ASD and Sexual and Gender Minority Identity in College Students

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Abstract

Objective: The current study builds on existing literatures on autism spectrum disorder (ASD) and sexual and gender minority (SGM) identities and is the first to examine prevalence rates, associated functional impairments, and treatment engagement levels for SGM and non-SGM populations with and without ASD cross-sectionally via a large nationwide college-student sample across 3 years. *Methods:* Using data from the American College Health Association-National College Health Assessment (ACHA-NCHA) III, we analyzed data from 82,030 college students (ages of 18-25 years old) randomly selected from 75 US colleges and universities across three years. Included ACHA-NCHA-III measures consisted of self-reported demographics, SGM identity, ASD diagnosis, stress, academic impairment, mental health symptoms, and treatment engagement. *Results:* We found a 2.7% prevalence of ASD in the SGM group, compared to a 0.9% prevalence among the non-SGM sample. Autistic college students with SGM identities had the highest levels of stress and averse academic and mental health outcomes across groups. *Conclusions:* These findings emphasize the need for mental healthcare providers to consider SGM identity in autistic college students to inform treatment. Implications for autistic college students with an intersecting SGM identity include the need for tailored supports and resources at multiple levels (e.g., academic, mental health).

Keywords: ASD, autism spectrum disorder, sexual and gender minority, SGM, LGBTQ+, College

Lay Abstract

Autistic individuals and those that identify with a sexual and/or gender minority are both at risk for various mental health concerns and related impairments. However, the connection between autism and sexual and/or gender minorities is not clear. For the first time, we provide evidence of these connections by analyzing data from a large nation-wide data set from the American College Health Association-National College Health Assessment III. We found that autistic college students that identify as a sexual and/or gender minority reported the highest rates of stress, academic, and mental health concerns when compared to autistic college students without a sexual and/or gender minority. These findings affirm the need for mental healthcare providers to consider the intersections of sexual and gender minority identities in autistic college students to develop and provide better supports and resources.

Autism Spectrum Disorder & Sexual and Gender Minority Identity in College Students

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by deficits in social communication and the presence of restricted/repetitive behaviors, interests, or activities (American Psychiatric Association [APA], 2022). The prevalence rate of ASD is approximately 2% in both adults (Dietz et al., 2020) and college students (White et al., 2011). The number of autistic young adults attending college is increasing steadily (Bakker et al., 2019; Volkmar et al., 2017).

Students who identify with sexual and gender minority (SGM) identities are also increasingly prevalent on colleges campuses (American College Health Association [ACHA], 2020). Briefly, sexual minorities groups may include individuals who identify as lesbian, gay, bisexual, asexual, or other non-heterosexual sexual orientations while gender minorities groups may include individuals who identify as transgender, non-binary, intersex, or other non-cis-gender identities (U.S. Department of Health and Human Services, 2021).

While both ASD and SGM identities are increasingly prevalent on college campuses, research focusing on the intersection of ASD and SGM has been very limited. Autistic adults with SGM identities face more barriers to healthcare access compared to autistic individuals without SGM identities (Hall et al., 2020). These findings are unsurprising given the increased healthcare accessibility barriers faced by individuals with SGM identities (e.g., concerns of experiencing prejudice and/or discrimination from providers due to their SGM identity leads to avoidance of services; Batza 2018; Simplson et al., 2013; Streed et al. 2019). Taken together, minority stress theory (Meyer, 2003) and intersectionality theory (Crenshaw, 1989) indicate that individuals belonging to minority groups experience higher rates of mental health and physical health problems due to compounding stressors that may be further exacerbated in the presence

of two or more intersecting minority identities. The current study seeks to expand on these existing literatures on ASD and SGM by examining prevalence rates, functional outcomes, mental health correlates, and mental health treatment patterns for college student SGM and non-SGM populations with and without ASD.

Autism Spectrum Disorder (ASD)

Approximately 70% of autistic individuals experience at least one co-occurring psychiatric disorder and approximately 40% experience two or more co-occurring psychiatric disorders (APA, 2022; Simonoff et al., 2008). The most common co-occurring conditions in autistic college students are anxiety, depression, ADHD, and learning disorders (Anderson et al., 2018; McMorris et al., 2019). Autistic college students also experience difficulties with activities of daily living, social perception, executive functioning, theory-of-mind, and emotion regulation (Baribeau et al., 2015; Gobbo & Shmulsky 2012; Hewitt 2011, White et al., 2016). Many of these associated features of ASD are further exacerbated by ASD stigma and accompanying stress (Pachankis, 20018). Importantly, autistic college students are less likely to seek out and engage in mental health treatments compared to individuals with psychiatric conditions other than ASD (Chandrasekhar, 2020).

Likely due to the compounding effects of these associated features and stigma, autistic college students face additional academic and social challenges. Only 17-35% of autistic individuals attend 2- or 4-year colleges (Newman et al., 2011; Roux et al., 2015; Shattuck et al., 2012) and among those who attend college, autistic individuals tend to underachieve academically (Kapp et al., 2013) and experience difficulties forming social relationships (Sasson et al., 2013; Test et al., 2014). For example, graduation rates for autistic college students are 38.8% as compared to 52.4% in the general population (Newman et al., 2011).

