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# Suicide, Heroin Use and Protective Resiliency Factors Amongst Transgender Adolescents in New Mexico

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**SUICIDE, HEROIN USE AND RESILIENCY FACTORS AMONGST  
TRANSGENDER ADOLESCENTS IN NEW MEXICO**

**BY**

**RICHARD GADOMSKI**

**B.A., COLGATE UNIVERSITY, 2005  
M.D., UNIVERSITY OF MARYLAND, 2015**

THESIS

Submitted in Partial Fulfillment of the  
Requirements for the Degree of

**MASTER OF SCIENCES  
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The University of New Mexico  
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**JULY, 2020**

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**ABSTRACT**

Transgender people experience significant mental health inequities. The goal of this study was to evaluate disparities related to suicide attempt in the past 12 months and ever heroin use in cisgender versus transgender adolescents, and identify specific resiliency factors associated with a decrease in the prevalence of suicide attempt and heroin use in transgender adolescents. This study is a cross-sectional, secondary analysis of the 2017 New Mexico Youth Risk and Resiliency Survey among high school students. The odds of suicide attempt were 5.5-fold greater, and the odds of lifetime heroin use were nearly 14-fold greater, for transgender compared to cisgender students. Resiliency factors which demonstrated statistically significant effect modification resulted in an increased magnitude of the association between transgender identity and suicide attempt or heroin use, contrary to our hypothesis. More research is needed to develop interventions which improve the mental health of transgender adolescents.

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## **Introduction**

As of 2017, it was estimated that nationally 3% of the population directly identify as transgender across age groups. (Harris Poll/Gladd, 2017) This represents approximately 9.7 million people. Gender identity is a person's concept of self as male, female, a combination of both or neither. An individual's gender identity may or may not correspond with the sex they were assigned at birth, which is often based on perceived anatomy. If a person's gender identity does not correspond with their sex assigned at birth, they may consider themselves transgender, genderqueer, genderfluid, or another gender. When an individual's gender identity corresponds with their sex assigned at birth, they are considered cisgender.

In high school grades 9 -12 among transgender adolescents, most respondents to the 2015 U.S. Transgender Survey experienced some form of mistreatment including being verbally harassed (54%), physical violence (24%), and sexually abused (13%) because they were transgender. In fact, 17% of transgender students experienced such significant harm that they left school as a result. (U.S. Transgender Survey, 2015) Transgender individuals, including adolescents, experience substantial health inequities as a result of unequal access to resources, discrimination, abuse, and trauma which negatively impact their achievement of critical prosocial developmental milestones. (Calderwood, 2018). These disparities may be explained by the concept of "minority stress;" a phenomenon which is generated by ubiquitous and persistent harassment,

discrimination and stigma which transgender youth experience within their families at home, at school and in the community. In fact, the US Transgender Survey from 2015 further demonstrated high levels of mistreatment, harassment, and violence in all aspects of life amongst adolescent respondents: 10% of those transgender youth who were openly transgender reported that a family member was violent towards them because they were transgender, and 8% were forced to leave their home because they were transgender. (The US Transgender Survey, 2015) Moreover, in their 2015 cross-sectional study, Lowry et al reported that male transgender identity among adolescents was associated with:

*“...seriously considering attempting suicide (Adjusted Odds Ratio 1.72; 95% CI, 1.16-2.56), making a suicide plan (APR, 1.79; 95% CI, 1.17-2.73), and attempting suicide (APR, 2.78; 95% CI, 1.75-4.40)... as well as heroin use (Adjusted Odds Ratio, 4.59; 95% CI, 2.48-8.47), and injection drug use (APR, 8.05; 95% CI, 4.41-14.70) (Lowery, 2018)*

These findings – especially those related to suicide and heroin use - are alarming and particularly notable for transgender youth, who are at grave risk of behavioral disparities generated by minority stress. (Eisenberg, 2017) Minority stress occurs in various spheres of life and impacts the mental health of transgender youth, including on individual, interpersonal and structural levels. Therefore, it is important to incorporate the concept of minority stress into the Social Ecological Model (SEM), which itself indicates numerous intersecting conditions that drive health and health risk behaviors. (Bronfenbrenner, 1979; Meyer, 2003) The SEM evaluates and contextualizes the dynamic interface between individual, relationship, community, and societal factors. Recent research associated with the SEM framework suggests that more work is needed

to elucidate factors which mitigate the impact of minority stress in the transgender youth population in particular. (Hendricks 2012; Hatzenbuehler, 2016) It remains unclear whether specific home, interpersonal and school related social determinants and/or resiliency factors are associated with a decrease in poor mental health outcomes in this population. Indeed, as a related 2018 report from the Center for Disease Control & Prevention (CDC) stated:

*“More work is needed to understand whether programs supporting safe and supportive environments in schools and communities or stable, nurturing relationships could be optimized to address within-group differences among sexual [and gender] minority youths based on their sexual [and/or gender] identity.” (CDC, 2018).*

