Does (Trans)Gender Identity Complicate the Relationship between Education and Self-Rated Health?

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Abstract

Education's association with health differs by social positions such as gender, but research has yet to examine the effect of gender minority status. This study asks how transgender individuals compare to cisgender counterparts in the association between education and self-rated health. Deploying perspectives of multiple disadvantaged statuses, I expand current debates of education as a resource substitution or multiplication to include gender minority subgroups. I use data from the TransPop Survey, which offers information on education and health for transgender and cisgender individuals (N=1,411). In contrast to results for ciswomen, I find no evidence of resource substitution for any gender minority. I find substantial subgroup heterogeneity among gender minorities. Transmen and transwomen exhibit no educational gradient in health and education is less health-protective for nonbinary individuals, even at the highest levels of education. Findings suggest that sexism and cissexism combine to yield diverse configurations of inequality.

Introduction

A comprehensive array of prior research demonstrates a consistent gradient in health by educational attainment, such that more education is associated with improved health outcomes. This gradient has been observed repeatedly across multiple health indicators (Mirowsky and Ross 2003; Ross and Mirowsky 2010; Ross, Masters, and Hummer 2012) and multiple cohorts (Krueger et al. 2015). Why are the better educated healthier? For one thing, education imparts the material possibility of a better job and higher salary. Individuals also gain sets of knowledge, skills, habits, as well as networks of similarly motivated peer groups, which contribute to improved health behaviors (Lawrence 2017). Formal education provides the knowledge to locate and skills to attain further resources for good health (Mirowsky and Ross 2003).

However, social positions such as gender further complicate and stratify the health benefit to education. Gendered patterns in health, health behaviors, and mortality combine with the association between education and health to produce different results for men and women. On average, women tend to have worse health than men, but tend to live longer (Ross et al. 2012). Women reap more health benefits from education in measures of self-rated health (Ross et al. 2012) and physical impairment (Ross and Mirowsky 2010), but education is more important to men's mortality (Ross et al. 2012). At the highest levels of education, education closes gendered gaps in health and mortality such that women's worse self-rated health becomes comparable to men and higher rates of education enhance men's survival (Ross et al. 2012).

Unfortunately, the wealth of research on gendered patterns in education and health stops short of expanding the cisnormative paradigm. Extant research exclusively depends on the gender binary – masculine versus feminine – to articulate disparities in the educational gradient

in health. The cisnormative perspective excludes the estimated one in every 250 U.S. adults who identify outside the gender binary, as transgender, gender nonconforming, nonbinary, or genderqueer (Meerwijk and Sevelius 2017). The exclusion of trans people from this research is particularly troubling given emerging evidence of widespread disadvantage relative to cisgender counterparts (James et al. 2016). On average, trans people face more hardship in their day-to-day lives, experiencing higher rates of homelessness, violence, and discrimination, alongside barriers to basic resources such as medical care, employment, or a supportive social network (James et al. 2016). Further, there is evidence that these disadvantages impact transgender health, with trans people reporting higher rates of disability, poor mental health, and certain chronic conditions relative to cisgender counterparts (Downing and Przedworski 2018).

Given the unique social position of transgender populations relative to the gender binary, and the importance of education for health and wellbeing, this paper contributes to existing scholarship by asking whether and how gender minority status alters the gendered association between education and health documented among cisgender men and women. To address this question, I use data from the TransPop Survey (Meyer 2021), a nationally representative survey of transgender and cisgender individuals to examine how levels of educational attainment shape the probability of reporting poor-to-fair self-rated health in a gender-diverse sample.

The Health Benefit of Education: Resource Substitution or Resource Multiplication?

Education is a root cause of good health, imbuing both material and immaterial resources (Lawrence 2017). The disparities in health by educational attainment are stark: one estimate finds that over 500,000 deaths can be attributed to individuals without a college degree compared to those with a college degree (Krueger et al. 2015). Even after taking the selection effect into

consideration, there is a marked causal relationship between attaining a college degree and better health (Lawrence 2017). Notably, while the educational gradient in self-rated health is consistent across countries, the disparity appears most stark in the United States relative to comparable countries (Borgonovi and Pokropek 2016).

Various mechanisms tie education to health. Education is one resource which cannot be rescinded, it embeds individuals with human capital along with socioeconomic and psychosocial resources (Lawrence 2017). Education provides the ability to solve a wide range of problems, enhancing the 'learned effectiveness' of an individual, enabling them to pursue health-protective resources and establish healthy behavioral patterns (Mirowsky and Ross 2003). However, normative gender expectations and systems of sexism and cisnormativity also structure the availability of these resources, leading to gendered differences in health. Ciswomen tend to report worse self-rated health than cismen, on average, but men tend to experience steeper declines in self-rated health as they age (Zajacova et al. 2017). Normative expectations around 'masculine' or 'feminine' behaviors shape health behaviors, such that women tend to engage in more protective health behaviors while men seek to uphold expectations that they remain self-reliant and tough (Courtenay 2000). Ciswomen tend to experience more constraint around their behaviors, making risky patterns like smoking more common among men and impacting their longevity (Bird and Reiker 2008; National Center for Health Statistics 2016). However, women do not experience a universal advantage in terms of health: while they hold an advantage over men in terms of survival (Ross et al. 2012) their health status (including how they self-rated their health) tends to be worse overall (Zajacova et al. 2017).

In the context of normative gender socialization, alongside structural sexism which

assigns power and resources to cismen, the link between education and health becomes gendered. While education matters broadly for health, education has a larger effect on ciswomen's self-rated health than men (Ross and Mirowsky 2010) and it also benefits their physical impairment more than cismen (Ross et al. 2012). For self-rated health, the gradient is successive such that as each level of educational attainment increases, we see an improvement in ciswomen's self-rated health relative to cismen (Ross and Mirowsky 2010), with the gender gap closing at the highest levels of education.