Autistic college students are also at increased risk of engaging in risky behaviors. Systematic reviews and meta-analytic evidence indicate substance use (particularly alcohol, cannabis, and nicotine use) may be more prevalent in adult ASD populations compared to non-ASD populations (Haasbroek & Morojele, 2021; Lugo-Marin et al., 2019). However, ASD is associated with lower rates of substance abuse (i.e., clinically impairing levels of substance use) among college students compared to those without ASD (Kuder et al., 2021, Yule et al., 2021), though autistic individuals are nearly nine times more likely to engage in substances use to self-manage mental health symptoms compared to those without ASD (Weir et al., 2021). In addition to substance use, young adults with ASD have higher rates of suicide attempts (Kirby et al., 2019) and deaths by suicide (Chen et al., 2017) compared the general population. However, no studies have examined the prevalence of suicidality in autistic college students specifically.

Sexual Gender Minorities (SGM)

Much like ASD, college students who hold an SGM identity are at higher risk for psychiatric disorders, such as anxiety and depression, compared to students without an SGM identity (Kirsch et al., 2015). SGM college students experience both *proximal stressors*, such as rejection sensitivity and internalized homonegativity, and *distal stressors*, such as discrimination, physical victimization, verbal harassment. These stressors, in turn, increase risk for the development of psychiatric conditions (Meyer, 2003; Pachankis et al., 2018; Rosendale et al., 2021).

SGM college students are at higher risk for substance abuse as compared to non-SGM individuals (Li et al., 2022; Rice et al., 2019). Similar to ASD, SGM individuals have higher prevalence rates of suicide attempts and deaths by suicide than non-SGM individuals

(Hatzenbuehler et al., 2013, Nock et al., 2008), with 11% of individuals sexual minorities (Hottes et al., 2016) and 40% of gender minorities (Marshall et al., 2016) reporting at least one suicide attempt throughout their lifetime, compared to 4% in the general population. SGM college students are more likely to seek out mental health treatments than non-SGM college students but are also more likely discontinue treatment prematurely due to feeling that their treatment needs are not being met by providers (Burgess et al., 2007; Dunbar et al., 2017). Additionally, SGM individuals engage in more non-suicidal self-injurious (NSSI) behaviors compared to individuals without an SGM identity (Bretherton et al., 2021; Frisell et al., 2010) and are three times more likely to engage in NSSI behaviors compared to same-aged heterosexual peers (Batejan et al., 2015).

ASD & SGM

Very few studies have examined the intersectionality of ASD and SGM despite findings that adolescents and adults (ages 16-70 years old) with ASD are seven to eight times more likely to identify as belonging to a sexual minority group (Weir et al., 2021). The prevalence of ASD within gender minority youth (ages 14-25 years old) is approximately 23% (Strauss et al., 2021). Notably, no study to date, has examined the prevalence rates of ASD within SGM populations in college students. One study considered mental health symptoms in adults with ASD stratified by heterosexuality (George & Stokes, 2018). Results indicated that mental health symptoms were not different between autistic heterosexual adults and autistic non-heterosexual adults. However, the rates of functional impairments, additional mental health correlates (e.g., loneliness, suicidality, etc.) and rate of mental health treatment engagement within autistic SGM populations are unexamined despite each being associated with significant societal barriers that impact functioning.

Better understanding ASD in SGM college students is a clinically significant topic for several reasons. First, as noted above, both SGM identities and ASD are increasingly prevalent among college students. Second, as predicted by both minority stress and intersectionality theories, negative outcomes may be more common in college students with two or more intersecting minority identities. Third, individuals belonging to two minoritized groups tend to be marginalized by members in one or both of their identified minority groups (Purdie-Vuagns & Eibach, 2008). Thus, autistic SGM college students are more likely to experience increased stigma and more negative functional and mental health outcomes than SGM college students without ASD, non-SGM autistic individuals, and non-SGM individuals without ASD. Despite seeming intuitive, this hypothesis has never been empirically tested.

Current Study

The current study is the first to investigate the prevalence rates, functional status, and treatment engagement levels for SGM and non-SGM college students with and without ASD via a large nationally representative college-student sample. Our first aim was to determine the prevalence rates among the intersections of ASD and SGM. We predicted (1) higher prevalence rates of ASD among SGM college students compared to non-SGM college students. Second, in line with prior literature demonstrating functional and psychiatric impairments for both ASD and SGM independently, we aimed to investigate academic, social, and mental health correlates across ASD and SGM. Specifically, we hypothesize that (2) SGM autistic individuals (SGM+ASD) will have higher reported rates of academic, functional status, and mental health impairments compared to SGM individuals without ASD (SGM-only), non-SGM autistic individuals (ASD-only), and non-SGM individuals without ASD (comparison). Lastly, consistent with empirical work highlighting stigma and barriers to receiving care, we

hypothesize that (3) SGM autistic individuals would report the lowest mental health treatment engagement rates.

Methods

A secondary analysis of data from the American College Health Association-National College Health Assessment (ACHA-NCHA) III (ACHA, 2019-2022) was conducted for this study. The ACHA-NCHA III survey was administered through 75 participating colleges and universities during both fall and spring semesters. Each campus followed their respected institutional policies and distributed the survey in-person on campus or online. Data were collected from randomly selected students or surveyed students in randomly selected classrooms from participating colleges/universities. These random sampling techniques and this large reference group obtained have contributed to the ACHA-NCHA being a useful study design for understanding contemporary trends in college student health (Kerr et al., 2021).

