore, and Indonesia (Chiang, Henry, and Leung 2018).

There are many limitations to be found in this study, particularly due to the focus of this survey on the population of Minnesota, which is only 1.71% of the United States population. Furthermore, Minnesota's demographic characteristics, particularly the ethnic composition of non-

white racial/ethnic groups, are quite different from those found elsewhere in the country, with far higher concentrations of Somali and Hmong immigrants living in Minnesota than in the broader United States population (Ronningen 2004). This study also only collects data from 9th and 11th graders in public high schools, which limits the generalizability of these findings to patterns among adults and younger children, as well as other adolescents who are in private schools, and potentially higher socioeconomic strata.

Despite these limitations, this study provides a starting point for future to pay closer attention to how race/ethnicity can shape the likelihood of transgender identity for many people – particularly among Hispanic individuals who were assigned male at birth, as well as Native American and Asian individuals who were assigned female at birth. That members of these groups who exhibit sex-unconventional gender presentation are particularly less likely to identify as transgender suggests that there may be alternative explanations, and indeed, alternative subpopulations that are not being captured adequately by research that focuses its approach to gender diversity through the category of transgender identity. This closer look at non-transgender individuals' gender presentation addresses a central limitation that Essay II of this dissertation was unable to address, due to data quality issues, and finds that there are indeed many individuals who do not identify as transgender who nevertheless present their gender in ways that do not conventionally correspond to the sex they were assigned at birth. Future research ought to add multiple measures of gender and examine whether there are links between the gender diversity among non-transgender people and the patterns of stratification and marginalization that are well-documented among transgender people, and further interrogate the role that race/ethnicity plays in differences between these two groups.

CHAPTER 5: CONCLUSION

The aims of this dissertation have been to bring survey-based studies up to speed with at least some of the nuance available in ethnographic and in-depth interview-based research on transgender people. I begin by analyzing gender-based differences within populations, such as the United States, and the state of Minnesota. Beyond this, I explore of gender-based differences beyond the typical binary analysis based on "male" and "female," since it is increasingly evident that these two categories do not fully capture the extent of gender in the contemporary United States. I also test existing measures of gender identity, gender-related embodiment, and sex assigned at birth, or to construct new measures based on available data, in order to see what these measures can tell us about gender and inequality, and what needs to be improved in future data collection efforts. These exercises are not intended to supplant the past contributions of qualitative research, or to replace one method for another, but rather to help decelop a praxis in which gender scholars' questions are not limited by methodological specialization, and in which methodological specialization is not limited by theoretical concerns. One of the major strengths of sociology as a discipline is its methodological pluralism, and my hope is for this dissertation to highlight ways in which qualitative and quantitative scholars can continue to work together to better understand gender inequalities in societies and populations.

To these ends, Essay I introduces three new gender categories to a U.S. population-based study of gender-based health inequality: transgender women, transgender men, and gender nonconforming respondents. While these expanded gender categories proved to not be exhaustive, they do capture a significant part of the population that was not captured by previous demographic research on health based on probability-based samples. This endeavor identifies a significant disparity among an understudied population: gender nonconforming adults. The main intervention

that this study presents is making full use of a set of expanded, yet imperfect categories, which prove to be informative. Survey methodologists may never provide enough gender categories to encompass the full scope of gender in a given society. However, the key findings from Essay I suggest that the addition of new gender categories should not be dismissed outright, since they can indeed add meaningful elements to our understanding of gender inequality and health on their own. Instead, survey methodologists should continue to add new categories as they grow in prevalence and as cultural norms around gender change, in a similar way to the ever-evolving measurement of ethnic and religious identities.