Why do we see a stronger health benefit to education for women? The leading theory relies on an understanding of systemic sexism which ascribes higher status to cismen, who are able to accrue diverse resources in their advantaged position. The *resource substitution* theory argues that in the absence of other resources, the resources associated with education have a greater impact for ciswomen (Ross and Mirowsky 2010). For ciswomen, education can 'substitute' for other forms of advantage afforded to men. Alternatively, *resource multiplication* holds that individuals gain the most from resources when they have numerous, and are able to draw on a constellation of advantage. According to this theory, resources multiply to reinforce advantages that men accrue from their dominant status in society (Ross and Mirowsky 2010).

However, the paradigm of sexism informing theories of resource substitution and multiplication ignores another structuring force in gender relations. Patterns of *cissexism* (oppression of those whose identities challenge an innate gender binary based on corresponding biological sex) compound with sexism to create a double bind for trans people (Yavorsky 2016). Cisgenderism oppresses those who exist outside of the gender binary, because their very existence poses a threat not only to the gendered order which advantages men but *also* to the

gender binary itself, upon which patriarchal paradigms depend (Yavorsky 2016). Understanding how education might benefit trans people's health informs a deeper understanding of how education and gendered power structures impact health. To date, despite a growing number of individuals who identify outside the gender binary (James et al. 2016), no prior literature examines the educational gradient in health outside of the cisgender paradigm.

Education and Health: Where Might Trans People Fit?

Current survey data estimates that the transgender population ranges between 0.35% and 0.53% of the U.S. population (Downing and Przedworski 2018; Grant et al. 2010). The lack of research investigating the relationship between education and health for transgender people is concerning given evidence of their poorer health outcomes (Grant et al. 2010). Broadly, transgender individuals have higher rates of disability (Fredriksen-Goldsen et al. 2014), HIV positivity (Grant et al. 2010), attempted suicide (Grant et al. 2010), poorer mental health, higher rates of certain chronic conditions (Downing and Przedworski 2018), and higher rates of poor-to-fair self-rated health compared to the cisgender population (James et al. 2016). Leading theories suggest that these health disparities stem from the disadvantaged social position of transgender individuals, which brings frequent discrimination, which yields chronic stress (Meyer 1995). Trans individuals are more likely to face rejection from family members (James et al. 2016), are at particular risk of physical violence (Kates et al. 2018), and are more likely to live in poverty (Kates et al. 2018) and experience homelessness (James et al. 2016). Cissexism presents trans people with barriers to social support as well as healthcare. A robust array of research finds that transgender individuals often have unmet healthcare needs (Kenagy 2005) and avoid healthcare due to anticipated discrimination (Kcomt et al. 2020).

Emerging literature has also begun to document health disparities *among* gender minority populations. In studies able to differentiate between binary and nonbinary trans people, some find that nonbinary individuals have better physical health, but others find evidence of worse health (Lagos 2018; Cicero et al. 2020; for a review see Scandurra et al. 2019). Binary transpeople (transmen and transwomen) were more likely to self-harm, experience depression and anxiety, and exhibit poorer health behaviors than nonbinary (Scandurra et al. 2019; Guy et al. 2020). Population-based surveys including a broad measure of gender identity are still rare, however, so evidence is varied in scope and comparison.

There is some consensus, particularly from qualitative work, that binary gender norms present divergent difficulties to trans people depending on their identity, yielding different health trajectories. For instance, transmen are particularly socioeconomically disadvantaged, but face lower rates of stigma, violence, and social isolation than transwomen. Qualitative studies tie these findings to sexist and cissexist expectations of how 'masculinity' or 'femininity' should be embodied (Schilt 2006). Transmen often transition from a lower status sex-category (female) to a higher status (man) and are more likely to pass as a cisgender man, thus reaping some of the rewards of the 'patriarchal dividend' paid to cismen (Connell 1995). Transwomen, on the other hand, transition from a higher status sex-category to a lower one and face condemnation from a sexist system as a 'failed man' alongside condemnation from a cissexist system as a trans person (Yavorsky 2016). Thus, transmen are likely to be ascribed *more* power and authority in the workplace while transwomen are stripped of autonomy, authority, and assumptions of competence after they transition (Connell 2010; Schilt 2006). Nonbinary and gender nonconforming individuals remain the most understudied. There is some evidence that they face

heightened cissexist stigma, depending on their level of visual conformity, but other evidence that they are able to avoid the stigma of being 'trans' by enduring persistent misgendering and allowing others to 'read' them as cisgender (Galupo, Pulice-Farrow, and Pehl 2021). Again, the direction of movement on the gender binary spectrum matters. Individuals can move from feminine to masculine with fewer constraints than the other way around (Factor and Rothblum 2008). Within this framework, subgroup heterogeneity emerges.

Overall, more research is needed to disaggregate the health needs of various subgroups in the transgender population. Transgender subgroups have different life experiences which lead to varied life chances, which in turn shape divergent health trajectories. Some studies find that transmen reported worse physical health than other gender minorities (Guy et al. 2020) although these findings appear tied to socioeconomic disadvantage (Cicero et al. 2020; Lagos 2018; Downing and Przedworski 2018). Transmen had the highest rates of healthcare avoidance (Kcomt et al. 2020) and unequal treatment when they did seek care (Grant et al. 2010; James et al. 2010). Transwomen appear to fall somewhere between transmen and nonbinary respondents in terms of healthcare avoidance (Kcomt et al. 2020) and appear to have comparable self-rated health to cisgender counterparts (Lagos 2018), but have higher rates of HIV than transmen (Grant et al. 2010).

Unfortunately, research on educational attainment among transgender people is sparse and often mixed. Some find that transgender people had lower educational attainment than cisgender individuals (Downing and Przedworski 2018; Poteat et al. 2021; Carpenter et al.2020) but others found higher rates of educational attainment (James et al. 2016; Factor and Rothblum 2007). While there is evidence that educational attainment stratifies t suicide attempts,

psychological distress, and HIV rates among trans individuals (James et al. 2016), further research is needed to specify where transgender individuals fit in previously established patterns of self-rated health. Unfortunately, no prior research examines *whether* there is an educational gradient to health for transgender individuals, *how* they differ from cisgender individuals or other gender minorities, and *where* they fit in theories of resource substitution or multiplication. This research seeks to fill this gap.