Participants & Group Assignment

The current study sample consisted of 82,030 self-reported full-time or part-time enrolled college/university students between the ages of 18-25 years old (M=20.39, SD=1.90). Most participants self-identified as women (65.8%), were full-time students (95.0%), were not in a current romantic relationship (56.9%), were living on-campus or within university-housing (44.2%) and were covered by their parents' health insurance (75.0%). The total sample ethnicity was 68.2% White, 13.5% Asian/Asian-American, 13.5% Hispanic/Latino, 7.5% Black/African American, 4.2% Biracial/Multiracial, 2.2% American Indian/Native Alaskan, and 1.4% Middle Eastern/North African or Arab Origin. Consistent with the current study’s aims, participants were assigned into one of four mutually exclusive groups based on SGM identity and ASD

diagnostic status: SGM+ASD (n=489), ASD-only (n=567), SGM-only (n=17,507), and Comparison (n=63,467).

Descriptive statistics for all demographic variables are presented in Table 1 and Supplementary Table 1. The mean age of participants significantly differed among the four groups, $F(3, 82026)=13.71$, $p<.001$, $\eta^2=.001$, such that participants in the two ASD groups (i.e., ASD-only, SGM+ASD) were the oldest and those in the SGM-only group were the youngest. Given that age was associated with several of the dependent variables (see Supplementary Table 2), age was statistically controlled for in all analyses.

Community Involvement

No members of the autism community were involved in the original study research question, study design, measures, implementation, or interpretation of these findings. The authors will discuss the results of this study with members of the public via conference and poster presentations.

Measures

SGM Identity

SGM identity was coded as a dichotomous variable (SGM/Non-SGM) derived from participant responses on questions about their sexual orientations and gender identities. Individuals who endorsed a sexual orientation other than straight/heterosexual (i.e., bisexual, gay, lesbian, pansexual, queer, or identity not listed) were coded as having a SGM identity. Similarly, individuals who endorsed any gender identity other than woman or man (i.e., trans woman, trans man, genderqueer, agender, gender fluid, intersex, non-binary, and identity not listed) were coded as having an SGM identity. Therefore, individuals coded as SGM could identify as either a gender minority, a sexual minority, or both. This operationalization for SGM

identity is consistent with current research practice recommendations by the U.S Department of Health and Human Services (2021). The SGM identity variable was used in all hypotheses.

ASD Diagnostic Status

ASD diagnostic status was a dichotomous variable (Yes/No) determined by participants who endorsed "yes" to whether they have ever been diagnosed with ASD by a healthcare or mental health professional. The ASD diagnostic status variable was used in all hypotheses.

Past Year Stress & Distress

Participants were asked to rate their level of general past-year stress using a Likert Scale (1=no stress to 4=high stress). Additionally, participants rated their level of domain-specific past-year distress using a Likert Scale (1=no distress to 4=high distress) for six domains: academics, faculty relationships, family relationships, intimate relationships, roommates/housemate relationships, and peer relationships. For past-year stress and all six past year-distress domain variables, higher scores indicated more self-reported stress/distress. The stress/distress variables were included in analyses for hypothesis 2.

Academic Performance & Impairment

Academic Performance. Academic performance was measured using self-reported cumulative grade point average (GPA). Participants rated their approximate cumulative GPA on a scale such that lower values represent poorer academic performance (i.e., *F*=1, *D*-=2, *D*=3, *D*+=4, *C*-=5, *C*=6, *C*+=7, *B*-=8, *B*=9, *B*+=10, *A*-=11, *A*=12, *A*+=13).

Academic Impairment. Academic impairment related to mental health factors and interpersonal factors were also measured. Academic impairment was defined as class performance being negatively impacted and/or progress toward degree being delayed. To assess academic impairment, the extent to which four mental health factors (i.e., anxiety, depression,

PTSD, and stress) and five interpersonal factors (i.e., intimate, faculty, family, roommates/housemates, peer relationships) affected academic performance was collected for participants who indicated those factors had been a problem for them within the previous 12 months. Participants rated impacts on academic performance using a Likert scale (0=*I did not experience this issue/Not Applicable*; 1=*This issue did not affect my academic performance*; 2=*This issue negatively impacted my performance in a class*; 3=*This issue delayed progress towards my degree*) for each of the four mental health and five interpersonal factors. Higher scores represent increased perceived academic impairment related to these factors. The academic performance and impairment variables were examined in hypothesis 2 analyses.

Mental Health Correlates

All nine mental health correlate variables were included in analyses for hypothesis 2.

Connor-Davidson Resilience Scale - 2 item version (CD-RISC 2). The CD-RISC 2 (Vaishnavi et al., 2007) is a two-item scale that measures an individual's ability to adapt and bounce back after experiencing hardships. Participants rated the extent to which a statement applies to them (e.g., "I am able to adapt when changes occur" and "I tend to bounce back, after illness, injury, or other hardships") using a five-point Likert scale (0=*not at all true* to 4=t*rue nearly all the time*). Total CD-RISC 2 scores ranged from 0 to 8 with higher scores indicating greater perceived resilience. Cronbach's alpha for the current sample was .76, indicating acceptable internal consistency.

Diener-Flourishing Scale (FS). The FS (Diener et al., 2010) is an eight-item scale designed to measure an individual's self-perceived achievement in categories such as optimism, purpose, relationships, and self-esteem. Participants rated the extent to which each item statement applies to them (e.g., "I am a good person and lead a good life") using a seven-point

Likert scale (1=*strongly disagree* to 7=*strongly agree*). Total FS scores range from 7 to 56 with higher scores indicating greater perceived psychological resources and strengths. Cronbach's alpha for the current sample was .93, indicating excellent internal consistency.