Accordingly, in this study we focused on specific, theoretically protective resiliency factors - relevant to home, interpersonal, and school settings for transgender youth - in order to evaluate their potential for mitigating poor mental health outcomes. Specifically, we focus on recent suicide attempts and lifetime heroin use; important outcomes which serve as a proxy for mental health in general. Moreover, heroin is especially distinctive in its strong addictive properties as well the lethality and long-term psychosocial disarray it often precipitates among users. This fact is highlighted by the ongoing opioid epidemic. Opioid Use Disorder is highly correlated with Post Traumatic Stress Disorder. (Najavits et al, 2010) Better understanding of the traumatic psychosocial factors related to minority stress which precipitate initial opioid use and depression in transgender youth - prior to the development of Opioid Use Disorder and/or Post Traumatic Stress Syndrome- would help facilitate a healthy transition to adulthood and mitigate morbidity and mortality in this special population across

the lifespan. The goal of this study was to document disparities related to suicide attempt and heroin use in cisgender versus transgender adolescents in New Mexico, and then identify specific resiliency factors which are associated with a decrease in the prevalence of suicide attempt and heroin use in transgender youth in particular. Our hypotheses are as follows: 1. there will be a greater prevalence of both of our outcomes (suicide attempts and heroin use) in the transgender population of interest compared to cisgender peers in New Mexico; and, 2. certain resiliency factors will exert effect modification and be associated with a decreased prevalence of suicide attempts and heroin use in the transgender population under study.

## **Methods**

### **Study Design**

This study is a cross-sectional, secondary analysis of the 2017 New Mexico Youth Risk and Resiliency Survey (YRRS) to evaluate the associations between transgender identity and the outcomes of suicide attempt in the last twelve months and lifetime heroin use. We also evaluate the effect that multiple resiliency factors have on the magnitude of these associations.

The New Mexico YRRS is a survey of public high school students (grades 9 – 12) and public middle school students (grades 6 – 8). The survey includes questions about risk behaviors, e.g., those contributing to unintentional injury, violence, mental health, and obesity. The survey also includes questions about certain resiliency (protective) factors, which are detailed below. The YRRS is conducted by the New Mexico Department of Health (DOH) and Public Education Department (PED) during the odd calendar years, with technical assistance from the University of New Mexico Prevention Research Center and the Centers for Disease Control and Prevention (CDC). The NM YRRS is a part of the national Youth Risk Behavior Surveillance System (YRBSS) which includes a national school-based survey conducted by the CDC in cooperation with state, territorial, tribal and local agencies. (CDC, 2020) This study was classified as exempt by the University of New Mexico Health Sciences Center Institutional Review Board (HRRC# 25647).

## **Data**

The data analyzed in this study included only participants in grades 9-12 from the 2017 NM YRRS, with 18,451 respondents in this sample. The data was collected via written student survey and sampled from all 89 school districts in New Mexico. Stratification was done by school district, using probability selection proportional to school size. Classrooms within each school were then systematically selected with every student selected to participate in a particular classroom. Passive consent was obtained from parents with less than 5% declining. Ultimately the survey had a 70% response rate. Surveys were completed anonymously. Survey data were entered using electronic scanning. Missing data were not imputed. We secured access to the cleaned data set from the New Mexico DOH. Of note, the data is publicly available and completely de-identified.

## **Variables**

Transgender identity was the exposure of interest and is compared to cisgender identity. To assess this, we utilized the following question from the YRRS: “Do you consider yourself transgender, genderqueer, or genderfluid?” Possible responses to this question were: “No, I am not transgender, genderqueer, or genderfluid;” “Yes, I am transgender, genderqueer, or genderfluid;” “I am not sure if I am transgender, genderqueer, or genderfluid;” and “I do not know what this question is asking.” We categorized the no response as cis-gender, and the yes response as transgender. We excluded from our analysis

those who chose responses of unsure, and, did not know what the question was asking.

We analyzed two separate outcomes: suicide attempt in the past 12 month and lifetime heroin use. We based the suicide attempt outcome on the following YRRS question: "During the past 12 months, how many times did you actually attempt suicide?" Possible responses to this question were: "0 times;" "1 time;" "2 or 3 times;" "4 or 5 times;" and "6 or more times." We categorized 0 times as negative and all other responses as positive for the suicide attempt outcome. Similarly, we based the heroin use outcome on the following question: "During your life, how many times have you used heroin (also called smack, junk or China White)?" Possible responses to this question were: "0 times;" "1 or 2 times;" "3 to 9 times;" "10 to 19 times;" "20 to 39 times;" and "40 or more times." We categorized 0 times as negative and all other responses as positive for the heroin use outcome.