Research Questions and Hypotheses

This paper asks how transgender individuals complicate the relationship between gender, education and health. First, I ask whether there is an educational gradient in health by gender identity. Hypothesis 1 (Resource Substitution): Gender minority subgroups will experience similar health gains to education as cisgender women, demonstrating evidence of resource substitution. In light of their disadvantaged position, I expect that higher educational attainment provides a 'boost' to gender minorities, who have fewer alternative resources to mobilize.

Second, I ask how gender minority health-by-education gradients compare to those of cisgender counterparts and where they fit in previously established patterns. A lack of educational gradient in health could be evidence that gender minorities are broadly disadvantaged in health and that educational attainment fails to impact this disadvantage. This leads to a second hypothesis. Hypothesis 2 (Deprivation): Gender minorities will have worse self-rated health than cisgender counterparts, regardless of educational attainment, reflecting durable disadvantage stemming from structural and interpersonal discrimination.

Data and Measures

To examine these research questions, I use the TransPop dataset (Meyer 2021). The

TransPop Survey was conducted over two time periods, in 2016 and again in 2018. It was designed to be a nationally representative probability sample of transgender adults (over 18 years old) in the United States. Transgender classification was based on a two-step question, asked slightly differently in each period. First, respondents were asked if they were assigned male or female on their original birth certificate. Second, respondents were asked to choose the term that best describes their current gender identity, choosing between woman, man, trans woman (male-to-female), trans man (female-to-male) and nonbinary/genderqueer. Respondents were classified as transgender if their sex assigned at birth differed from gender identity and if they identified as transgender regardless of sex assigned at birth. Note that the data does not include nonbinary or genderqueer respondents who may not identify as transgender.

TransPop also includes a supplemental dataset which provides a cisgender comparison group to the transgender sample. For this analysis, I use the fully combined dataset of transgender and cisgender respondents of 1,436 respondents, distributed by ICPSR (Meyer 2021). I restrict the analytic sample to those with nonmissing values on the independent and dependent variables, to yield an analytic sample of 1,411. My final sample includes 547 cisgender men, 594 cisgender women, 77 transmen, 119 transwomen, and 74 transgender nonbinary or genderqueer respondents (hereafter, nonbinary, for brevity).

Measures

The main outcome variable is a binary measure of self-rated health assessing whether a respondent reported poor or fair self-rated health (often referred to hereafter as simply ‘poor health’). Self-rated health is a widely used measure in health research and has been repeatedly shown to be a valid and reliable measure of health and wellbeing (Singh-Manoux et al. 2006).

Educational attainment is interacted with gender identity in the analysis, such that the interaction between educational attainment and gender identity act together as the main predictor. The gender identity measure is constructed to include cisgender men, cisgender women, transmen (female-to-male), transwomen (male-to-female), and trans nonbinary respondents. Educational attainment is measured according to three categories: high school graduate or less, some college, and college graduate or higher. The first category, a high school degree or less, includes those who completed 6th grade to those who completed high school or GED certificate. The second category, some college, includes those who completed technical, trade, vocational, business school, or a program after high school, some college (college, university, or community college) but no degree, and a two-year associate degree. The third category, college or more, includes those who completed a four-year bachelor's degree from a college or university or a postgraduate or professional degree.

I predict poor-to-fair self-rated health according to a series of four models. Model 1 controls for demographic covariates, including racial identity (*white, Black, Hispanic or other*), age, and current marital status (*married or unmarried*). Model 2 adds socioeconomic status measures including whether one is in poverty or not (calculated using weighted Census estimates for 2018 poverty thresholds, defined as at or exceeding 100% of the federal poverty level), whether one is currently employed or not, and whether one is currently insured or not. Model 3 adds a series of healthcare access measures and health behaviors, including whether the respondent has a personal doctor, has missed necessary care due to cost in the past 12 months, or lacks a regular place for care. Health behaviors are heavy alcohol consumption (whether the respondent reports having more than 1-2 drinks on a typical day) and current smoking status

(current smoker or not).

Finally, I add validated scale variables designed to measure everyday discrimination and social support. Each scale has been calculated from individual variables and missingness was imputed by the TransPop survey team. The everyday discrimination scale (Williams et al. 1997) assesses chronic, relatively minor experiences of discrimination or unfair treatment (Cronbach's alpha=.90) and is constructed so that higher numbers indicate more frequent experiences of everyday discrimination. Social support was constructed using the "Multidimensional Scale of Perceived Social Support" (Zimet et al. 1988) (Cronbach's alpha=.96) and is constructed so that higher numbers indicate higher social support.

Item nonresponse was small in the sample (less than 2.5%) except for employment status (3.83%), having a place for usual care (5.85%) and smoking status (3.41%). To manage item non-response and avoid biasing the analysis, I performed multiple imputation with chained equations using the mi suite in Stata 15.0 (Allison 2001). Respondents who did not respond to the dependent variable and those with missing education were included in the imputation but excluded from the analysis (Von Hippel 2007). All analyses also use survey weights as constructed by the TransPop investigators to estimate a national probability sample of transgender adults, using the svy suite in Stata 15.0. I predict poor-to-fair self-rated health with an interaction between education and gender identity and present results in the form of Average Marginal Effects (AME) using the "mi margins" command suite in Stata 15.0 (Klein 2014).