UCLA Loneliness Scale (ULS). The ULS measures an individual's subjective feelings of social isolation and loneliness (Russell et al., 1978). For the current study, the short form consisting of three items from the ULS was used given its strong correlation (r=.81) with the longer ULS and strong convergent and divergent validity (Hughes et al., 2004). Participants reported the frequency of the experience (e.g., "How often do you feel left out?") using a three-point Likert scale (1=*hardly ever*; 2=*some of the time*; 3=*often*). Total ULS scores ranged from 3 to 9 with higher scores indicating greater perceived loneliness. Cronbach's alpha for the current sample was .83, indicating good internal consistency.

Global Distress (Kessler-6). The Kessler-6 is a six-item global distress measure based on symptoms of anxiety and depression over the past month (Kessler et al., 2003). Participants reported the past-month frequency of the experience (e.g., "How often have you felt nervous?") using a 5-point Likert scale (0=*none of the time* to 4=*all of the time*). Total Kessler-6 scores ranged from 0-24 with higher scores reflecting greater perceived past-month distress. Cronbach's alpha for the current sample was .88, indicating good internal consistency.

Suicide Behavior Questionnaire-Revised (SBQ-R). The SBQ-R is a five-item measure surveying suicidality (Osman et al., 2001). Participants reported the lifetime frequency of suicidal ideation and suicide attempts (e.g., "Have you ever thought about or attempted to kill yourself?") using 5- and 7-point Likert scales. Total SBQ-R scores were used for the current study with higher scores indicating higher endorsement of past suicidal behaviors and higher risk of suicide. Consistent with prior literature (Osman et al., 2001), total scores were

dichotomized to indicate >7 as positive suicidality. Cronbach's alpha for the current sample was .80, indicating good internal consistency.

Non-Suicidal Self Injury (NSSI). Past year engagement with NSSI behaviors was assessed for using the following question: "Within the last 12 months, how often have you intentionally cut, burned, bruised, or otherwise injured yourself?" Participants responded on a five-point Likert scale (1=*Never* to 5=*Daily or almost daily)*.

Past Year Suicide Attempts. Past year history of suicide attempts was assessed using the following question: "Within the last 12 months, have you attempted suicide?" Participants responded either "Yes" or "No."

Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST). The ASSIST (WHO ASSIST Working Group, 2002) is an eight-item measure that assessed for various substances and substance-use over the lifetime and last three months, frequency of use, and consequences of use (e.g., "During the past 3 months, how often has your use of the following substance(s) led to health, social, legal or financial problems?"). Substances assessed for include alcohol, tobacco, cocaine, cannabis, prescription stimulants, methamphetamine, inhalants, sedatives, hallucinogens, heroin, opioids, and 'other.' Prescription stimulant-use scores were adjusted for students with prescriptions so that participants with prescriptions only reported when they took their stimulants "just for the feeling or experience they caused or taking them more often or at higher doses than prescribed." Adhering to ASSIST guidelines (WHO ASSIST Working Group, 2002), risk levels were categorized for each substance as (1=*low risk*; 2=*moderate risk*; 3=*high risk*). Each of the 12 substance groups were considered individually for analysis.

Mental Health Treatment Status

Mental health treatment status over the past year was assessed from participants that had indicated they had spoken with a healthcare or mental health care professional within the last year about any of 13 mental health conditions (i.e., attention deficit/hyperactivity disorder, substance related abuse or addiction, gambling disorders, anxiety disorders, autism spectrum, bipolar disorders, personality disorders, depressive disorders, eating disorders, insomnia, obsessive-compulsive disorders, trauma disorders, and psychotic disorders; Supplementary Table 3). For each condition endorsed by the participant, participants were asked to denote the types of treatment received as "No treatment," "Medicine only," "Therapy only," "Both medicine and therapy," and "Other treatment." The Mental Health Treatment Status variable was derived by collapsing responses across all endorsed mental health conditions for each participant and recategorized into "No treatment," "Medicine only," "Therapy only," "Both medicine and therapy," and "Only other treatment." The Mental Health Treatment Status variable was only included in analyses for hypothesis 3.

Data Analysis Overview

The current study examines prevalence rates, associated mental health correlates, functional impairments, and treatment engagement levels for SGM and non-SGM college-student populations with and without ASD. To test hypothesis 1, we examined the prevalence rates of ASD between SGM identity (SGM-only and non-SGM) using chi square tests. To test hypothesis 2, we investigated associated functional outcomes and mental health correlates between our groups (i.e., SGM-only, ASD-only, SGM+ASD, Comparison) using multivariate analyses of covariance (MANCOVA) for continuous variables while covarying for age. Significant findings were followed up with univariate analyses of covariance (ANCOVA) with Bonferroni post-hoc analysis performed for significant univariate models. Effect size estimates

for comparisons are reported as partial eta square (η^2) for continuous variables. To test hypothesis 3, we examined mental health treatment engagement level differences for students within each group by using chi square tests.

Analyses were conducted using SPSS version 23. Participants missing >25% of data were excluded from analyses. Little's MCAR (missing cases at random) test concluded that missing data was random. Missing cases were addressed using pairwise deletion across all analyses. Given the large sample size of this study and its associated power, an alpha level of .001 was chosen for demonstrating statistical significance to reduce the risk of a Type I error.

Results

Hypothesis 1: Prevalence Rates of ASD among SGM

In the total sample, the self-reported lifetime prevalence rate of ASD was 1.3%. ASD prevalence rates were significantly higher in the SGM-only group (2.7%) as compared to the non-SGM group (0.9%), $\chi^2(1)=370.94$, $p<.001$, $\Phi=-0.07$. These results support hypothesis 1; there is a higher prevalence rate of ASD among SGM college students compared to non-SGM college students.