The NM YRRS asked about 13 resiliency factors, as follows:

1. Having a parent or other adult at home who is interested in the adolescent's school work;
2. Having a parent or other adult at home who believes the adolescent will be a success;
3. Having a teacher or other adult at school who listens to the adolescent;
4. There is an adult in the community who really cares about the adolescent;
5. There is an adult in the community who tells the adolescent when they do a good job;
6. Having a peer friend who really cares about the adolescent;
7. Having a peer friend who helps the adolescent when they are having a hard time;
8. Parent knows where the adolescent is when not at home;
9. There are clear rules at school about what students can and cannot do;

10. Plans to go to college/other school after high school;
11. Involved in sports, clubs or other extracurriculars at school;
12. Involved in community extracurriculars;
13. Involved in music, art, literature or a hobby.

Possible responses ranged from: “Not true;” “A little true;” “Somewhat true;” and “Very much true.” For the purposes of our analysis, we generated new binary variables for each resiliency factor and categorized it such that response “Not true” was classified as no; and “A little true”, “Somewhat true”, and “Very much true” were classified as yes. We categorized these responses in such a manner in order to be consistent with previous studies that evaluated these same YRRS resiliency factors. (Fitzgerald, 2017; Hall, 2018; Reed, 2016)

We evaluated baseline demographic factors from the YRRS. For student age, we included only those who were age 14-18. For grade level, we assessed 9<sup>th</sup>-12<sup>th</sup> grade. For race, students were categorized as American Indian/Alaska Native; Asian; Black/African-American; Hispanic; Native Hawaiian/Other Pacific Islander; and, White. A follow up question which we included in our evaluation of descriptive statistics was: “Are you Hispanic or Latino?” Responses were: yes or no. For the highest level of schooling that the student’s mother completed, responses were categorized as completed grade school or less; some high school; completed high school; some college; completed college; graduate or professional school; and, not sure. We included a similar question as it pertains to the father: “What is the highest level of schooling your father completed?” The responses were the same as for the previous question. The next question was: “Have you ever been forced to have sexual intercourse when you did not want to?” The answers were: yes or no. In addition, we utilized the following question:

“During the past 12 months, have you ever been bullied on school property?”

Possible responses were: yes or no. We chose to examine the following question

next: “Were you born in the USA?” Responses were yes or no. We also took into

account: “How often do you speak a language other than English at home?”

Responses ranged from: never; less than half the time; about half the time; more

than half the time but not all the time; and, all the time. Finally, we examined

responses to the question: “During the past 30 days, where did you sleep?”

Responses included: “in my parent’s or guardian’s home;” “in the home of a

friend, family member, or other person because I had to leave my home or my

parent or guardian cannot afford housing;” “in a shelter or emergency housing; in

a hotel or motel;” “in a car, park, campground, or other public space;” “I do not

have a usual place to sleep; somewhere else.” We categorized the response – in

my parent’s or guardian’s home – as negative with respect to

homelessness/unstable housing. All other responses were categorized as

positive with respect to homelessness/unstable housing.

### **Statistical Analysis**

The YRRS uses a sample weighting scheme. A weight is applied to each student survey to adjust for the sampling method, overall student nonresponse, and the distribution of students by grade, sex, and race/ethnicity in each school district. Thus, weighted estimates are representative of all students in grades 9-12 in each school district. (CDC, 2013) We performed all analysis with Stata statistical software (version 14, 2016, College Station, TX) by using the “svy:” command for survey data.

First, we generated descriptive statistics (frequencies and percentages) comparing cisgender and transgender students by demographic and other factors including age, grade, race, Hispanic ethnicity, mother's education level, father's education level, ever forced intercourse, bullied at school in last 12 months, homelessness/unstable housing, born in US, and frequency of language other than English used at home. For each characteristic, we assessed for differences between the cisgender and transgender groups using the chi-square test. Secondly, we compared the cisgender vs transgender groups based on responses to each resiliency factor question utilizing the chi square test.

Next, we evaluated the association between transgender identity and the outcome of suicide attempt in the past 12 months. We calculated the prevalence odds ratio (POR) and 95% confidence interval (CI) for this association, using logistic regression. We also evaluated this association for confounding. We considered the following potential confounding factors: age, grade, race, Hispanic vs non-Hispanic, mother's education level, father's education level, ever forced intercourse, bullied at school in last 12 months, homelessness/unstable housing, born in US, and frequency of language other than English used at home. We entered each potential confounding factor into our regression model individually and compared the crude and adjusted POR. If the crude and adjusted PORs differed by more than 10%, we considered that factor a confounding variable and adjusted the logistic regression model by including the given variable in the model. The variable "born in US" was the only confounding

variable that we adjusted for. The same regression analysis method with respect to PORs and confounding was applied to the outcome of heroin use.