Results

Sample Characteristics

Descriptive statistics are presented in Table 1. Looking first at educational attainment,

cismen had fairly equal proportions in each education category, with about one-third of cismen in each. Ciswomen were more highly educated, with a higher proportion having a college degree or higher. Transgender individuals were more poorly educated in general, with transmen having the highest proportion of those with only a high school degree or less (51%). Transwomen had lower proportions of college graduates relative to cisgender groups, although not as low as transmen. Nonbinary people had comparable rates of college graduation (33%) to cismen (34%) but higher rates of high school or less. (*Table 1 about here)*

Turning next to self-rated health, nonbinary individuals had the largest proportion reporting poor-to-fair self-rated health relative to any other group (36%) with cismen reporting the smallest (13%). The sample is majority white, with larger proportions of minority respondents in transgender categories. Nonbinary individuals were more likely to be Hispanic than any other category (21%) and transwomen were most likely of any gender to identify as 'other' racial identity (23%). Cisgender men and women had much higher proportions of legally married individuals than any gender minority category. We also see higher rates of poverty in the transgender respondents despite similar levels of employment. Insurance is similar across groups except for transwomen, of whom only 85% report having insurance. We see the lowest rates of healthcare access among nonbinary individuals, with only 55% having a personal doctor, 50% having missed care due to cost, and 50% lacking a regular place for healthcare. Ciswomen exhibit lower rates of heavy drinking, and transwomen have higher rates of smoking. Ciswomen score highest on the social support scale (indicating better social support) with transwomen indicating the lowest, transmen scoring similar to cismen, and nonbinary individuals falling between transmen and transwomen. We see more experiences of everyday discrimination across

transgender groups.

Multivariate Results

Table 2 includes results of analyses that test two-way interactions of education*gender identity. Model 1 controls for demographic covariates, Model 2 adds socioeconomic covariates, Model 3 adds health behaviors and healthcare access, and Model 4 adds social support and everyday discrimination. I draw on results from Table 2 to test the basic relationship between education and health by gender identity. I produce figures based on results from the baseline and fully adjusted models. For example, Figure 1A corresponds to Model 1 of Table 2. Figure 1B represents Model 4 in Table 2. In light of space constraints, pairwise comparisons of predicted probabilities for all four models are not shown; I show only the baseline and fully adjusted models, referencing the mediating controls when relevant. *(Figure 1 about here)*

Looking first at the baseline models (Figure 1A), we see evidence of the previously established trend in education and health between cisgender men and women. For cismen, the probability of poor health declines slightly as educational attainment increases, but the education-level differences are not statistically significantly different. For ciswomen, however, there is a clear educational gradient in probability of poor self-rated health. We see the highest probability of poor health among ciswomen with a high school degree or less (.23), followed by those with some college (.18), and the lowest probability of poor health among the college educated (.09). Figure 1B displays the results from the fully adjusted model (based on Model 4 of Table 2). For ciswomen, we see a stronger decline in poor-to-fair self-rated health with increasing education, even after introducing controls. In keeping with results from prior literature, I find a stronger education effect on health for ciswomen than men, supporting the

resource substitution perspective for ciswomen.

Turning now to gender minorities, we see substantial heterogeneity in the relationship between health and educational attainment (Figure 1A). Among transmen, on average, the probability of poor health appears elevated in those with the highest and lowest educational attainment, but the confidence intervals are wide, and these differences are not statistically significant in any of the models. Like cismen, results from Figures 1A and 1B suggest that transmen do not experience a clear educational gradient in self-rated health. Results for transmen do *not* suggest support either the resource substitution or deprivation perspective. Instead, transmen look similar to cismen, with fairly good health across levels of education.

Among transwomen (Figure 1A), we see a unique pattern in the relationship between education and health with elevated probability of poor health among those with some college experience. Transwomen with some college had a significantly higher probability of poor health (.38) relative to either those with only high school or less as well as those with a college degree or more. Transwomen with some college-related experience (an associates, technical or vocational degree, or incomplete four-year degree) are over twice as likely to have poor health than both higher educated and less educated same-gender counterparts. These differences are statistically significant even in the fully adjusted model (Figure 1B). Results for transwomen do not align with any of the hypothesized patterns in education and health.

Next, turning to nonbinary individuals (Figure 1A), we see that nonbinary people had higher predicted probabilities of poor health than nearly any other gender identity group, although confidence intervals are wide. Further, there is no clear gradient in the association between education and health. Controls do very little to reduce the high probability of poor

health among nonbinary individuals in the fully adjusted model (Figure 1B) and flatten any educational gradient even further. Even after controls, nonbinary individuals appear to have worse health overall, regardless of education, suggesting support for the deprivation perspective.

To further describe the unique position of gender minorities, and to explore their heterogeneity, I turn next to pairwise significance tests of difference in probability of poor health *within educational attainment category*, across gender (Figures 3-8). Among those with a high school degree or less (Figure 3), nonbinary individuals are significantly more likely to have poor health relative to cismen and transwomen of comparable educational status. These differences remain statistically significant in Model 2 (Table 2), but lose significance after controlling for healthcare access and health behaviors in Model 3. This suggest that among the poorest educated, different healthcare experiences and health behaviors moderate the association between poor health and identity for nonbinary individuals. *(Figures 3-8 about here)*

Among those with some college, transwomen are significantly more likely than cismen, ciswomen, or transmen, to have poor-to-fair self-rated health (Figure 5). These differences remain significant after controlling for socioeconomic covariates in Model 2 (Table 2), marginally significant after controlling for health covariates (Model 3, Table 2), and only become insignificant after controlling for transwomen's lower social support in Model 4 (Table 2). It appears that social support and experiences of stigma and discrimination moderate the poorer overall health of transwomen relative to other gender identities (Figure 6).

Among those with a college degree or higher, nonbinary individuals are significantly more likely to have poor health relative to cismen, ciswomen, and transwomen (Figure 7). These differences remain statistically significant after controlling for all covariates. In the fully adjusted

model, nonbinary individuals are nearly three times more likely to have poor health than cisgender and transwomen college-degree holders (Figure 8). These results suggest further evidence of the deprivation hypothesis for nonbinary individuals.

