



# HHS Public Access

Author manuscript

*J Gambl Stud.* Author manuscript; available in PMC 2020 March 01.

Published in final edited form as:

*J Gambl Stud.* 2019 March ; 35(1): 79–92. doi:10.1007/s10899-018-9806-7.

## Gambling Behaviors and Problem Gambling: A Population-Based Comparison of Transgender/Gender Diverse and Cisgender Adolescents

G. Nic Rider, Ph.D.<sup>a</sup>, Barbara J. McMorris, Ph.D.<sup>b</sup>, Amy L. Gower, Ph.D.<sup>c</sup>, Eli Coleman, Ph.D.<sup>a</sup>, and Marla E. Eisenberg, Sc.D., M.P.H.<sup>c</sup>

<sup>a</sup>Program in Human Sexuality, Department of Family Medicine and Community Health, University of Minnesota Medical School. 1300 S. 2<sup>nd</sup> St., Suite 180, Minneapolis, MN 55454, USA.

<sup>b</sup>School of Nursing, University of Minnesota. 308 Harvard St. SE, Minneapolis, MN 55455, USA.

<sup>c</sup>Division of General Pediatrics and Adolescent Health, Department of Pediatrics, University of Minnesota. 717 Delaware St. SE, Minneapolis, MN 55414, USA.

### Abstract

Most gambling research utilizes general youth samples and focuses on binary gender categories; few studies examine and compare gambling behaviors between transgender and gender diverse (TGD) youth and their cisgender peers. The current study used population-based data from the 2016 Minnesota Student Survey to compare the prevalence of gambling behaviors and problem gambling among TGD versus cisgender adolescents, in addition to examining differences by birth-assigned sex. The analytic sample consisted of 80,929 students (including,  $n = 2,168$  [2.7%] TGD) in 9th and 11th grades. Chi-square tests and Cohen's  $d$  effect sizes were used for all comparisons. TGD youth reported greater involvement in most gambling behaviors and problem gambling compared to cisgender youth. In comparisons by birth-assigned sex, TGD youth assigned male at birth were particularly at risk for gambling involvement and problem gambling. TGD youth assigned female at birth also reported higher rates of problem gambling than both cisgender youth assigned male and female at birth. Results suggest that examining rates of gambling behavior and problem gambling as well as identifying disparities in vulnerable youth populations is crucial in order to develop culturally responsive and gender inclusive prevention, intervention, and outreach programs.

### Keywords

Adolescence; transgender; gender diverse; cisgender; gambling; problem gambling

---

**Address correspondence to:** G. Nic Rider, Ph.D., University of Minnesota Medical School, 1300 S. 2<sup>nd</sup> St., Suite 180, Minneapolis, MN 55454, gnriders@umn.edu, 612-625-1500.

**Conflict of Interest:** G. Nic Rider, Barbara J. McMorris, Amy L. Gower, and Marla E. Eisenberg declare that they have no conflicts of interest. Eli Coleman serves as the Co-Chair of the Sexual Health Advisory Council for Church & Dwight, Inc.

**Ethical approval:** This article does not contain any studies with human participants or animals performed by any of the authors.

Although gambling is illegal for young people under the age of 18 in most of the United States, gambling behaviors are relatively common. Gambling is thought to be one of the first “risky” behaviors adolescents explore, even prior to experimentation with substances or sexual activities (Volberg et al., 2010). Indeed, youth are introduced to a variety of these behaviors early, as parents and other adults participate in gambling as part of their recreational activities (e.g., bingo, keno, sports wagering) and even as forms of charitable giving and fundraising (e.g., lotteries, raffles). Studies suggest that between 50 and 70% of youth, depending on the country under study, have taken part in some form of gambling in their lifetime (Delfabbro et al., 2016).

Gambling behaviors that become problematic result in negative consequences for young people, their families and friends, and their social contexts (i.e., schools) (Derevensky & Gupta, 2004, Neal, Delfabbro & O’Neal, 2005). Although most youth who gamble do not experience negative effects (Rossen et al., 2016), some engage in behaviors that do escalate into problem gambling. This is notable given that problem gambling has been linked to a variety of detrimental outcomes such as greater depressive symptoms, alcohol and substance use, suicide ideation and attempts, anxiety, and poor general health (Derevensky & Gupta, 2004; Dowling et al, 2017). Estimates of problem gambling for adolescents are highly variable. For example, a 2010 review indicated that prevalence of problem gambling ranged from 4% to 8%, with another 10-15% considered at risk for developing problems (Volberg et al., 2010). A more recent study noted that between 0.2-12.3% of youth in five different countries met diagnostic criteria for problem gambling (Calado, Alexandre, & Griffiths, 2017). However, methodological issues around measurement of problem gambling continue to raise questions about inflated and inconsistent rates (Derevensky, Gupta, & Winters, 2003).

## Gambling and Gender Identity

Adolescence is a transitional period from childhood to adulthood characterized by biological, cognitive, social, emotional, and behavioral changes (Op de Macks et al., 2016). Gender roles may become emphasized during this time and contribute to gender differences in gambling problems across the life course. Male sex is a consistent risk factor for problem gambling in both cross-sectional and longitudinal studies (Dowling et al., 2017). For example, birth-assigned females generally tend to begin gambling later in life, gamble less frequently, and experience fewer gambling problems than birth-assigned males (Desai et al., 2005).