We hypothesized that certain resiliency factors would decrease the odds of recent suicide attempts for the transgender students. In order to assess this hypothesis, we wanted to determine whether each separate resiliency factor modified the magnitude of the association between the exposure (gender identity) and outcome (suicide attempt or heroin use). Therefore, we evaluated the association between transgender identity and each outcome for effect modification by each resiliency factor using two different approaches. First, we performed preliminary stratified analyses - the stratification variable was the presence or not of a resiliency factor variable – to give an initial understanding of the data. By comparing these strata descriptively, we were able to identify potential effect modification i.e. interaction effects. Next, we fit separate regression models to the outcome of suicide attempt with an interaction term between transgender identity and the particular resiliency factor of interest. We used the Wald test to assess the statistical significance of the interaction term in the model and compared the  $p$ -value to a type I error rate of 0.05. If  $p < 0.05$ , the interaction was considered significant. The “lincom” postestimation Stata command was used after the Wald test to ascertain the final odds ratios with and without the resiliency factor of interest. Lastly, we performed this same two-step approach to the analysis and assessment of effect modification and/or interaction for the separate heroin use outcome.

## Results

Among the 18,451 student respondents in the YRRS, we found no differences between the cisgender and transgender groups with respect to age, grade, race, Hispanic vs non-Hispanic, mother’s education level, father’s education level and frequency of language other than English used at home (Table 1).

**Table 1. Demographic, Risk Factor and Outcome Characteristics of New Mexico High School Students - Cisgender vs Transgender- 2017 New Mexico Youth Risk and Resiliency Survey (N=18,451).**

Variable	Cisgender (%)	Transgender (%)	P-value
<b>Age</b>			0.44
14	19.2	16.5	
15	26.1	31.1	
16	25.5	23.8	
17	21.9	20.3	
18+	7.4	8.7	
<b>Grade</b>			0.27
9 <sup>th</sup>	26.9	24.4	
10 <sup>th</sup>	26.1	32.1	
11 <sup>th</sup>	25.6	22.4	
12 <sup>th</sup>	21.5	21.1	
<b>Race</b>			0.41
American Indian / Alaska Native	12.6	13.8	
Asian	2.3	3.4	
Black / African American	3.9	5.5	
Hispanic	50.5	46.6	
Native Hawaiian Other Pacific Islander	0.7	1.4	
White	30.0	29.4	
<b>Hispanic or Latino</b>			0.80
Non-Hispanic	38.1	38.9	
Hispanic	61.9	61.1	
<b>Mother’s Education Level</b>			0.26
Completed Grade School or less	3.9	5.2	

Some High School	12.2	14.8	
Completed High School	18.8	17.6	
Some College	16.9	15.6	
Completed College	23.9	20.4	
Grad or Prof School	11.7	9.9	
Not Sure	12.6	16.5	
<b>Father's Education Level</b>			0.33
Completed Grade School or less	5.0	3.4	
Some High School	12.7	14.7	
Completed High School	22.8	19.2	
Some College	12.6	13.2	
Completed College	16.4	15.3	
Grad or Prof School	10.6	9.1	
Not Sure	19.9	25.1	
<b>Ever forced intercourse</b>			<0.01
Yes	7.1	22.9	
No	92.9	77.1	
<b>Bullied at School last 12 months</b>			<0.01
Yes	16.6	29.3	
No	83.4	70.8	
<b>Attempted Suicide last 12 months</b>			<0.01
Yes	8.1	34.6	
No	91.9	65.4	
<b>Ever used heroin in lifetime</b>			<0.01
Yes	1.5	21.9	
No	98.5	78.1	
<b>Unstable housing / Homeless</b>			<0.01
Stable	96.3	58.0	
Unstable	3.7	42.1	
<b>Born in US</b>			<0.01
Yes	92.9	75.4	
No	7.1	24.6	
<b>Frequency of Language other than English used at home</b>			0.03
Never	47.2	38.2	
Less than half the time	22.8	29.3	
About half the time	9.8	13.5	
More than half the time	6.4	6.9	
All the time	13.7	12.1	

For transgender students, the prevalence of certain negative experiences was higher compared to cisgender peers, respectively: forced sexual intercourse (22.9% vs 7.1%), bullying at school (29.3% vs 16.6%), suicide attempts (34.6% vs 8.1%), heroin use (21.9% vs 1.5%) and homelessness (42.1% vs 3.7%). A significantly lower percentage of transgender students were born in the US compared to cisgender peers (75.4% vs 92.9%).

With respect to the prevalence of the resiliency factors for cisgender versus transgender students (Table 2), a larger percentage of transgender students responded “not true at all” for twelve of fourteen resiliency factors. Most notably, 25.3% of transgender students responded “not true at all” with respect to having an adult at home interested in their schoolwork, versus 7.7% of cisgender peers. Similarly, 25.0% of transgender students reported that it was “not true at all” that outside their home there was an adult who really cares about them, compared to 7.2% of their cisgender peers.