Discussion

This study sought to understand how the relationship between education and self-rated health compares between gender minorities and cisgender counterparts. Despite burgeoning literature documenting health and socioeconomic disparities between the cisgender and transgender populations, no studies have examined self-rated health and education. This study was motivated by broader debates over gendered health disparities, including whether education acts as a resource substitution or multiplication for health.

Overall, I found evidence of substantial subgroup heterogeneity among gender minorities in the relationship between education and self-rated health. Transgender individuals do not mimic trends among cisgender women, who in this study (and in prior research) experience a greater health benefit from increased educational attainment relative to cismen (Ross and Mirowsky 2010). I did not find evidence of resource substitution or multiplication for any of the gender minorities. Instead, transmen exhibit similar trends to cismen, transwomen look uniquely disadvantaged but only among certain education groups, and nonbinary individuals are broadly disadvantaged across the education spectrum. Below, I take the findings for each gender minority in turn, stressing their unique contribution to our understanding of the relationship between gender, education, and health.

Transmen: Receiving the Patriarchal Dividend?

First, I found no evidence of an educational gradient in health for transmen. Transmen of

all education categories exhibited similarly low levels of poor health, comparable to cismen. However, transmen do exhibit some socioeconomic disadvantage in prior literature, which would suggest that they have much to gain from education. Compared to transwomen and nonbinary individuals, transmen were the least likely to have a college degree, own their own home, or have health insurance, and were the most likely to be low-income (Downing and Przedworski 2018). In light of transmen's socioeconomic disadvantage, we might expect education to 'substitute' for lack of other material resources.

Further, prior literature establishes that transmen are at heightened risk of mistreatment in healthcare settings. Transmen were more likely than any other gender minority counterpart to report being mistreated by a healthcare provider (James et al. 2016; Grant et al. 2010), avoid necessary healthcare (Kcomt et al. 2020), and were most likely to have to 'teach' providers about their own health needs (Grant et al. 2010). Given evidence of discrimination in healthcare settings, we might expect to see minority stress impact transmen's health. Minority stress theory posits that perpetual experiences of stigma and discrimination over the life course result in chronic stress, which negatively impacts the health of minority identities (Meyer 1995). Further, we might expect education to moderate the impact of chronic stress on their health. For instance, more highly educated transmen might practice better health behaviors, mobilize resources to access trans-affirming providers, and be better positioned to afford trans-specific care. By contrast, I found no evidence that health-related resources are stratified by education for transmen. How should we make sense of the similarity between transmen and cismen in the relationship between education and self-rated health?

Some scholarship emphasizes that transgender men may experience less gender-related

friction in daily interactions compared to transwomen and nonbinary individuals because of their social position relative to the gender binary: they move from a lower position in the gender order to a higher one. Transmen often face pressure to conform to gendered norms of masculinity, both in embodied and unembodied ways, but this appears to broadly give them *advantage* in daily life, rather than cause stress. Doing gender, as a transman, often involves physical transitions to 'prove' that one is serious about being a man, acquiescing to the "biomedical transition imperative" (Catalano 2015:424) and assimilating into normative masculinity (Schilt 2006). As a result, transmen report being ascribed more power and respect in the workplace when they pass as cismen (Schilt 2006). To the extent that transmen activate masculine identity in order to access similar benefits to cismen, their lack of an educational gradient in health may be evidence that they are already able to reap the benefits of a 'patriarchal dividend' (Connell 1995:79) and do not need education to 'substitute.' Perhaps, the link between trans-specific discrimination and health is less salient for transmen. If so, theories of sexism and cissexism as fundamental causes of poor health would suggest that being able to bypass the stigma of being trans, to claim the advantages of being a man, trump stigmatizing experiences in limited arenas of social life where gender is contestable on the basis of biology, such as healthcare. If so, education does not moderate this process for transmen.

Further research should interrogate whether and how the burden of healthcare avoidance and healthcare-related stigma impacts transmen's health trajectories. Along the same lines, more research is needed to specify the role of socioeconomic disadvantage in impacting transmen's health, especially regarding whether male privilege moderates the association between disadvantage and poor health for transmen. This study is limited in its ability to account for

'passing' and visual conformity. Future research should examine how processes of gender recognition modify this association (Connell 2009).

Transwomen: Multiple Disadvantage?

Resource substitution would suggest that, like ciswomen, transwomen might exhibit a steeper education gradient in self-rated health, since more educational resources substitute for their lack of resources around gender identity. Instead, I found no evidence of an educational gradient in self-rated health for transwomen, but rather an elevated likelihood of poor self-rated health among those with some college. Transwomen with a high school degree or less, or a college degree or higher had similarly low probabilities of poor health.

In contrast to transmen, transwomen face compounding structural forces of stigma and disadvantage. Sexism allows those perceived as female to "assume masculine presentations (…) with greater impunity" (Factor and Rothblum 2008: 244), but targets transwomen as "failed men" (Yavorsky 2016:964). We see this tension in survey data. Transwomen are more likely to have genital surgery, to change their name, to have spent part of their life actively trying not to be trans (Factor and Rothblum 2008) and are at greater risk of physical violence relative to other gender minorities (Kates et al. 2018). Overall, transwomen occupy a precarious social position. In spite of these constraints, other research has found that transwomen exhibit no disadvantage in poor-to-fair self-rated health (Lagos 2018). This study finds an exception to this trend. Transwomen with *some college* do appear disproportionately unhealthy relative to lower and higher educated transwomen *and* relative to cisgender some-college counterparts.