The field of adolescent gambling research tends to focus on binary gender categories of boys/girls, resulting in a lack of understanding of gambling behaviors among specific gender subgroups of young people. To date, no studies have examined gambling involvement among transgender and gender diverse (TGD) adolescents. “Transgender” is an umbrella term to describe individuals whose gender identity and birth-assigned sex differ, whereas “cisgender” is a term for those who have a gender identity aligning with their birth-assigned sex. “Gender diverse” describes individuals whose gender expression, role, or identity does not align with cultural expectations of boy/masculinity and girl/femininity and who may or may not also identify as transgender.

Adolescents are often socialized to conform to mainstream, binary, gender conventions - gender categories that simply do not fit many youth, including those who are TGD. Research has suggested that birth-assigned males who do not conform to masculine expectations tend to be perceived as weak and receive a more negative response from others than birth-assigned females who do not follow feminine societal expectations (Erickson-Schroth, Gilbert, & Smith, 2014). For TGD adolescents, transgressing cultural expectations for gender means that they must also confront societal pressures that try to enforce conformity (Dietert & Dentice, 2013). Gender affirmation is an interactive process in which individuals receive social support and recognition for their gender identities and expressions and are treated in a way that aligns with how they understand themselves and would like to be treated (Sevelius, 2013). According to Minority Stress Theory, when gender is not affirmed for those who identify as TGD, they may experience minority stress, which, in turn, may contribute to risky behaviors (Hendricks & Testa, 2012), including problem gambling. In addition to the practicality of earning money, gambling may provide a means to gain acceptance and escape emotional pain (Hamilton-Wright et al., 2016), which may stem from minority stress for TGD youth, similar to their TGD adult counterparts.

## The Current Study

Recently, attention in the gambling literature has turned to the severity of gambling and what patterns in childhood and adolescence are associated with gambling problems in adulthood using general samples (Dowling et al, 2017); however, little is known about gambling for particular subgroups of vulnerable youth. Previous gambling studies that have incorporated TGD individuals are limited by small samples of adults (see, e.g., Birch, Ireland, Strickland, and Kolstee, 2015) and the tendency to aggregate across lesbian, gay, bisexual, transgender, and/or intersex (LGBTI) communities (see, e.g., Grant and Potenza, 2006). These studies capture understudied communities in gambling research, but they do not include youth or analyze TGD participants separately. Large population-based studies of adolescents are needed to accurately examine differences between subgroups of youth with differing genders and to increase generalizability of findings.

The goal of the current study is to compare the prevalence of gambling behaviors and problem gambling among TGD adolescents and their cisgender peers in a population-based sample of students. Given that previous research finds gender differences (using the binary categories of boys/girls or men/women), a second goal is to test for potential differences in gambling behaviors by birth-assigned sex for both TGD youth and their cisgender peers. Examining rates of gambling behaviors and problem gambling as well as identifying disparities in vulnerable populations is crucial in order to develop relevant, appropriate, and culturally competent prevention and intervention programs.

## Methods

This study is a secondary analysis of existing, anonymous data. The University of Minnesota Institutional Review Board deemed this study exempt from ethics review.

## Participants

The study sample came from the 2016 Minnesota Student Survey (MSS), a statewide surveillance effort coordinated by the Minnesota Departments of Education, Health, Human Services, and Public Safety. Every public school district has the option of 5th, 8th, 9th, and 11th graders participating, and in 2016, 85% of districts had one or more grades complete the MSS. Because questions about gender identity were only asked of 9th and 11th graders, our sample is restricted to the 81,885 students in these grades who provided survey responses. Approximately 1.2% of students had missing data for their gender identity, resulting in an analytic sample of 80,929. In accordance with relevant laws, recruitment involved passive parental consent procedures.

## Measures

Administered primarily as an online survey in classrooms, students self-reported birth-assigned sex, gender identity, sociodemographic characteristics, and gambling behaviors. An adaptation to the validated 2-item approach (The Gender Identity in U.S. Surveillance Group [The GenIUSS Group], 2014; Reisner et al., 2014) was used to assess students' gender identity. The two items included birth-assigned sex ("What is your biological sex?" male/female) and gender identity ("Do you consider yourself transgender, genderqueer, genderfluid, or unsure about your gender identity?" yes/no). Students who responded affirmatively to the gender identity question comprised the TGD sample.

Sociodemographic characteristics included grade (9<sup>th</sup> or 11<sup>th</sup>), race/ethnicity, free/reduced priced lunch, and school location. Students were asked to indicate whether or not they identify as Hispanic and with any of five racial groups. Responses were combined to create a 7-item race/ethnicity variable (Hispanic; non-Hispanic American Indian, non-Hispanic Asian, non-Hispanic Black, non-Hispanic Pacific Islander, non-Hispanic White, and non-Hispanic multiple race). An affirmative response to whether students received free/reduced price lunch was used as a proxy for socioeconomic status. School location was coded as schools that were within or outside of the Minneapolis/St. Paul (Twin Cities) metropolitan area.

The 2016 MSS assessed students' gambling activity and frequency over the past year. Four types of gambling behaviors were assessed: 1) "played cards, bet on sports teams or games of personal skill like video gaming, pool, golf or bowling"; 2) "bought lottery tickets or scratch offs"; 3) "gambled in a casino"; and 4) "gambled for money online" (Stinchfield, 2011). Six response options assessing frequency from "daily" to "not at all" were dichotomized into any involvement in the past year versus none, due to skewness in distributions. Finally, a dichotomous variable assessing involvement in any of the four gambling behaviors was also created to contrast any gambling behavior versus none.