**Table 2. Resiliency Factors - Cisgender vs Transgender High School Students - 2017 New Mexico Youth Risk and Resiliency Survey (N=18,451).**

<b>Resiliency Factor</b>	<b>Cisgender (%)</b>	<b>Transgender (%)</b>	<b>P-value*</b>
<b>“In my home, there is a parent or some other adult who is interested in my schoolwork.”</b>			< 0.01
Not true at all	7.7	25.3	
A little true	16.0	20.0	
Pretty much true	25.1	26.7	
Very much true	51.2	28.0	
<b>“In my home, there is a parent or some other adult who believes that I will be a success.”</b>			< 0.01
Not true at all	4.4	18.4	
A little true	8.0	24.8	
Pretty much true	16.8	20.9	
Very much true	70.9	35.9	

<b>“At my school, there is a teacher or some other adult who listens to me when I have something to say.”</b>			< 0.01
Not true at all	9.7	21.8	
A little true	18.7	29.8	
Pretty much true	30.9	25.9	
Very much true	40.6	22.4	
<b>“At my school, there is a teacher or some other adult who believes that I will be a success.”</b>			< 0.01
Not true at all	7.4	24.1	
A little true	15.3	20.5	
Pretty much true	28.5	22.2	
Very much true	48.8	33.2	
<b>“Outside of my home and school there is an adult who really cares about me.”</b>			< 0.01
Not true at all	7.2	25.0	
A little true	9.1	20.6	
Pretty much true	17.5	22.1	
Very much true	66.3	32.4	
<b>“Outside of my home and school, there is an adult who tells me when I do a good job.”</b>			< 0.01
Not true at all	10.8	29.3	
A little true	14.9	25.5	
Pretty much true	24.6	19.8	
Very much true	49.7	25.4	
<b>“I have a friend about my own age who really cares about me.”</b>			< 0.01
Not true at all	6.3	17.8	
A little true	9.4	20.7	
Pretty much true	20.3	20.3	
Very much true	64.0	41.3	
<b>“I have a friend about my own age who helps me when I’m having a hard time.”</b>			< 0.01
Not true at all	8.8	21.5	
A little true	12.5	20.2	
Pretty much true	21.2	21.8	
Very much true	57.4	36.5	
<b>“When I am not at home, one of parents/guardians knows where I am and who I am with.”</b>			< 0.01
Not true at all	4.9	18.1	

A little true	9.6	23.2	
Pretty much true	26.4	24.5	
Very much true	59.2	34.2	
<b>“In my school, there are clear rules about what students can and cannot do.”</b>			< 0.01
Not true at all	4.7	17.2	
A little true	10.9	21.7	
Pretty much true	32.5	28.3	
Very much true	51.8	32.8	
<b>“I plan to go to college or some other school after highschool.”</b>			< 0.01
Not true at all	5.6	22.2	
A little true	8.5	20.7	
Pretty much true	16.7	18.4	
Very much true	69.2	38.7	
<b>“At school I am involved in sports, clubs, or other extra-curricular activities.”</b>			< 0.01
Not true at all	31.5	39.4	
A little true	9.8	19.9	
Pretty much true	9.8	16.0	
Very much true	48.9	24.8	
<b>“Outside of my home and school, I am part of clubs, sports teams, church or temple, or other group activities.”</b>			< 0.01
Not true at all	38.9	38.8	
A little true	12.4	22.3	
Pretty much true	12.2	17.3	
Very much true	36.5	21.6	
<b>“Outside of my home and school, I am involved in music, art, literature, sports or a hobby.”</b>			<0.01
Not true at all	25.5	22.7	
A little true	12.6	19.7	
Pretty much true	16.6	18.6	
Very much true	45.3	39.1	

\*Chi-square test

The odds of suicide attempt in the past 12 months were 5.5-fold greater (POR=5.5, 95% CI: 4.1 - 7.6) for transgender students compared to their cisgender peers (Table 3). The odds of lifetime heroin use were nearly 14-fold greater (POR=13.9, 95% CI: 9.3 - 20.7) for transgender students compared to their cisgender peers.

**Table 3: Prevalence Odds Ratios for the association between Gender Identification and Attempted Suicide in the past 12 months and Ever Used Heroin among High School Students, 2017, New Mexico Youth Risk and Resiliency Survey (N= 18,451).\***

<b>Outcome</b>	<b>Cisgender (%)</b>	<b>Transgender (%)</b>	<b>Prevalence Odds Ratio</b>	<b>95% Confidence Intervals</b>
Suicide: No	91.9	65.4	Reference	
Suicide: Yes	8.1	34.6	5.5	4.1, 7.6
Heroin: No	98.5	78.1	Reference	
Heroin: Yes	1.5	21.9	13.9	9.3, 20.7

\*The logistic regression models were adjusted for whether or not the student had been born in the US.

Our analysis of effect modification by each resiliency factor, for suicide attempt in the past 12 months, noted that the resiliency factor “At my school, there is a teacher or some other adult who listens to me when I have something to say” significantly modified the association between transgender identity and suicide attempt (p=0.01, Table 4). Among transgender students who reported a teacher at school listened to them, the odds of suicide attempt was increased 6.6-fold (OR=6.6, 95% CI: 4.5-9.6). Among transgender students who did not report a teacher at school listened to them, the odds of suicide attempt was increased 2.3-fold (OR=2.3, 95% CI: 1.2-4.4).