In Essay II, I continue using the same data source used in Essay I, but I explore the role of embodied characteristics in shaping within group-differences between transgender men and transgender women, moving beyond the use of identity categories as a way to measure health. The main intervention pursued in this essay is to repurpose some of the major errors and shortcomings in the measurement of sex and identity in a major survey into a proxy measure that reveals clues about gendered perceptions about embodied characteristics. This study finds that transgender men who are perceived to be women based on the sounds of their voices face significantly worse overall health than transgender men who are perceived to be men. Among transgender women, there is inconclusive evidence for any differences between the overall health patterns of transgender women who are perceived to be women and transgender women who are perceived to be men based on the sounds of their voices. These findings suggest that gender misclassification based on voice has unequal implications for health among transgender men than among transgender women, and that not all forms of gender misclassification, at least in terms of voice-based gender misclassification, have particularly strong links to differences in overall health among transgender Americans.

In Essay III, look at the role of race/ethnicity in shaping whether sex-incongruous gender presentation corresponds to identifying as transgender among adolescents in Minnesota – not only looking at embodied characteristics and identity, but testing the relationship between the two, and also looking at potential mediating factors. The main intervention of this essay is to test whether race/ethnicity correspond to differences in gender identity in light of differences in embodied gender presentation, taking a step back from using gender identity and embodiment as predictors of health, and looking at whether other factors influence whether and how likely people are to identify with non-cisgender identities in the first place. The main finding is that transgender identity is higher among adolescents of color in comparison to white adolescents. However, this study also finds that there are certain groupings of adolescents of color in which having a gender presentation that is incongruous with the sex one was assigned at birth is not as closely associated with identifying as transgender, gender nonconforming, or nonbinary than it is among other racial/ethnic groups. In comparison to other groups, there is a much lower incidence of identifying as transgender, gender nonconforming, or nonbinary among adolescents with gender presentations that are incongruous with sex assigned at birth. among the following groups: Hispanic adolescents who were assigned male at birth, and among Native American and Asian adolescents who were assigned female at birth.

Through these three essays, I have embarked on several "crash tests" for some of the most commonly available measurements of gender identity and gendered embodiment. In these crash tests, I have employed the straightforward use of identity and embodiment measurements intended by the survey designers to address under-measured questions of identity, as well as repurposed a key shortcoming not considered by the survey designers that is also undermeasured – the role of external perceptions of external characteristics. As the findings from these three essays

demonstrate, these under-measured aspects matter, both to the overall health of transgender and gender nonconforming populations, but also to the definition and understanding of these gender identities and other populations that challenge simple binary understandings of how gender works in populations. Measurements, especially identity-based measurements, are subject to social changes, and the categories that are important to measure today may not be the same ones that are crucial to measure in the next fifty or a hundred years. However, by taking a critical approach to these measurements, I demonstrate ways to continue working with imperfect measurements and improving them to correspond to social changes as they occur.

Beyond its contributions to the sociological study of gender, this dissertation may contribute to the further study of other identities, communities, and populations, as well as to improve the ability for scholars to distinguish between these three related but not entirely overlapping units of human social organization. Race and ethnicity are the social categories that are most analogous to gender in terms of social construction, historical relationship to identity-based inequalities, and the role of physical embodiment in classification and social interactions. Findings from Essays II and III of this dissertation suggest that race and ethnicity often intersect with the propensity to have one's gender classified in a certain way, the odds of identifying as transgender, and the odds of not identifying as transgender even if one's gender presentation is incongruous with the sex one was assigned at birth. Furthermore, in Essay II, I find that gender misclassification does not necessarily correspond to poorer overall health outcomes among transgender women, even though there is a clear connection between gender misclassification and poorer overall health among transgender men. This surprising finding, in which there are significant between-group differences in the salience of within-group differences, may suggests that racial and ethnic misclassification may also have a limited relationship to overall health

outcomes, depending on what race or ethnicity is being perceived, and how an individual identifies. As in the case of gender, this dissertation provides support for the need to examine and continue to re-examine existing measures of race and ethnicity, as well as racialized patterns of embodiment and perception, in order to keep up with how race and ethnicity shape opportunities and inequalities in contemporary populations.