Problem gambling was assessed via the 3-item Brief Adolescent Gambling Screen (BAGS; Stinchfield, Wynne, Wiebe, & Tremblay, 2017). Only students who reported ever engaging in any gambling behavior completed the BAGS. The measure has good sensitivity (0.88) and specificity (0.98) in identifying adolescent problem gambling (Stinchfield et al., 2017). Items asked: during the last 12 months, how often have you 1) "felt that you might have a

problem with gambling/betting?"; 2) "hidden your gambling/betting from your parents, other family members, or teachers?"; and 3) "skipped hanging out with friends who do not gamble/bet to hang out with friends who do gamble/bet?" The 4-point response options (ranging from "never" to "all of the time") were coded as 0-3 and summed to create a total score range of 0-9 ( $\alpha = .74$ ). Scores on the problem gambling screen were dichotomized for two cutoff options suggested by the BAGS developers. A cutoff score of 4+ is recommended for prevalence estimation, and a cutoff of 2+ is recommended to identify youth for further clinical assessment and diagnostic purposes. Both problem gambling screen cutpoints were used separately in the present analysis.

## Data Analysis

Chi-square tests were used to compare sociodemographic characteristics, past year gambling behaviors, and problem gambling screens 1) between students who identify as TGD versus cisgender and 2) across both cisgender and TGD youth who indicated being assigned female versus male at birth. A two-sided significance level of .001 was selected to reduce Type I error rate, due to the very large sample size and number of group comparisons. All descriptive analyses were conducted using IBM SPSS version 23.

In addition to testing for statistical differences between groups, we also calculated effect sizes using Cohen's (1988)  $d$  to allow us to distinguish statistical significance from practical significance (Huck, 2008) and help characterize the size of differences in prevalence estimates between cisgender and TGD students. Effect sizes are important to report, especially for large sample studies that compare and contrast many estimates from multiple groups, where  $p$  values all tend to be highly significant, and it may be difficult to pinpoint which differences are large and meaningful relative to others. Interpretation of effect sizes as small ( $d = 0.2$ ), medium ( $d = 0.5$ ) and large ( $d = 0.8$ ) are based on quantitative benchmarks suggested by Cohen (1988), with the caveat that these benchmarks, by themselves, ignore context and that small differences have practical consequences when it comes to population-level differences and implications for prevention and intervention efforts.

## Results

Approximately 2.7% ( $n = 2,168$ ) of the student sample reported identifying as TGD, whereas 97.3% ( $n = 78,761$ ) identified as cisgender. For both the TGD and cisgender samples, age ranged from 13 to 19 years ( $M = 15.5$ ;  $SD = 1.1$ ). TGD students were significantly more likely to report being assigned female at birth, being a youth of color, and receiving free/reduced price lunch than their cisgender peers (Table 1). Similar proportions of TGD and cisgender youth attended schools in metropolitan and non-metropolitan areas of the state.

### Gambling Behaviors and Problem Gambling by Gender Identity

The most frequently reported gambling behavior was playing cards or betting on sports/games (Table 2), with slightly more cisgender students reporting involvement than TGD students (27.4% vs. 23.7%,  $X^2 = 12.9, p < .001$ ;  $d = 0.03$ ). However, students who identify as TGD reported greater involvement in the other three gambling behaviors. For example,

greater numbers of TGD youth reported buying lottery tickets/scratch offs (11.6% vs. 9.6%,  $X^2 = 8.8$ ,  $p = .003$ ,  $d = 0.03$ ), compared to their cisgender peers. Differences in specific gambling activities reflect effect sizes ranging between  $d = 0.02$  and  $0.05$ , indicating that although these differences are statistically significant, their magnitude is quite small. Notably, nearly equivalent proportions of youth in both groups (29.6% TGD and 31.7% cisgender,  $p > .050$ ) reported involvement in *any* gambling behavior in the past year.

With regard to rates of problem gambling among those who reported any gambling in the past year, greater proportions of TGD students screened positive than cisgender students when using either suggested cutoff (Table 2). For example, 11.2% of TGD students met criteria for further assessment, with scores of 2 or more, compared to only 4.1% of their cisgender peers ( $X^2 = 66.2$ ,  $p < .001$ ). Effect sizes for differences in the BAGS ranged between  $d = 0.08$  and  $0.11$ .

### Comparisons by Gender Identity and Birth-Assigned Sex

Turning to comparisons that involve both gender identity and birth-assigned sex (6 tests for 7 dependent variables; Table 3), we found that 32 out of 42 (76%) comparisons demonstrated statistically significant group differences. Several patterns characterized these results.