What is it about *some* college women, in particular, that leads to this health disadvantage? Some college, here, includes those who are on a four-year degree path, but have not graduated,

those with an associate's, technical, or vocational degree. Qualitative work around marginalized students on the sub-baccalaureate path finds that they experience substantial barriers to completion, but rather than temper their college degree aspirations, maintain these aspirations because of the knowledge that a college degree is required for middle-class jobs (Nielsen 2015). However, as these students accumulate debt and their progress stagnates, they do not approach the desired social mobility, but rather 'hold steady' (Nielsen 2015). It is possible that at least part of the 'some college' transwomen are holding steady with little degree progress, or are victims of the exploitative credentialing of for-profit degree programs (Holland and Deluca 2016

Thus, this group of 'some college' transwomen may represent those who seek career mobility but are unable to mobilize credentials to a better career. Moderating variables in the final model suggests evidence of this pattern. After controlling for transwomen's lower social support relative to other genders (Table 2), their probability of poor health becomes equitable to that of cismen and ciswomen of the same educational attainment. While data limitations prohibit the explicit testing of the factors underpinning the poorer health of transwomen in this category, the association between 'some college' status and poor health for transwomen likely derives from the combination of lack of opportunity, lack of social support, and a heavy burden of interpersonal and institutional stigma. Overall, findings for transwomen underscore how multiple social forces, cissexism, sexism, and educational inequality, combine to concentrate disadvantage among a group ambitious to be socially mobile, but ultimately held back by marginalization.

Nonbinary: Deprivation Grounded in Stigma

Finally, I found evidence to support the deprivation hypothesis for nonbinary individuals. Descriptive results found that nonbinary individuals were the most likely to lack a personal

doctor, miss necessary care for cost, and have no regular place for care. Multivariate results found that college-educated nonbinary individuals were more likely to have poor health relative to same-education status cisgender counterparts, regardless of educational attainment. Among the most poorly educated, however, different experiences of healthcare and health behaviors moderate their higher probability of poor health, evidence that barriers to healthcare are impacting nonbinary individuals' health. While prior studies have found lower personal doctor retention and identity disclosure to a provider among nonbinary relative to binary trans people (Scandurra et al. 2019), this study is the first to find evidence that this deprives poorly educated nonbinary individuals of better health outcomes. Further, findings contribute to an emerging trend of heightened disadvantage among nonbinary populations in health (Lagos 2018; Cicero et al. 2020), and household income (Whyte, Brooks, and Torgler 2018; Grant and Herman 2012), despite being highly educated. Here, I find that a college degree is not enough to attenuate the health disadvantage faced by nonbinary individuals.

Explaining this health disadvantage is complex. In some measures, nonbinary individuals are better off than binary counterparts, even from a minority stress perspective. Their mental health appears broadly better, with nonbinary folks being less likely to attempt suicide, having lower rates of depression or anxiety (Reisner and Hughto 2019; Scandurra et al. 2019), although not among youth (Todd et al. 2019). However, they tended to be disadvantaged relative to binary trans people in social spheres, with lower support from family and friends (Scandurra et al. 2019), higher rates of harassment and assault (Harrison, Grant and Herman 2012).

What is unequivocal, however, is that nonbinary individuals experience disproportionate stress and 'othering' by existing outside of the normative gender binary. Unlike binary trans

people who may be able to ‘pass’, nonbinary folks navigate a dilemma between demonstrating gender nonconformity or being ‘read’ as cisgender, experiencing frequent misgendering (Galupo, Pulice-Farrow, and Pehl 2021). While some nonbinary individuals articulate this dilemma as a necessary part of nonbinary identity articulation, and describe ‘playing’ with the gender binary, many others feel marginalized in a binary culture and seek refuge in queer-friendly places (McCarthy et al. 2020). That this would result in high rates of poor health among even the college-educated is sobering.

Overall, nonbinary folks are less likely than other trans counterparts to feel that others accurately perceive their gender identity (Factor and Rothblum 2008) and more likely to feel isolated by cissexist norms of a gender binary (Rankin and Beemyn 2012). ‘Doing’ nonbinary gender is a unique interactive process, one that often requires the nonbinary person to educate others that there are more than two genders (Darwin 2017). This is a unique burden, indicative of heightened minority stress faced by nonbinary individuals, even with the potential resources of a college education. The findings of poor health among highly educated nonbinary respondents presented in this study call for sweeping legislation protecting gender nonconforming populations from stigma and discrimination. The burden of poor health among even the most highly educated nonbinary individuals is cause for concern.

Conclusion

This study is the first attempt to incorporate gender diverse populations into investigations of the association between gender, education and health. It amplifies minority stress theory by highlighting the way transgender stigma compounds with other forms of inequality, such as sexism, to produce multiplicative disadvantage (Grollman 2014). My findings

underscore the urgency of incorporating expansive measures of gender identity into national level surveys. The subgroup heterogeneity in this paper, thanks to the expansive gender identity categories available in TransPop, enabled an account of intercategorical complexity in how one's position relative to the gender binary results in changing "configurations of inequality" (McCall 2005:1789).

Overall, this study provides compelling evidence of the disparate and unique health outcomes faced by gender minorities depending on their position relative to the gender binary. This knowledge is essential for understanding gender as a structuring force in social life and these findings further the effort to establish gender inequality as a fundamental, social determinant of health.

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Tables and Figures

Table 1. Descriptive Statistics by Gender Identity

% or mean (weighted)	Cismen	Ciswomen	Transmen	Transwomen	Trans Nonbinary
Education					
High school or Less	0.36	0.28	0.51	0.41	0.41
Some College	0.30	0.34	0.31	0.36	0.25
College Graduate +	0.34	0.38	0.18	0.23	0.33
Poor to Fair Self-Rated Health	0.13	0.16	0.22	0.21	0.36
Demographic					
Age (mean)	48.31	49.02	30.30	40.34	30.20
Race					
White	0.72	0.73	0.56	0.59	0.56
Black	0.09	0.13	0.13	0.08	0.09
Hispanic	0.10	0.08	0.16	0.10	0.21
Other	0.08	0.07	0.15	0.23	0.15
Married	0.53	0.48	0.10	0.17	0.12
Socioeconomic					
In Poverty	0.13	0.18	0.30	0.30	0.21
Employed	0.55	0.47	0.49	0.55	0.53
Insured	0.92	0.93	0.96	0.85	0.97
Health and Healthcare					
Has Personal Doctor	0.72	0.80	0.65	0.62	0.55
Never Missed Care for Cost	0.91	0.80	0.76	0.73	0.50
No Regular Place for Care	0.09	0.20	0.24	0.27	0.50
Heavy Drinker	0.14	0.06	0.06	0.08	0.04
Current Smoker	0.16	0.19	0.17	0.26	0.17
Social Constructs					
Social Support Scale	5.34	5.60	5.26	4.80	4.93
Everyday Discrimination Scale	1.77	1.74	2.07	2.24	2.25
N (unweighted)	**547**	**594**	**77**	**119**	**74**

Source: TransPop Fully Combined Dataset.