Hypothesis 2: Associated Functional Impairments and Mental Health Correlates

Past Year Stress & Distress

Differences in general *past-year stress* levels were found among the four groups, $F(3, 81876)=511.48$, $p<.001$, $\eta^2=.018$. As demonstrated in Table 2, pairwise comparisons indicated that both the SGM+ASD and the SGM group similarly reported the highest levels of general stress over the past year while the ASD group reported the lowest.

With regard to domain specific *past-year distress*, the omnibus MANCOVA was statistically significant, Wilk's $\lambda=0.95$, $F(18, 4429.80)=4.10$, $p<.001$, $\eta^2=.015$. Follow-up

univariate analyses indicated past-year distress differences among the four groups for the following domains: academics $F(3, 38246)=67.14$, $p<.001$, $\eta^2=.005$, family relationships $F(3, 27963)=86.00$, $p<.001$, $\eta^{2=}.009$, intimate relationships, $F(3, 30736)=38.22$, $p<.001$, $\eta^2=.004$, peer relationships, $F(3, 20357)=42.28$, $p<.001$, $\eta^2=.006$, and roommate relationships domains, $F(3, 22972)=24.92$, $p<.001$, $\eta^2=.003$. In general, pairwise comparisons indicated that both SGM groups (SGM+ASD and SGM-only) reported the highest levels of domain specific distress while the Comparison group reported the lowest levels of distress across all domains. The ASD-only group was comparable to the SGM+ASD and SGM-only groups on intimate relationships and peer relationship domains. The ASD-only and Comparison group similarly reported the lowest levels of distress for academics, family relationships, and roommate relationships domains. No between group differences emerged for faculty relationships.

Academic Performance and Impacts

Differences in *academic performance* using self-reported GPA were found among the four groups, $F(3,79893)=48.27$, $p<.001$, $\eta^2=.002$. Pairwise comparisons indicated that both ASD groups (ASD-only and SGM+ASD) reported lower GPAs, and the comparison group reported the highest GPA (Table 1).

Regarding *academic impairment related to mental health factors*, the omnibus MANCOVA was significant, Wilk's $\lambda=0.91$, $F(12, 213869.60)=635.44$, $p<.001$, $\eta^2=.030$. Differences in the extent that mental health factors negatively impacted academic performance were found among the four groups: depression, $F(3, 81728)=2201.82$, $p<.001$, $\eta^2=.075$, anxiety, $F(3, 81398)=1354.76$, $p<.001$, $\eta^2=.048$, PTSD, $F(3, 81655)=703.77$, $p<.001$, $\eta^2=.025$, and stress, $F(3, 81636)=860.61$, $p<.001$, $\eta^2=.031$. As seen in Table 3, across nearly all mental health domains, the SGM+ASD group reported the most significant negative academic impacts,

followed by the SGM-only group, then the ASD-only group, and the Comparison group reporting the least academic impacts from mental health conditions.

In terms of *academic impairment related to interpersonal factors*, the omnibus MANCOVA for interpersonal problems within the last 12 months was significant, Wilk's $\boldsymbol{\lambda}$=0.97, F(15, 223434.58)=186.48, p<.001, η^2=.011. Differences in the extent that interpersonal factors negatively impacted academic performance were found among the four groups: family relationships, F(3, 27955)=20.16, p<.001, η^2=.002, intimate relationships, F(3, 30711)=20.70, p<.001, η^2=.002, peer relationships, F(3, 20272)=19.28, p<.001, η^2=.003, and roommate relationships, F(3, 22956)=24.68, p<.001, η^2=.003. In general, follow-up univariate analyses indicated that both ASD groups (SGM+ASD and ASD-only) both similarly reported the highest levels of academic impairment while the Comparison group reported the lowest levels of academic impairment across all these domains. The SGM-only group also reported similarly high levels of academic impairment as the SGM+ASD and/or ASD-only groups across all these domains except for a lower reported level of academic impairment related to peer relationships. No between group differences emerged for academic impairment related to faculty relationships.

Mental Health Correlates

The omnibus MANCOVA that included the mental health correlate measures related to *flourishing*, *resilience*, *loneliness*, *internalizing symptoms*, *NSSI*, and *suicide risk* was significant, Wilk's $\boldsymbol{\lambda}$=0.89, F (21, 219227.91)=450.55, p<.001, η^2=.040. Follow-up univariate analyses for each of these measures are presented in Table 4. For flourishing, differences on the Diener-Flourishing Scale were found among the four groups, F (3, 81479)=1165.88, p<.001, η^2=.041. The SGM+ASD group reported the lowest levels of flourishing, ASD-only and SGM-

only groups reported similar levels, and the Comparison group reported the highest levels of flourishing. For resilience, differences on the CD-RISC-2 were found among the four groups, F (3, 81663)=376.99, p<.001, η^2=.014. The SGM+ASD group reported the lowest level of resilience, followed by the SGM-only group, then the ASD-only group, and finally the Comparison group reported the highest level of resilience. For loneliness, differences on the UCLA Loneliness Scale were found among the four groups, F (3, 81761)=844.00, p<.001, η^2=.030. The SGM+ASD group reported the highest level of loneliness, followed by both the ASD-only and SGM-only groups reporting similar levels of loneliness, and finally the Comparison group reporting the lowest level of loneliness. Next, for psychological distress as measured by the Kessler-6 Scale, differences were found among the four groups, F (3, 81135)=1668.36, p<.001, η^2=.058. The SGM+ASD group reported the highest level of psychological distress, followed by the SGM-only group, then the ASD-only group, and finally the Comparison group reported the lowest level of psychological distress.