#### Gambling behaviors.

TGD youth assigned male at birth were equally as likely as their cisgender assigned male peers to report playing cards or betting on sports/games (36.0% vs. 39.2%,  $p = .128$ ,  $d = 0.02$ ) and involvement in any gambling behavior (43.5% vs. 43.1%,  $p = .864$ ,  $d = 0.01$ ). Youth assigned male at birth, regardless of their gender identity, were significantly more likely to report all gambling behaviors than youth assigned female at birth, with effect sizes ranging between  $0.02$  and  $0.55$ . For example, over a third of birth-assigned males (36.0% TGD; 39.2% cisgender) reported playing cards or betting on sports/games during the past year; these rates are approximately two to two and half times the rate for birth-assigned females (18.7% TGD; 15.6% cisgender). We noted only two exceptions to this pattern: nonsignificant differences ( $p > .001$ ) between TGD youth assigned female and cisgender youth assigned male in their reports of lottery tickets/scratch offs (9.0% vs. 11.4%,  $p = .006$ ,  $d = 0.03$ ) and gambling in a casino (2.1% vs. 3.1%,  $p = .046$ ,  $d = 0.02$ ). Finally, youth assigned female at birth, regardless of being TGD or cisgender, reported similar rates of three behaviors: playing cards or betting on sports/games (18.7% vs. 15.6%,  $p = .002$ ,  $d = 0.03$ ), buying lottery tickets (9.0% vs. 7.8%,  $p = .096$ ,  $d = 0.02$ ) and any gambling behavior in the past year (24.0% vs. 20.2%,  $p = .864$ ,  $d = 0.01$ ).

#### Problem gambling.

TGD youth assigned male at birth appear to be at much greater risk for screening positive for problem gambling, regardless of cutoff. For example, 8.9% of TGD youth assigned male at birth screened positive for problem gambling (using the 4+ cutoff), compared to rates of only 1.0-2.1% for cisgender youth assigned female and male ( $p < .001$  for both comparisons;  $d = 0.26$  and  $0.11$ , respectively). Although TGD youth assigned male also met both of the BAGS cutoff scores at twice the rate of their TGD assigned female peers (e.g., 15.7% vs. 7.6% for the 2+ cutoff), these differences were not statistically significant ( $p > .001$ ), likely

due to sample size. However, note that the effect sizes for these differences ( $d = 0.24$  and  $0.26$ , respectively) were relatively larger than other effects noted in our multiple comparisons. TGD youth assigned female at birth also reported slightly, but not significantly, higher rates of meeting both BAGS cutoffs compared to their cisgender assigned male peers. Here, effect sizes were small ( $d = 0.02$  and  $0.03$ ) relative to other comparisons. Significantly greater differences in both BAGS cutoff scores, however, were noted between youth assigned female by their gender identity. For example, 7.6% of TGD youth assigned female scored 2 or greater on the BAGS, compared to only 2.2% of cisgender youth assigned female ( $p < .001$ ,  $d = 0.14$ ).

## Discussion

This study described and compared prevalence rates of gambling behaviors and problem gambling in a large sample of students attending school in Minnesota. To our knowledge, it is the first population-based study to compare youth who identify as TGD to their cisgender counterparts with regard to gambling. Relatedly, it is one of the first studies to use a new brief screener, the BAGS, derived from the Canadian Adolescent Gambling Inventory (Tremblay, Sinchfield, Wiebe & Wynne, 2010; Stinchfield et al., 2017), to estimate the prevalence of youth problem gambling.

We found that TGD youth, in general, reported slightly higher rates of involvement for three out of four types of gambling behaviors (bought lottery tickets or scratch offs, gambled in a casino, and gambled for money online), whereas cisgender youth reported slightly higher rates of playing cards or betting on sports/games. The prevalence of involvement in any gambling behavior in the past year was essentially equivalent across these two groups. Notably, TGD youth had higher rates of problem gambling than cisgender youth when using either of the suggested cutpoints for the BAGS. In disaggregated analyses by birth-assigned sex, results also confirmed previous studies finding consistently higher rates of birth-assigned male gambling involvement compared to birth-assigned females (Edgren, Castren, Jokela, & Salonen, 2016; Weidberg et al., 2018) but introduced nuance and complexity with our inclusion of youth who identify with diverse gender identities and their reports of engaging in gambling. Prior studies have shown that earlier onset of gambling is associated with adulthood gambling involvement (Burge, Pietrzak, Molina, & Petry, 2004), which highlights the importance of identifying rates of gambling across TGD adolescents.

In comparisons that involved both gender identity and birth-assigned sex, TGD youth assigned male appear particularly at risk for problem gambling. Specifically, TGD youth assigned male reported problem gambling at a rate that is at least 2 or 3 times higher than other groups, depending on which cutoff is used (8.9% vs. 1.0-3.3% or 15.7% vs. 2.2-7.6%). Our estimates of gambling behaviors and problem gambling in the MSS sample are consistent with estimates from previous studies (Calado, Alexandre, & Griffiths, 2017; Derevensky & Gupta 2000), with the added benefit of providing disaggregated rates for TGD youth who appear to be at the higher end of the spectrum with regard to problem gambling.

The reasons behind the higher prevalence of problem gambling for TGD youth are undoubtedly complex and beg for future research. Unfortunately, we lack information on whether participants have ever received gender-affirming medical interventions such as puberty suppression or hormone therapy. Puberty is a difficult developmental period for some TGD adolescents who may become distressed with changes happening to their bodies, potentially contributing to feelings of incongruence between their body and their gender identity (Erickson-Schroth et al., 2014). During puberty, testosterone, which has been associated with increased risk-taking behaviors (Op de Macks et al., 2016; Weidberg et al., 2018), typically increases more in birth-assigned males than birth-assigned females (Erickson-Schroth et al., 2016). Notably, involvement in risk-taking behaviors also appears to be a risk factor for problem gambling during adolescence (Grant, Odlaug, & Chamberlain, 2016). TGD adolescents may struggle in managing discomfort and distress related to puberty and behave in maladaptive ways that exacerbate risk for problem gambling.