This dissertation is being completed at a time in which data collection on transgender populations has increased in availability in the past four years, but potentially stands to be scaled back due to political contingencies that shape public health-related data collection (Cahill and Makadon 2017). For this reason, as well as the ever-changing nature of gender identity categories, it cannot be assumed that the data I am working on will continue to be collected in the same way in the future. This adds some degree of urgency to the work I am doing, so that this moment in the United States' cultural and social conversations around gender is preserved. The contributions of this dissertation extend beyond simple preservation, however. By interrogating the extent of existing data, these essays point towards improvements that can be made to future surveys for studying transgender and gender nonconforming people at the population level. Furthermore, both Essays I and III study cisgender populations alongside transgender populations, allowing a critical look at cisgender populations instead of only looking critically at transgender subjects (Schilt and Lagos 2017), and looking at the "remarkable" social importance of the "unremarkable" (Zerubavel 2018).

In a social world in which there is an increasing amount of data collected that is not based on the answering of survey questions, but is increasingly based on observations and other forms of passively collected information, a critical observational social science is a vital step in maintaining the ability for sociology to speak to the dynamics of a changing world. Because

identities, communities, and populations play different aspects of social inequalities, being able to measure and distinguish between the two, and to be able to make the case for these distinctions is a vital undertaking to existing survey research, as well as any future social research that analyzes data collected through other means.

At present, gender continues to be a vital part of individuals' personal identities, an important factor in how individuals interact with each other, and an important site of political economy, not only in terms of resources and social hierarchies, but also in the political economy associated with physical health. Rather than ceasing to be relevant after decades of feminist struggle, gender itself is changing – there are more categories, and these categories take on different meanings in different contexts. The distribution of advantages and disadvantages can also no longer be seen as one exclusively between men and women – individuals and populations of transgender, gender nonconforming, and nonbinary identities bring their own unique elements to the study of gender regimes, and these differences do not map on to binary lines. In spite of these massive changes in the paradigms surrounding gender and inequality, this dissertation finds that in some cases, many aspects of gender remain very consistent: Observations play an important role in how people are classified according to gender, and embodied characteristics are still a relevant and formidable factor in gender-related social interactions. By taking a diverse set of measures – identity, embodied characteristics, perception by others, and sex assigned at birth – and doing the analytic equivalent of putting them in a blender, stretching them out as far as they can go, and throwing them against the wall, this dissertation will hopefully prove valuable to future scholars looking to continue the study of gendered political economy and other forms of economy. Hopefully they will be able to build on some of the steps described here, and expand what can be known about these deep-seated, but highly subjective sites of differentiation between humans.

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APPENDICES

Appendix A: Questionnaire used to measure gender identity in BRFSS 2014 to 2016

Module 21: Sexual Orientation and Gender Identity – BRFSS Questionnaires 2014 to 2016

Question 2: Do you consider yourself to be transgender?

> If yes, ask "Do you consider yourself to be 1. male-to-female, 2. female-to-male, or 3. gender nonconforming?

INTERVIEWER NOTE: Please say the number before the "yes" text response. Respondent can answer with either the number or the text/word.

> 1 Yes, Transgender, male-to-female
> 2 Yes, Transgender, female to male
> 3 Yes, Transgender, gender nonconforming
> 4 No
> 7 Don't know/not sure
> 9 Refused

INTERVIEWER NOTE: If asked about definition of transgender: Some people describe themselves as transgender when they experience a different gender identity from their sex at birth. For example, a person born into a male body, but who feels female or lives as a woman would be transgender. Some transgender people change their physical appearance so that it matches their internal gender identity. Some transgender people take hormones and some have surgery. A transgender person may be of any sexual orientation—straight, gay, lesbian, or bisexual.