For suicidality, differences with screening positive for suicidal risk on the SBQ-R screening were found among the four groups, χ^2(3)=7259.71, p<.001, Φ=0.30. For NSSI, differences in the frequency of engagement in NSSI were found among the four groups, F (3, 78662)=1076.86, p<.001, η^2=.039. The SGM+ASD group reported the highest scores for NSSI and suicide risk, followed by the SGM-only and ASD-only groups, and then the Comparison group reported the lowest scores for each of these areas. For *suicide attempts*, differences in suicide attempts over the past year were found among the four groups, χ^2 (3)=411.26, p<.001, Φ=0.07 More specifically, the SGM+ASD group had the highest endorsement of attempting suicide over the past year (8.4%), followed by the SGM-only (4.8%) and the ASD-only (4.2%) groups, and finally the Comparison group (1.8%).

Regarding high-risk *substance use*, the omnibus MANCOVA was significant, Wilk's $\boldsymbol{\lambda}$=0.05 F (21, 219227.91)=450.55, p<.001, η^2=.040. Differences in various individual substance use categories were found among the four groups in nearly all of the substance categories. As seen in Table 5, across nearly all these specific substances, the SGM+ASD group had the greatest risk for high-risk substance use. No between group differences emerged for tobacco, heroin, or "other" drugs.

These results support our hypothesis that autistic SGM individuals would report the highest rates of academic, social, and mental health impairments.

Hypothesis 3: Mental Health Treatment Engagement

Differences on the percentage of students receiving mental health treatment were found among the four groups, χ^2(12)=369.65, p<.001, V=.08. Pairwise comparisons for level of engagement for all mental health treatment are shown in Table 6. The comparison and ASD groups similarly reported the highest level of engagement in medicine only treatments (27.2% and 24.6%, respectively), followed by both the SGM and SGM+ASD groups. The comparison and SGM groups similarly reported the highest level of therapy only treatment engagement (23.7% and 24.7%, respectively), followed by the ASD group, while the SGM+ASD group reported the lowest use of therapy treatment. For treatment with both medicine and therapy, the SGM+ASD, SGM, and ASD groups similarly had the highest treatment engagement (44.4-56.2%) while the Comparison group shows the lowest treatment engagement. Lastly, all four groups reported similar rates for both not engaging in any treatment (5.7-9.1%) or engaging in another ("other," 0-4.1%) form of treatment for their mental health conditions.

Taken together, these results partially support our hypothesis that SGM autistic individuals would have lowest reported rates mental health treatment. SGM autistic individuals

engage in combined treatment as often as other groups yet participate in medicine-only and therapy-only at lower rates.

Discussion

The present study was the first to examine the prevalence rates, functional status, and treatment engagement levels for SGM and non-SGM college students with and without ASD via a large nationally representative college-student sample. A considerable strength of this study is that results are derived from the ACHA-NCHA-III from 2019 to 2022 and included randomly sampled students from 75 US colleges and universities. Results of the current study reflect a prevalence rate of ASD as 1.3% and are consistent with extant literature (Baio et al., 2018; Christensen et al., 2019; Maenner et al., 2022). This study builds off existing literatures by testing and finding support for the hypothesis that the prevalence rates of ASD among SGM students would be higher than non-SGM college students (2.7 vs 0.9%).

In general, and in line with our second hypothesis, SGM autistic college students reported higher rates of academic, functional status, and mental health concerns compared to SGM individuals without ASD, non-SGM autistic individuals, and non-SGM individuals without ASD. This pattern of results is in line with both the minority stress and intersectionality theories, postulating that the presence of two or more intersecting minority identities may create and/or exacerbate mental health problems driven by compounding stressors faced by individuals belonging to minority groups (Crenshaw, 1989; Meyer, 2003). More specific to academic outcomes and expanding on previous literature showing that autistic college students and SGM college students each experience academic difficulties (Kapp et al., 2013; Oswalt &Wyatt, 2011), SGM autistic college students reported the lowest academic performance and highest academic impairment concerns among all four groups. Regarding mental health, SGM autistic

adults experienced the highest levels of depression, loneliness, and psychological distress and the lowest levels of flourishing and resilience across all four groups. These results begin to bridge together previous independent ASD and SGM literatures showing that both groups are at elevated risk for feelings of depression, loneliness and psychological distress (Suzuki et al., 2021; Wilson & Liss, 2022). Having both minoritized identities seems to increase these mental health concerns.

Perhaps some of the most notable findings from this study were the medium-sized relations between group membership and NSSI and the small-sized relation between group membership and suicide attempts. Autistic college students with and without an SGM identity reported higher rates of NSSI compared to non-autistic college students. The relation between ASD and NSSI is of clinical importance given that it is in line with prior work among autistic adult samples (Maddox et al., 2017), but had not been previously documented in college samples. Furthermore, we continue to expand on these findings by showing that autistic college students with a SGM identity reported the highest rates of NSSI and suicide attempts across all four groups. These results emphasize the need for autistic college students, and especially SGM autistic college students, to have access to and receive supports/resources to mitigate suicide risk.