Interestingly, results revealed no statistically significant differences in rates of problem gambling between TGD youth assigned female at birth and cisgender youth assigned male at birth, regardless of cutoff score used. At the same time, significant differences emerged in comparisons of TGD youth assigned male at birth to their cisgender assigned female peers. As noted previously, birth-assigned males who do not conform to masculine expectations tend to be perceived as weak and receive a more negative response from others than birth-assigned females who do not follow feminine norms (Erickson-Schroth et al., 2014). Masculinity tends to be more valued and thus, the consequences for a person assigned female not to conform to femininity expectations may be less harsh compared to the consequences of a person assigned male not to conform to masculinity expectations (Erickson-Schroth et al., 2014). As such, TGD youth assigned male may be reluctant to express or disclose their authentic self, or when they do, they may not be affirmed in their gender identity. This potentially increases their risk for mental health concerns, which might be mitigated through problem gambling. A previous study found that gambling was used as a coping strategy for a general sample of youth to psychologically escape mental health concerns and daily stressors (Gupta and Derevensky, 1998). Similarly, TGD adolescents, who often experience minority stressors in many areas of their lives, may also use gambling involvement as an escape from emotional pain or to gain acceptance from others who are also engaging in such behaviors.

In sum, TGD youth may express their gender in ways that are considered “non-traditional” by society or that may not follow binary conceptions of gender. As a result of the stigma associated with gender nonconformity based on current Westernized societal expectations, TGD individuals experience rejection, harassment, victimization, and other forms of minority stress, which is associated with deleterious health outcomes (Hendricks & Testa, 2012). Previous studies indicate that TGD youth are at heightened risk for substance use and emotional distress (Eisenberg et al., 2017; Perez-Brumer, Day, Russell, & Hatzenbuehler, 2017; Veale, Watson, Peter, & Saewyc, 2017), both of which have been shown to co-occur with problem gambling in general samples of adolescents (Dowling et al, 2017). TGD individuals assigned male at birth may be at greater risk for violence victimization and psychological distress, due to sexism and misogyny (Glynn et al., 2016), which may result in maladaptive or unhealthy coping including gambling involvement, subsequently placing



them at greater risk for poor health outcomes. Further investigation is needed to better understand mechanisms underlying gambling involvement and problem gambling among gender diverse youth.

### Limitations and Strengths

Results from this study should be interpreted with respect to limitations. Findings are based on anonymous, self-report data from surveys administered at schools. Due to a lack of support within schools (Kosciw, Greytak, Palmer, & Boesen, 2014), vulnerable students (such as youth who have mental health problems and those who identify as TGD) may be more likely to miss school on any given day, including survey administration day. Thus, our school-based findings may underestimate the prevalence of youth involvement in gambling and problem gambling. Given the majority of youth in both the TGD and cisgender samples identified as white, non-Hispanic (59% and 72%, respectively), findings may be more reflective of the experiences of this subgroup. Further, surveys were conducted with youth in Minnesota, a context that varies with respect to opportunities to gamble compared to other states, although the vast majority of these opportunities are only legally available to adults. For example, allowable gambling activities in Minnesota include licensed charitable gambling (including pull-tabs, paddlewheels, tipboards, bingo and raffles), pari-mutual betting on horse races, a state lottery, and gaming machines and blackjack in casinos on tribal land (The Minnesota State Lottery, 2013; Minnesota Legislative Reference Library, 2017). Generalizations are thus restricted by this context. Of note, however, individuals must be 18 years or older to participate legally in gambling activities in Minnesota, with the exception bingo (in specific circumstances).

Issues with wording of certain measures characterize the survey. For instance, the MSS uses variations of a recommended two-item approach to assess birth-assigned sex and gender identity (The GenIUSS Group, 2014). First, youth were asked to report on their “biological sex,” not their birth-assigned sex, a distinction which might be less clearly understood by those used to “sex assigned at birth,” a phrase more commonly used in among TGD individuals. And secondly, the item used to categorize gender identity aggregates those students who are “unsure” along with those who identify as transgender, genderqueer, or gender fluid, resulting in an inability to differentiate between distinct identities.

Despite these limitations, the current analysis includes several strengths. The very large, population-based sample provided adequate numbers of TGD youth to compare to cisgender youth with regard to gambling prevalence estimates. We also used the new 3-item BAGS to estimate rates of problem gambling. This brief screen was derived primarily from the gambling problem severity subscale of the Canadian Adolescent Gambling Inventory (CAGI) and validated against a clinician-administered diagnostic interview including DSM-5 diagnostic criteria for pathological gambling (Stinchfield et al., 2017). Although the BAGS was not designed to directly assess DSM-5 Gambling Disorder among youth, it is intended to improve screening and assessment of adolescent problem gambling.

## Conclusion

This research presents the first large-scale, population-based study of gambling behaviors and problem gambling comparing TGD and cisgender adolescents. Results revealed that TGD adolescents engage in gambling behaviors and experience problem gambling at higher rates than cisgender adolescents, highlighting the importance of examining and understanding differences across gender identities beyond simply boy/girl in gambling involvement. Illustrating heterogeneity in gender-related risk, results also indicated that TGD youth assigned male at birth appear to be at particular risk for problem gambling. Findings support the need for developing and implementing culturally responsive and TGD-inclusive prevention and intervention strategies. The gender differences in gambling involvement and problem gambling noted here accentuate the need for increased public awareness, early screening methods, and improved training regarding educational, prevention, and intervention strategies. Youth workers and medical and mental health providers serving individuals with gambling difficulties are encouraged to obtain training on issues relevant to and factors that might impact treatment with TGD adolescents in order to provide inclusive and competent screening and care.