**Table 4. Prevalence Odds Ratios for the Association Between Transgender Identity Status and Suicide Attempt in Last 12 Months stratified by the Presence or Absence of Each Resiliency Factor and Wald test for interaction among High School Students, 2017, New Mexico Youth Risk and Resiliency Survey.\***

<b>Resiliency Factor</b>	<b>Prevalence Odds Ratio (95% CI), Resiliency Factor: YES</b>	<b>Prevalence Odds Ratio (95% CI), Resiliency Factor: NO</b>	<b>P-value<sup>†</sup></b>
“In my home, there is a parent or some other adult who is interested in my schoolwork.”	5.8 (4.0, 8.5)	2.8 (1.5, 5.3)	0.06
“In my home, there is a parent or some other adult who believes that I will be a success.”	5.3 (3.7-7.5)	3.6 (1.7, 7.7)	0.37
“At my school, there is a teacher or some other adult who listens to me when I have something to say.”	6.6 (4.5, 9.6)	2.3 (1.2, 4.4)	0.01
“At my school, there is a teacher or some other adult who believes that I will be a success.”	5.8 (4.0, 8.4)	2.9 (1.5, 5.8)	0.09
“Outside of my home and school there is an adult who really cares about me.”	5.9 (4.1, 8.5)	2.8 (1.5, 5.5)	0.06
“Outside of my home and school, there is an adult who tells me when I do a good job.”	5.9 (4.0, 8.9)	3.0 (1.7, 5.1)	0.06

“I have a friend about my own age who really cares about me.”	5.6 (3.9, 8.0)	5.1 (2.5, 10.9)	0.87
“I have a friend about my own age who helps me when I’m having a hard time.”	5.9 (4.1, 8.6)	3.7 (1.9, 7.4)	0.27
“When I am not at home, one of parents/guardians knows where I am and who I am with.”	5.9 (4.1, 8.3)	2.9 (1.4, 6.2)	0.11
“In my school, there are clear rules about what students can and cannot do.”	5.7 (4.1, 8.0)	3.5 (1.6, 7.7)	0.27
“I plan to go to college or some other school after highschool.”	5.8 (4.1, 8.4)	3.3 (1.8, 6.2)	0.12
“At school I am involved in sports, clubs, or other extra-curricular activities.”	6.6 (4.2, 10.0)	4.6 (2.8, 7.4)	0.32
“Outside of my home and school, I am part of clubs, sports teams, church or temple, or other group activities.”	6.4 (4.0, 10.1)	5.1 (3.4, 7.6)	0.48
“Outside of my home and school, I am involved in music, art, literature, sports or a hobby.”	6.0 (4.1, 8.8)	5.7 (3.0, 10.9)	0.90

\*The logistic regression models were adjusted for whether or not the student had been born in the US.

+P-value from the Wald test for the interaction between strata and gender identity in the logistic regression models.

Our analysis of effect modification and/or interaction by each resiliency factor for lifetime heroin use indicated four resiliency factors that significantly modified the association between transgender identity and lifetime heroin use (all p-values <0.05, Table 5).

**Table 5. Prevalence Odds Ratios for the Association Between Transgender Identity Status and Heroin Use Ever stratified by the Presence or Absence of Each Resiliency Factor and Wald test for interaction among High School Students, 2017, New Mexico Youth Risk and Resiliency Survey.\***

<b>Resiliency Factor</b>	<b>Prevalence Odds Ratio (95% CI), Resiliency Factor: <u>YES</u></b>	<b>Prevalence Odds Ratio (95% CI), Resiliency Factor: <u>NO</u></b>	<b>P-value<sup>+</sup></b>
“In my home, there is a parent or some other adult who is interested in my schoolwork.”	15.0 (10.0, 22.5)	6.1 (2.7, 13.4)	0.04
“In my home, there is a parent or some other adult who believes that I will be a success.”	14.0 (9.4, 20.9)	6.2 (2.6, 15.1)	0.08
“At my school, there is a teacher or some other adult who listens to me when I have something to say.”	13.5 (8.3, 21.8)	9.6 (4.1, 22.2)	0.51
“At my school, there is a teacher or some other adult who believes that I will be a success.”	16.0 (10.7, 24.1)	5.2 (2.3, 12.0)	0.01
“Outside of my home and school there is an adult who really cares about me.”	14.0 (8.9, 22.0)	6.7 (3.3, 13.4)	0.07
“Outside of my home and school, there is an adult who tells me when I do a good job.”	11.8 (7.6, 18.5)	11.0 (5.4, 22.0)	0.85
“I have a friend about my own age who really cares about me.”	13.9 (8.7, 22.0)	8.5 (3.7, 19.3)	0.31
“I have a friend about my own age who helps me when I’m having a hard time.”	13.8 (8.7, 22.0)	8.5 (4.1, 17.6)	0.25
“When I am not at home, one of parents/guardians knows where I am and who I am with.”	12.7 (7.9, 20.3)	9.1 (4.3, 19.1)	0.45
“In my school, there are clear rules about what students can and cannot do.”	12.7 (8.2, 19.8)	7.8 (3.4, 17.6)	0.30