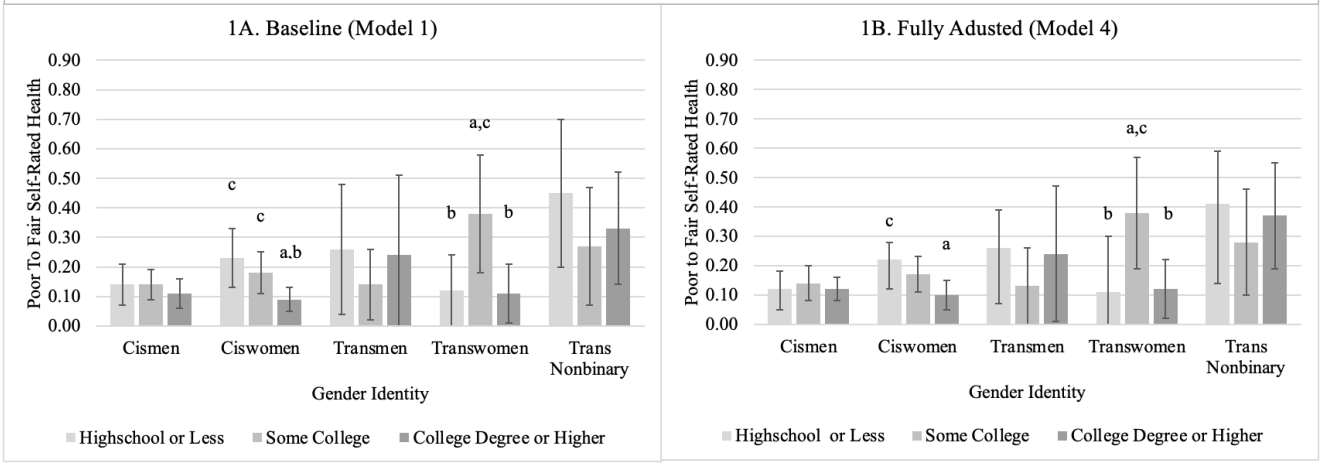
Table 2. Odds Ratios for Education and Gender Predicting Poor-to-Fair Self-Rated Health.

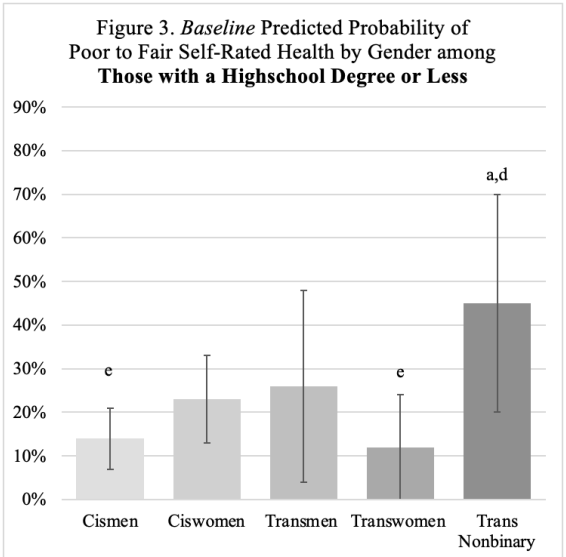
	Model 1	Model 2	Model 3	Model 4
Education (ref. High School or Less)				
Some College	1.00	1.03	1.05	1.20
College Graduate +	0.81	0.90	0.92	1.00
Gender (ref. Cismen)				
Ciswomen	1.77	1.65	1.40	1.85
Transmen	2.33	2.25	2.19	2.69

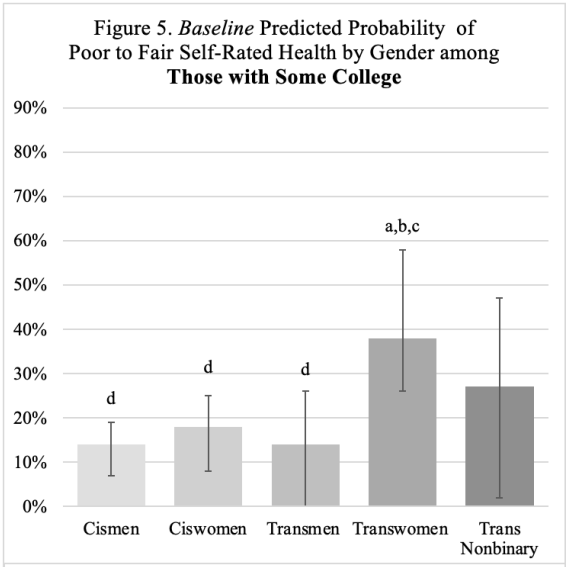
Transwomen	0.72	0.70	0.60	0.52
Trans GNB	5.63**	5.95**	3.47	3.84
Education*Gender				
Some College*Ciswoman	0.74	0.78	0.76	0.57
Some College*Transman	0.44	0.41	0.36	0.33
Some College*Transwoman	4.85	4.77	4.86	4.98
Some College*Trans GNB	0.44	0.37	0.32	0.40
College Graduate+*Ciswoman	0.40	0.42	0.44	0.37
College Graduate+*Transman	1.11	1.11	0.97	0.89
College Graduate+*Transwoman	1.10	1.09	1.21	1.11
College Graduate+*Trans GNB	0.73	0.68	1.11	0.82
Demographic				
Race (ref. white)				
Black	0.99	0.97	1.03	0.82
Latino	0.63	0.64	0.65	0.54
Other	1.25	1.23	1.44	1.16
Marital Status	0.44***	0.49**	0.48**	0.52**
Age	1.02*	1.02*	1.02*	1.03***
Socioeconomic				
In Poverty	/	1.45	1.31	1.04
Employed	/	0.78	0.71	0.69
Uninsured	/	0.88	0.54	0.72
Health and Healthcare				
Has Personal Doctor	/	/	0.92	0.92
Missed Care for Cost	/	/	3.67***	2.90**
Regular Place for Care	/	/	1.42	1.65
Current Smoker	/	/	0.99	1.02
Heavy drinker	/	/	1.17	1.26
Social Constructs				
Social Support Scale	/	/	/	0.85
Everyday Discrimination Scale	/	/	/	1.78*