## Acknowledgments:

Minnesota Student Survey data were provided by public school students in Minnesota via local public school districts and are managed by the Minnesota Student Survey Interagency Team.

**Funding:** Research reported in this publication was supported by the Eunice Kennedy Shriver National Institute of Child Health and Human Development of the National Institutes of Health under Award Number R21HD088757. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

## References

- Birch P, Ireland JL, Strickland C, & Kolstee J (2015). Examining problematic gambling and mental health in LGBTI Communities: A preliminary study. *Medical Research Archives*, 3, 1–8.
- Burge AN, Pietrzak RH, Molina CA, & Petry NM (2004). Age of gambling initiation and severity of gambling and health problems among older adult problem gamblers. *Psychiatric Services*, 55(12), 1437–1439. doi:10.1176/appi.ps.55.12.1437 [PubMed: 15572575]
- Calado F, Alexandre J, & Griffiths MD (2017). How coping styles, cognitive distortions, and attachment predict problem gambling among adolescents and young adults. *Journal of Behavioral Addictions*, 6(4), 648–657. doi: 10.1556/2006.6.2017.068 [PubMed: 29076355]
- Cohen J (1988). *Statistical Power Analysis for the Behavioral Sciences*. New York, NY: Routledge Academic.
- Delfabbro P, King D, & Derevensky JL (2016). Adolescent gambling and problem gambling: prevalence, current issues and concerns. *Current Addiction Report*, 3, 268–274. doi: 10.1007/s40429-016-0105-z
- Derevensky JL, & Gupta R (2000). Prevalence estimates of adolescent gambling problems: A comparison of the SOGS-RA, DSM-IV-J, and the GA 20 questions. *Journal of Gambling Studies* 16: 227–251. [PubMed: 14634314]
- Derevensky JL, & Gupta R (eds). (2004). *Gambling Problems in Youth: Theoretical and Applied Perspectives*. New York: Kluwer Academic Publishers.
- Derevensky JL Gupta R, & Winters K. (2003). Prevalence rates of youth gambling problems: Are the current rates inflated? *Journal of Gambling Studies*, 19, 405–424. [PubMed: 14634300]
- Desai RA, Maciejewski PK, Pantalon MV, & Potenza MN (2005). Gender differences in adolescent gambling. *Annals of Clinical Psychiatry*, 17, 249–258. [PubMed: 16402759]

- Dietert M, & Dentice D (2013). Growing up trans: Socialization and the gender binary. *Journal of GLBTFamily Studies*, 9, 24–42. doi: 10.1080/1550428X.2013.746053
- Dowling NA, Merkouris SS, Greenwood CJ, Oldenhof E, Toumbourou JW, & Youssef GJ (2017). Early risk and protective factors for problem gambling: A systematic review and meta-analysis of longitudinal studies. *Clinical Psychology Review*, 51, 109–124. doi: 10.1016/j.cpr.2016.10.008 [PubMed: 27855334]
- Edgren R, Castren S, Jokela M, & Salonen AH (2016). At-risk and problem gambling among Finnish youth: The examination of risky alcohol consumption, tobacco smoking, mental health and loneliness as gender-specific correlates. *Nordic Studies on Alcohol and Drugs*, 33, 61–79.
- Eisenberg ME, Gower AL, McMorris BJ, Rider GN, Shea G, & Coleman E (2017). Risk and protective factors in the lives of transgender/gender nonconforming adolescents. *Journal of Adolescent Health*, 61(4), 521–526. doi: 10.1016/j.jadohealth.2017.04.014 [PubMed: 28736148]
- Erickson-Schroth L, Gilbert MA, & Smith TE (2014). Sex and gender development In Erickson-Schroth L (Ed.), *Trans bodies, trans selves: A resource for the transgender community* (pp. 80–101). New York, NY: Oxford University Press.
- The GenIUSS Group. (2014) Best Practices for Asking Questions to Identify Transgender and Other Gender Minority Respondents on Population-Based Surveys. Herman JL (Ed.). Los Angeles, CA: The Williams Institute Available online at: <https://williamsinstitute.law.ucla.edu/wp-content/uploads/geniuss-report-sep-2014.pdf>
- Glynn TR, Gamarel KE, Kahler CW, Iwamoto M, Operario D, & Nemoto T (2016). The role of gender affirmation in psychological well-being among transgender women. *Psychology of Sexual Orientation and Gender Diversity*, 3(3), 336–344. doi:10.1037/sgd0000171 [PubMed: 27747257]
- Grant JE, Odlaug BL, & Chamberlain SR (2016). Neural and psychological underpinnings of gambling disorder: A review. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, 65, 188–193. [PubMed: 26497079]
- Grant JE, & Potenza MN (2006). Sexual orientation of men with pathological gambling: prevalence and psychiatric comorbidity in a treatment-seeking sample. *Comprehensive Psychiatry*, 47, 515–518. doi: 10.1016/j.comppsy.2006.02.005 [PubMed: 17067876]
- Gupta R, & Derevensky JL (1998). Adolescent gambling behavior: A prevalence study and examination of the correlates associated with problem gambling. *Journal of Gambling Studies*, 14(4), 319–345. [PubMed: 12766444]
- Hamilton-Wright S, Woodhall-Melnik J, Guilcher SJT, Schuler A, Wendaferew A, Hwang SW, & Matheson FI (2016). Gambling in the landscape of adversity in youth: Reflections from men who live in poverty and homelessness. *International Journal of Environmental Research and Public Health*, 13, 854–871. doi: 10.3390/ijerph13090854
- Hendricks ML, & Testa RJ (2012). A conceptual framework for clinical work with transgender and gender nonconforming clients: An adaptation of the Minority Stress Model. *Professional Psychology: Research and Practice*, 43(5), 460–467. doi:10.1037/a0029597
- Huck SW (2008). *Reading statistics and research* (5th ed.). Boston, MA: Pearson/Allyn & Bacon.
- Kosciw JG, Greytak EA, Palmer NA, & Boesen MJ (2014). *The 2013 National School Climate Survey: The experiences of lesbian, gay, bisexual and transgender youth in our nation's schools*. New York: GLSEN.
- Minnesota Legislative Reference Library. (2017). Resources on Minnesota Issues: Gambling. Available online at: <https://www.leg.state.mn.us/lrl/guides/guides?issue=gambling>
- Minnesota State Lottery. (2013). *Gambling in Minnesota: An Overview*. Available online at: [https://www.mnlottery.com/gambling/gambling\\_in\\_minnesota\\_pdf/](https://www.mnlottery.com/gambling/gambling_in_minnesota_pdf/)
- Neal P, Delfabbro P, & O'Neal M (2005). *Problem gambling and harm: Towards a national definition*. Melbourne: Gambling Research Australia.
- Op de Macks ZA, Bunge SA, Bell ON, Wilbrecht L, Kriegsfeld LJ, Kayser AS, & Dahl RE (2016). Risky decision-making in adolescent girls: The role of pubertal hormones and reward circuitry. *Psychoneuroendocrinology*, 74, 77–91. [PubMed: 27591399]
- Perez-Brumer A, Day JK, Russell ST, & Hatzenbuehler ML (2017). Prevalence and correlates of suicidal ideation among transgender youth in California: Findings from a representative,