“I plan to go to college or some other school after highschool.”	13.4 (8.7, 20.6)	7.1 (3.2, 15.6)	0.15
“At school I am involved in sports, clubs, or other extra-curricular activities.”	18.7 (11.6, 29.9)	9.2 (5.1, 16.6)	0.046
“Outside of my home and school, I am part of clubs, sports teams, church or temple, or other group activities.”	21.3 (12.9, 35.3)	6.0 (3.4, 10.5)	<0.01
“Outside of my home and school, I am involved in music, art, literature, sports or a hobby.”	15.1 (9.3, 24.8)	13.3 (6.8, 26.2)	0.76

\*The logistic regression models were adjusted for whether or not the student had been born in the US.

†P-value from the Wald test for the interaction between strata and gender identity in the logistic regression models.

First, among transgender students who reported that there is an adult who is interested in their schoolwork at home, the odds of lifetime heroin use was increased 15.0-fold (OR=15.0, 95% CI: 10.0-22.5). Among transgender students who did not report an adult at home interested in their school work, the odds of lifetime heroin use was increased 6.1-fold (OR=6.1, 95% CI: 2.7-13.4) Secondly, of those transgender students who reported that at school there is an adult who believes they will be a success, the odds of lifetime heroin use was increased 16.0-fold (OR=16.0, 95% CI: 10.7-24.1). Whereas among those transgender students who denied that there is an adult at school who believes they will be a success, the odds of lifetime heroin use was increased 5.2-fold (OR=5.2, 95% CI: 2.3-12.0). Third, among transgender students who reported that at school they are involved in extra-curricular activities, the odds of lifetime heroin use was increased 18.7-fold (OR=18.7, 95% CI: 11.6-29.9). Of those transgender respondents who denied that they are involved in extra-curricular activities at school, the odds of lifetime heroin use was increased 9.2-fold (OR=9.2, 95% CI:

5.1-16.6). Finally, among those transgender students who responded that they are part of community based extracurricular activities, the odds of lifetime heroin use was increased 21.3-fold (OR=21.3, 95% CI: 12.9-35.3). In contrast, of those transgender respondents who denied being involved in community based extracurricular activities, the odds of lifetime heroin use was increased 6.0-fold (OR=6.0, 95% CI: 3.4-10.5).

## Discussion

Our results suggest that transgender students had a lower prevalence of resiliency factors than their cisgender peers. Moreover, we observed large odds ratios for the associations between transgender and cisgender respondents and the two main outcomes of interest: suicide attempt in the last 12 months and lifetime heroin use. Finally, we found that most resiliency factors did not modify the association between transgender identity and odds of suicide or heroin use. We did note that certain resiliency factors increased the odds of these negative outcomes for transgender students in our representative sample.

We found significant disparities between transgender and cisgender students with respect to involvement in many types of risk behaviors and experiences, including our two main outcomes. Transgender students had significantly higher odds of having attempted suicide in the last twelve months and having ever used heroin, compared to their cisgender peers. Eisenberg et al. published a large-scale, population-based study that found significant health disparities in transgender high school students in Minneapolis. (Eisenberg, 2017) Our findings are consistent with theirs in that involvement in all types of risk behaviors and experiences was significantly higher among transgender youth than cisgender youth. Johns et al. reported evidence from 19 states and large urban school districts in 2017 which suggested that compared to their cisgender peers, transgender students were more likely to report substance use and suicide risk. (Johns, 2018) Between 2013-2015, the prevalence of substance use

for California youth was 2.5-4 times higher for transgender youth compared to their cisgender peers in a large statewide cross-sectional study similar to the YRRS. (Day, 2017) Moreover, in a cross-sectional study of 6,082 high school students which utilized the Youth Risk Behavioral Survey (YRBS), gender nonconformity was strongly associated with substance use among male students. Specifically, they found in this group an adjusted prevalence for lifetime heroin use of 4.59% (95% CI: 2.48-8.47%). (Lowry, 2018)

Several other studies suggested an increased prevalence of suicide attempt, depression, or self-harm in transgender youth (Perez-Brumer, 2017; Clark, 2014; Devries, 2011; Spack, 2012, Shields, 2013; Khatchadourian, 2014; Reisner, 2015; Olson, 2015; Deimer, 2015; Kaltiala-heino, 2015; Holt, 2016; Chen, 2016; Arcelus, 2016). A potential explanatory mechanism for these disparities relates to “minority stress” and the harassment, ostracization, violence and trauma that this concept involves. (Meyer, 2003)