Appendix B: Bases of comparison, gender identity groupings, and hypotheses

Hypothesis Number	Basis of Comparison	Hypothesized Health Advantage	Hypothesized Health Disadvantage
1	Transgender or cisgender	*Cisgender Respondents:* Cisgender Men Cisgender Women	*Transgender Respondents:* Transgender Women Transgender Men Gender Nonconforming
2	Sex assigned at birth	*Assigned Male at Birth:* Cisgender Men Transgender Women	*Assigned Female at Birth:* Cisgender Women Transgender Men
3	Gender identity	*Identify as Men:* Cisgender Men Transgender Men	*Identify as Women:* Cisgender Women Transgender Women
4	Gender identity	*All Other Groups:* Cisgender Men Cisgender Women Transgender Women Transgender Men	*Gender Nonconforming:* Gender Nonconforming
5	Gender identity, adjusted for demographic and socioeconomic factors, marital status, and smoking	*All Adjusted Groups*	*All Non-Adjusted Groups*

Appendix C: State samples using gender identity modules in BRFSS 2014 to 2016

State	Years Sampled	Pooled n =
West		
California	2016	11,382
Colorado	2015	13,487
Hawai'i	2014, 2015 & 2016	22,896
Idaho	2014, 2015 & 2016	16,500
Montana	2014	7,474
Nevada	2014, 2015 & 2016	11,009
Washington	2016	14,232
Wyoming	2014	6,393
Midwest		
Illinois	2015 & 2016	10,049
Indiana	2014, 2015 & 2016	28,514
Iowa	2014 & 2016	15,355
Kansas	2014 & 2015	36,887
Minnesota	2014, 2015 & 2016	49,894
Missouri	2015 & 2016	14,407
Ohio	2014, 2015 & 2016	35,176
Wisconsin	2014, 2015 & 2016	18,475
Northeast		
Connecticut	2015 & 2016	22,896
Massachusetts	2015 & 2016	17,650
New York	2014, 2015 & 2016	53,150
Pennsylvania	2014, 2015 & 2016	23,448
Rhode Island	2016	5,444
Vermont	2014 & 2016	12,984
South		
Delaware	2014, 2015 & 2016	12,393
Georgia	2015 & 2016	10,020
Kentucky	2014 & 2016	21,422
Louisiana	2014 & 2016	12,001
Maryland	2014 & 2015	25,117
Mississippi	2016	5,115
Texas	2015 & 2016	26,196
Virginia	2014, 2015 & 2016	27,035
West Virginia	2015	5,940
Guam	2014, 2015 & 2016	5,757
Total:	**2014, 2015 & 2016**	**598,286**

Note: Table presents unweighted sample sizes. Later analyses adjust for population sampling and complex survey design using weights.

Appendix D: Significant pairwise comparisons from predicted probabilities for baseline and fully adjusted models

	Cisgender Man	Cisgender Woman	Transgender Man	Transgender Woman	Gender Nonconforming
Cisgender Man					
(Baseline):	-	(Yes)	(Yes)	(No)	(Yes)
Full:	-	*Yes*	*No*	*No*	*Yes*
Cisgender Woman					
(Baseline):	(Yes)	-	(No)	(No)	(Yes)
Full:	*Yes*	-	*No*	*No*	*Yes*
Transgender Man					
(Baseline):	(Yes)	(No)	-	(No)	(No)
Full:	*No*	*No*	-	*No*	*No*
Transgender Woman					
(Baseline):	(No)	(No)	(No)	-	(Yes)
Full:	*No*	*No*	*No*	-	*Yes*
Gender Nonconforming					
(Baseline):	(Yes)	(Yes)	(No)	(Yes)	-
Full:	*Yes*	*Yes*	*No*	*Yes*	-

Note: "Yes" indicates significant pairwise comparison for the average marginal effect (AME) of being in Group A vs. being in group B (e.g. Cisgender Man vs. Cisgender Woman) at the p ≤ .05 level. Source: Pooled analytic sample from BRFSS 2014 to 2016.