- population-based sample of high school students. *Journal of the American Academy of Child and Adolescent Psychiatry*, 56(9), 739–746. [PubMed: 28838578]
- Reisner SL, Conron KJ, Tardiff LA, Jarvi S, Gordon AR, & Austin SB (2014). Monitoring the health of transgender and other gender minority populations: validity of natal sex and gender identity survey items in a U.S. national cohort of young adults. *BMC Public Health*, 14, 1224. doi: 10.1186/1471-2458-14-1224 [PubMed: 25427573]
- Rossen FV, Clark T, Denny SJ, Fleming TM, Peiris-John R, Robinson E, & Lucassen MFG (2016). Unhealthy gambling amongst New Zealand secondary school students: An exploration of risk and protective factors. *International Journal of Mental Health Addiction*, 14, 95–110. doi: 10.1007/s11469-015-9562-1 [PubMed: 26798329]
- Sevelius JM (2013). Gender affirmation: A framework for conceptualizing risk behavior among transgender women of color. *Sex Roles*, 65(11–12), 675–689. doi: 10.1007/s11199-012-0216-5
- Stinchfield R (2011). Gambling among Minnesota public school students from 1992–2007: Declines in youth gambling. *Psychology of Addictive Behaviors*, 25(1), 108–117. [PubMed: 21244120]
- Stinchfield R, Wynne H, Wiebe J, & Tremblay J (2017). Development and psychometric evaluation of the Brief Adolescent Gambling Screen (BAGS). *Frontiers in Psychology*, 8, 2204. doi: 10.3389/fpsyg.2017.02204 [PubMed: 29312064]
- Tremblay J, Stinchfield R, Wiebe J, & Wynne H (2010). Canadian Adolescent Gambling Inventory (CAGI): Phase III Final Report. Canadian Consortium on Gambling Research (CCGR). Available online at: <http://www.ccgr.ca/en/projects/canadian-adolescent-gambling-inventory--cagi-.aspx>
- Veale JF, Watson RJ, Peter T, & Saewyc EM (2017). Mental health disparities among Canadian transgender youth. *Journal of Adolescent Health*, 60, 44–49. [PubMed: 28007056]
- Volberg R, Gupta R, Griffiths M, Olason D, & Delfabbro P (2010). An international perspective on youth gambling prevalence studies. *International Journal of Adolescent Medicine and Health*, 22(1), 3–38. [PubMed: 20491416]
- Weidberg S, González-Roz A, Fernández-Hermid JR, Martínez-Loredo V, Grande Gosende A, García-Pérez Á, & Secades-Villa R (2018). Gender differences among adolescent gamblers. *Personality and Individual Differences*, 125, 38–43.