Regarding treatment engagement, autistic college students are less likely to seek out mental health treatments compared to non-autistic college students (Chandrasekhar, 2020), while SGM college students are more likely to seek mental health treatments but are more likely to discontinue treatments prematurely (Dunbar et al., 2017). Given compounding evidence highlighting stigma and barriers to receiving care faced by both autistic college students and SGM college students separately, we hypothesized that SGM autistic college students would

report the lowest mental health treatment engagement rates compared to SGM college students without ASD, non-SGM autistic individuals, and non-SGM college students without ASD. Interestingly, and only partially supporting our hypothesis, results reflect that SGM autistic individuals engage in combined mental health treatment as often as other groups but participate at lower rates in medicine-only and therapy-only treatments. At the same time, the ASD-only group reported the highest treatment engagement in medicine-only while the SGM-only group reported the highest treatment engagement in therapy-only. One possible explanation for this pattern of results is that a combined treatment approach may be better suited to address exacerbated mental health problems associated with belonging to multiple minority groups, such as having a diagnosis of ASD and an SGM identity.

Limitations

The current study has several strengths, including a large nationally randomly selected sample of college students across multiple college and universities. However, the following limitations should be considered when interpreting results. Data collection was ongoing before, during, and after the COVID-19 pandemic, which may have had both direct and indirect impact on these findings. Recent work suggests that culminating factors of virtual education, strained interpersonal relationships, and decreased social engagement during COVID-19 increased mental health problems in college students (Lee et al., 2021). Future studies continuing to monitor these trends are needed to determine how COVID-19 may or may not be continuing to impact these relations. Another limitation of this study is that ASD diagnostic status was based on one self-reported question for ASD rather than best evidence-based assessment practices which include the use of multi-informant and multi-method approaches. While this study is an important first step towards understanding the relations among ASD, SGM, and functional

statuses, future work using comprehensive, evidence-based assessments of ASD and examining sexual and gender minorities separately is necessary to continue to fill in these notable gaps in the literature. A qualitative study design may permit a deeper consideration of the mental health and functional challenges faced by autistic college students who have a SGM identity. The current study examined mental health treatment engagement of SGM and non-SGM autistic and non-autistic college students; however, more work is needed to determine the efficacy of treatment engagement across these groups. Another potential limitation is the method invariance with all data being reported by one person (college student). Lastly, while all the results presented in this study are statistically significant at the .001 level, most of the effect sizes are uniformly small and warrant consideration when interpreting the strength of these findings.

Clinical Implications

Taken together, the results that SGM and non-SGM autistic college students with and without ASD experience unique functional differences and treatment engagement levels provide important implications for both assessment and intervention. Coupled with emerging work showing that sex- and gender-related factors may impact behavioral variabilities in neurodevelopmental disorders (Bölte et al., 2023), results of the current study emphasize the need for mental health providers to inquire about SGM identities when working with autistic individuals. Similarly, mental health providers are encouraged to conduct comprehensive assessments that include evaluations of general stress, academic functioning, and mental health factors, especially suicide risk, when working with SGM and non-SGM autistic college students. Regarding intervention efforts, the findings of this study demonstrate that each of these groups has difficulties across many domains but experiences them differently, suggesting that supports/resources may be needed at multiple levels (e.g., academic, mental health).

Further, given the differences across these groups, it is possible some supports/resources would be more efficacious for some groups and not others. As such, additional research is necessary to examine how these supports may or may not be efficacious across groups. It is imperative that mental healthcare providers are trained to work with these intersecting identities in supportive ways as to increase treatment engagement.

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Table 1.
Demographics

	Comparison		**ASD**		**SGM**		**SGM+ASD**		
Variable	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Pairwise Comparisons
Age	20.41	1.91	20.36	1.86	20.31	1.84	20.44	1.85	SGM+ASD = ASD = SGM; SGM+ASD = ASD = Comparison; Comparison > SGM
GPA (letter equivalent)	10.53 (B+ to A-)	1.78	10.13 (B+ to A)	1.94	10.38 (B+ to A)	1.92	9.98 (B to B+)	2.23	Comparison > SGM > ASD, SGM + ASD
Gender Identity	% within group		% within group		% within group		% within group		
Woman or Female	66.0		31.4		67.4		32.7		SGM > Comparison > SGM+ASD = ASD
Man or Male	33.8		68.3		17.5		25.2		ASD > Comparison > SGM+ASD > SGM
Non-Binary	0.1		0.0		14.8		41.1		SGM+ASD > SGM > ASD = Comparison

Table 2.
Mean Levels of General Stress and Specific Domain Distress

	Comparison		ASD		SGM		SGM+ASD		
Domain	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	Pairwise Comparisons
Past year stress	2.96	0.74	2.87	0.81	3.20	0.70	3.23	0.76	SGM+ASD = SGM > Comparison > ASD
Past year distress									
Academics	3.26	0.72	3.16	0.74	3.37	0.68	3.36	0.73	SGM+ASD = SGM, Comparison > ASD; SGM > Comparison, ASD
Family	2.85	0.82	2.80	0.83	3.02	0.81	3.08	0.87	SGM+ASD = SGM > Comparison = ASD
Intimate	2.83	0.84	2.95	0.92	2.95	0.84	2.91	0.95	SGM = SGM+ASD = ASD; SGM > Comparison
Peers	2.46	0.76	2.58	0.83	2.59	0.82	2.61	0.77	SGM = SGM+ASD = ASD; SGM = SGM+ASD > Comparison; ASD = Comparison
Roommate	2.67	0.82	2.54	0.79	2.77	0.84	2.88	0.83	SGM+ASD = SGM > Comparison = ASD
Faculty	2.62	0.83	2.66	0.82	2.66	0.83	2.68	0.78	SGM+ASD = SGM = ASD = Comparison