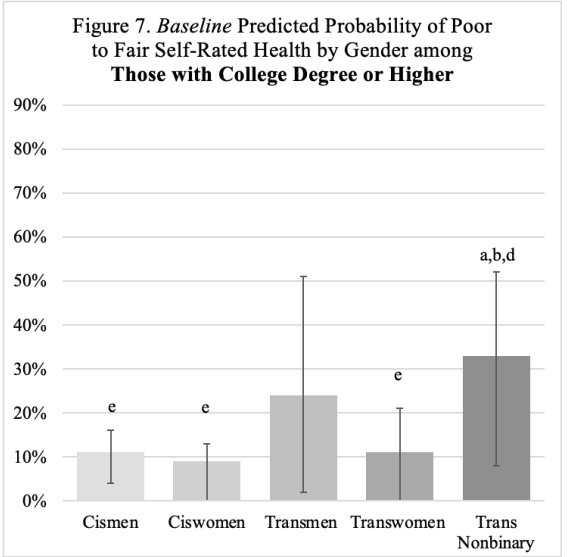
*Source: TransPop Fully Combined Dataset, 2016-2018. ***p < .001, **p < .01, *p < .05.*

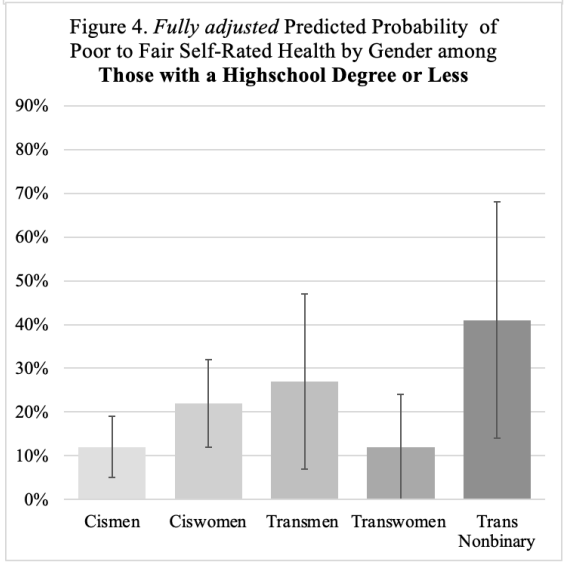
Figure 1. Predicted Probability of Poor to Fair Self-Rated Health by Gender Identity and Educational Attainment.

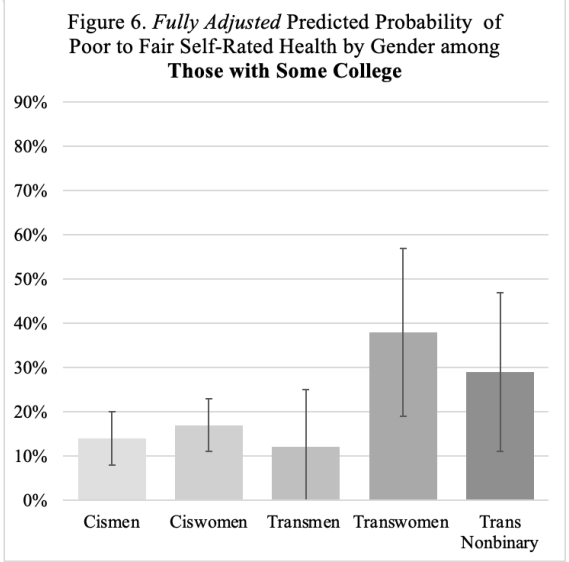


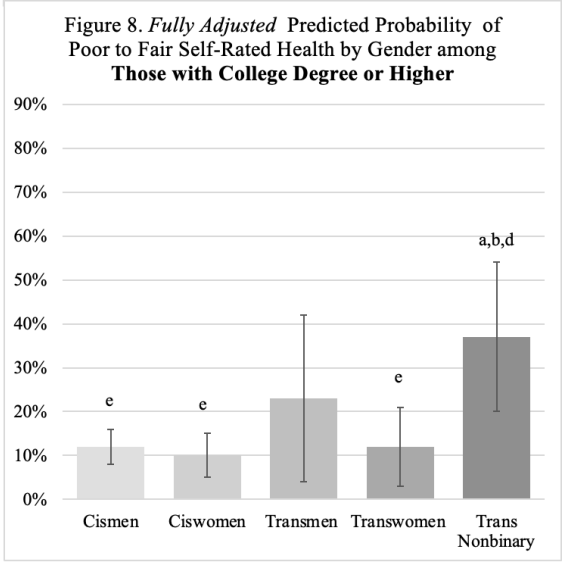












Letters indicate significant results from pairwise tests of significant difference (p<.05). Figure 1: a=highschool or less, b=some college, c=college or more.

Figures 3-8. a=cisman, b=ciswoman, c=transmen, d=transwomen, e=trans nonbinary