**Table 1**

Sociodemographic Characteristics of Minnesota Student Survey Participants by Gender Identity (N = 80,929)

	<b>TGD</b>		<b>Cisgender</b>		<b>Chi square, <i>p</i>-value, <i>d</i></b>
	<b>(<i>n</i> = 2,168)</b>		<b>(<i>n</i> = 78,761)</b>		
	<i>n</i>	%	<i>n</i>	%	
<u>Birth assigned sex</u>					298.7, <.001, <i>d</i> =0.12
Male	684	31.9	40,014	50.9	
Female	1,457	68.1	38,639	49.1	
<u>Grade</u>					10.8, .001, <i>d</i> = 0.02
9 <sup>th</sup>	1,271	58.6	43,368	55.1	
11 <sup>th</sup>	897	41.4	35,393	44.9	
<u>Race/ethnicity</u>					207.9, <.001, <i>d</i> = 0.10
American Indian/Alaskan	44	2.1	805	1.0	
Native, NH					
Asian, NH	181	8.5	4,677	6.0	
Black, African or African American, NH	140	6.5	4,545	5.8	
Native Hawaiian or other Pacific Islander, NH	11	0.5	117	0.1	
White, NH	1,257	58.7	55,962	71.5	
Multiple, NH	252	11.8	5,319	6.8	
Hispanic or Latino/a	255	11.9	6,816	8.7	
<u>Free/reduced price lunch</u>					153.0, <.001, <i>d</i> = 0.09
Yes	834	38.8	20,936	26.8	
No	1,315	61.2	57,226	73.2	
<u>School Location</u>					2.1, .148, <i>d</i> = 0.01
Twin Cities Metro	1,188	54.8	41,921	53.2	
Non-metro	980	45.2	36,840	46.8	

*Notes.* TGD = transgender and gender diverse. NH = non-Hispanic; *d*= Cohen's *d*.

**Table 2**

Engagement in Gambling Behaviors and Problem Gambling among Minnesota Student Survey Participants by Gender Identity (N = 80,929)

Past year gambling behaviors	TGD (n = 2,168)		Cisgender (n = 78,761)		Chi square, p-value, d
	n	%	n	%	
Played cards, bet on sports/games	460	23.7	20,033	27.4	12.95, <.001, d = 0.03
Bought lottery tickets/scratch offs	224	11.6	6,994	9.6	8.79, .003, d = 0.03
Gambled in a casino	84	4.3	1,481	2.0	49.56, <.001, d = 0.05
Gambled for money online	110	5.7	2,218	3.0	44.02, <.001, d = 0.05
Any gambling behavior	571	29.6	23,081	31.7	3.62, .06, d = 0.01
Problem gambling <sup>1</sup>	(n = 571)		(n = 23,081)		
BAGS score of 4+ for prevalence estimate	31	5.7	385	1.8	44.27, <.001, d = 0.08
BAGS score of 2+ for further assessment	61	11.2	883	4.1	66.21, <.001, d = 0.11

Notes. TGD = transgender and gender diverse. BAGS = Brief Adolescent Gambling Screen. d = Cohen’s d. Numbers do not sum to sample sizes because of missing data.

<sup>1</sup> Problem gambling screener only asked of students who reported any gambling in past year.

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

**Table 3** Prevalence of Gambling Behaviors and Problem Gambling by Gender Identity and Birth-Assigned Sex<sup>1</sup>

	TGD Assigned Male (n = 684)	Cisgender Assigned Male (n = 40,014)	TGD Assigned Female (n = 1,457)	Cisgender Assigned Female (n = 38,639)	TGD AM vs Cis AM	TGD AM vs TGD AF	Cis AM vs TGD AF	Cis AM vs Cis AF	Cis AF vs TGD AF	p-value, d
<b>Past year gambling behaviors</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>p-value, d</b>	<b>p-value, d</b>	<b>p-value, d</b>	<b>p-value, d</b>	<b>p-value, d</b>	<b>p-value, d</b>
Played cards, bet on sports/games	202	36.0	14,293	39.2	.128, d = 0.02	<.001, d = 0.38	<.001, d = 0.16	<.001, d = 0.55	<.001, d = 0.03	
Bought lottery tickets / scratch offs	100	17.9	4,155	11.4	<.001, d = 0.26	<.001, d = 0.26	.006, d = 0.03	<.001, d = 0.12	.096, d = 0.02	
Gambled in a casino	54	9.7	1,125	3.1	<.001, d = 0.09	<.001, d = 0.34	.046, d = 0.02	<.001, d = 0.15	<.001, d = 0.04	
Gambled for money online	74	13.3	1,986	5.5	<.001, d = 0.08	<.001, d = 0.44	<.001, d = 0.05	<.001, d = 0.28	<.001, d = 0.08	
Any gambling Behavior	242	43.5	15,667	43.1	.864, d = 0.01	<.001, d = 0.40	<.001, d = 0.14	<.001, d = 0.51	.864, d = 0.01	
<b>Problem gambling<sup>2</sup></b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>p-value, d</b>	<b>p-value, d</b>	<b>p-value, d</b>	<b>p-value, d</b>	<b>p-value, d</b>	<b>p-value, d</b>
BAGS score of 4+ for prevalence estimate	21	8.9	318	2.1	<.001, d = 0.11	.005, d = 0.24	.177, d = 0.02	<.001, d = 0.08	<.001, d = 0.09	
BAGS score of 2+ for further assessment	37	15.7	731	4.9	<.001, d = 0.12	.003, d = 0.26	.037, d = 0.03	<.001, d = 0.13	<.001, d = 0.14	

Notes. TGD = transgender and gender diverse. AM = assigned male. AF = assigned female. Cis = cisgender. BAGS = brief adolescent gambling screen. d = Cohen's d.

<sup>1</sup> Sample sizes differ because of missing data across variables of interest.

<sup>2</sup> Problem gambling screener only asked of students who reported any gambling in past year.