We hypothesized that certain resiliency factors would modify the association between transgender identity and our outcomes, with a decreased prevalence of suicide and heroin use among transgender youth who reported having certain resiliency factors. Our results did not support our hypothesis. Rather, our analysis indicated that some resiliency factors increased the odds of suicide or heroin use for transgender students. These findings conflict with previous research. Most notably, Gower et al., using the 2016 Minnesota Student Survey, examined associations between eight protective factors (connectedness to parents, adult relatives, friends, adults in the community, and teachers; youth

development opportunities; and feeling safe in the community and at school) and substance use, suicidality and depression. Their population consisted of 2,168 adolescents who identified as transgender. Their results indicated that each protective factor was associated with lower odds of substance use and suicidality. (Glomer, 2018)

The reasons that might explain the contrasting findings between our study and that of Glomer et al. stem from the concept of minority stress as well the phenomenon of polyvictimization as experienced by the transgender youth in our sample. Polyvictimization can be defined as experiencing four or more distinct forms of victimization – e.g., sexual abuse, dating violence, bullying - in the last 12 months. (Finkelhor, 2007) Transgender students in the 2017 NM YRRS experienced significantly higher levels of victimization in multiple domains including rape, bullying and violence compared to their cisgender peers. Polyvictimization research as it pertains to transgender, genderqueer, and cisgender sexual minority adolescents:

*“...helps address the problems created by studying single forms of violence as if they occur in isolation to one another by (a) identifying the scope, seriousness, and complexity of victimization experiences, (b) promoting the development of integrative theoretical explanations, and (c) advancing better prevention policies and interventions.” (Sterzing, 2017).*

The concept of polyvictimization can therefore be incorporated into the Social Ecological Model as part of the dynamic interface between individual, relationship, community and societal factors and the numerous intersecting conditions that drive health and health risk behaviors. (Sterzing, 2017; Bronfenbrenner, 1979) Factors on all levels have been demonstrated to confer

risk or protection from social and mental health outcomes, including factors surrounding interpersonal relationships between family, teachers and peers as well as community support factors. (Bronfenbrenner, 1979; Day, 2017). However, pertinently, the resiliency factor questions from the YRRS focused on individual and relationship factors. They do not address the community or societal factors, which may explain, in part, why they are insufficient to confer protection from poor mental health outcomes. Furthermore, in considering the Social Ecological Model together with the phenomena of minority stress and polyvictimization, it is conceivable that the intricacy, gravity and range of transgender students' lived experience as victims of multiple forms of trauma and abuse is too complex to be accurately captured by the YRRS resiliency factors as they relate to the interface between various psychosocial factors and structural contexts that drive mental health outcomes. In fact, the resiliency factor questions which were used in the 2017 NM YRRS were designed for a large, general, representative population of middle and high school students in New Mexico. They do not represent a validated instrument designed to specifically measure the tumultuous and difficult transgender lived experience. This may represent information bias in that there has been an inaccurate assessment of the effects of the resiliency factors, and explain why the resiliency factors do not appear protective for the outcomes of interest. Finally, an additional explanation for our findings related to resiliency factors may be that the YRRS, especially with respect to sensitive responses surrounding risk behaviors and negative experiences, is subject to self-reporting bias and social desirability bias. For example, transgender students may have

been more likely to report socially desirable resiliency factors thereby obfuscating their apparent effect on the outcomes.

Our study had several limitations. One limitation is that the data were cross-sectional and therefore causality between transgender identity and the outcomes of suicide and heroin use is difficult to ascertain because of the requirement for temporality. However, one could reasonably assume that temporality was ensured because transgender identity likely occurred before the incidence of suicide attempt and/or heroin use. Moreover, when the YRRS data was collected, approximately 15% of students were absent on any given day. High-risk (e.g. transgender) students are prone to higher likelihood of being absent, thereby potentially biasing the data towards underestimation of the association between transgender identity and our outcomes. Finally, our study may have suffered from confounding bias. While we did assess the limited demographic variables for confounding and adjusted our analyses accordingly, we may not have adjusted for all confounding variables such as domestic violence or gender-role policing at home or in the community. As such, transgender identity may have been strongly associated with another unidentified exposure that is also related to the outcomes.

## **Conclusion**

The mental health disparities between cisgender and transgender youth are clear. The resiliency factors we studied did not modify the associations between transgender identity and the outcomes of suicide and heroin use as we had hypothesized. More research is needed to develop interventions that target improved mental and emotional health for transgender youth. Based on our results, it would be helpful to create and test new YRRS or YRBS resiliency factor questions designed to capture the complexity of the lived experience of transgender adolescents and, in turn, identify prosocial interventions that mitigate the effects of minority stress and polyvictimization. For example, questions that measure the extent of community support and gender-role policing would be of interest. The Massachusetts Gender Measures Project was a mixed methods study to develop and cognitively test instruments for youth health surveillance studies. (Conron, 2014) Further attention to their promising results in designing future YRRS or YRBS questions may be helpful to better capture the nuances of this unique population. Moreover, randomized controlled trials that examine specific social interventions would be useful to decrease the incidence of suicide and heroin use. Finally, qualitative studies may yield a better understanding of the traumatic psychosocial factors which potentiate the staggering mental health disparities in this vulnerable and marginalized transgender youth population, thereby reducing morbidity and mortality throughout life.



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