Table 3.
Academic Impairment Caused by Mental Health and Interpersonal Factors

Issues Affecting Academics		% within group				Pairwise Comparisons
		Comparison	**ASD**	**SGM**	**SGM+ASD**	
Mental Health Factors						
Depression	Negatively Impacted Performance in Class	15.8	23.5	35.9	38.6	SGM+ASD = SGM > ASD > Comparison
	Delayed Progress Towards Degree	2.6	4.8	7.3	13.3	SGM+ASD > SGM = ASD > Comparison
Anxiety	Negatively Impacted Performance in Class	23.6	30.3	42.0	46.9	SGM+ASD = SGM > ASD > Comparison
	Delayed Progress Towards Degree	2.5	5.0	5.6	8.9	ASD = SGM+ASD, SGM > Comparison; SGM+ASD > SGM
PTSD	Negatively Impacted Performance in Class	1.4	3.5	5.3	11.3	SGM+ASD > SGM = ASD > Comparison
	Delayed Progress Towards Degree	0.3	1.2	1.3	4.3	SGM+ASD > SGM = ASD > Comparison
Stress	Negatively Impacted Performance in Class	33.8	36.5	49.7	47.2	SGM+ASD = SGM > ASD = Comparison
	Delayed Progress Towards Degree	2.9	4.2	6.2	13.0	SGM+ASD > ASD, SGM, Comparison; SGM > Comparison
Interpersonal Factors						
Family	Negatively Impacted Performance in Class	24.2	27.4	27.2	30.3	SGM+ASD = ASD, SGM, Comparison; SGM > Comparison
	Delayed Progress Towards Degree	4.6	7.0	5.4	10.0	SGM+ASD > SGM > Comparison; ASD = SGM+ASD, SGM, Comparison

Intimate	Negatively Impacted Performance in Class	26.0	28.3	29.5	32.4	ASD = SGM+ASD = Comparison; SGM > Comparison
	Delayed Progress Towards Degree	3.3	6.6	3.9	7.8	ASD = SGM = Comparison; SGM+ASD > Comparison
Roommate	Negatively Impacted Performance in Class	17.5	23.5	21.5	33.1	SGM+ASD > SGM > Comparison; ASD = SGM; Comparison = SGM
	Delayed Progress Towards Degree	2.1	5.2	2.4	4.5	SGM+ASD = ASD = SGM = Comparison
Peers	Negatively Impacted Performance in Class	16.5	26.6	19.7	21.8	ASD, SGM > Comparison; SGM+ASD = ASD, SGM, Comparison
	Delayed Progress Towards Degree	1.7	4.2	1.8	6.3	SGM+ASD > SGM, Comparison; ASD = SGM+ASD, SGM, Comparison
Faculty	Negatively Impacted Performance in Class	44.6	43.7	43.9	48.6	SGM+ASD = ASD = SGM = Comparison
	Delayed Progress Towards Degree	10.2	9.2	10.9	16.2	SGM+ASD = ASD = SGM = Comparison

Table 4.
Mental Health Means

Variable	Comparison		ASD		SGM		SGM+ASD		Pairwise Comparisons
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	
Flourishing	46.80	0.03	42.76	0.34	43.04	0.06	38.35	0.37	Comparison > ASD = SGM > SGM+ASD
Resilience	6.05	1.49	5.31	1.68	5.69	1.54	4.90	1.71	Comparison > SGM > ASD > SGM+ASD
Loneliness	5.31	1.83	6.06	1.97	6.07	1.85	6.63	1.92	SGM+ASD > SGM = ASD > Comparison
Psychological Distress	7.38	4.99	9.08	5.49	10.37	5.37	11.99	5.23	SGM+ASD > SGM > ASD > Comparison
NSSI	1.08	0.35	1.20	0.58	1.28	0.563	1.55	0.93	SGM+ASD > SGM > ASD > Comparison
	% within group		% within group		% within group		% within group		
Positive for Suicidality	18.5		36.0		49.2		66.6		SGM+ASD > SGM > ASD > Comparison
Suicide attempts	1.8		4.8		4.2		8.4		SGM+ASD > SGM > Comparison; ASD = SGM; ASD+SGM = ASD

Table 5.
Substance Use

Substance	Risk Level	% within group				Pairwise Comparisons
		Comparison	ASD	SGM	SGM+ASD	
Alcohol	Moderate Risk	16.9	18.3	19.0	14.2	SGM+ASD = ASD, SGM, Comparison; SGM > Comparison
	High Risk	1.3	2.7	1.8	5.2	SGM+ASD > SGM > Comparison; ASD = SGM+ASD, SGM, Comparison
Tobacco	Moderate Risk	43.0	54.1	44.3	41.7	SGM+ASD = ASD = SGM = Comparison
	High Risk	3.2	2.0	3.8	6.3	SGM+ASD = ASD = SGM = Comparison
Cocaine	Moderate Risk	23.5	26.7	24.9	35.5	SGM+ASD = ASD = SGM = Comparison
	High Risk	1.0	6.7	1.4	19.4	SGM+ASD = ASD > Comparison; SGM = ASD, Comparison; SGM+ASD > SGM
Cannabis	Moderate Risk	42.3	42.0	51.2	48.1	SGM+ASD = ASD, SGM, Comparison; SGM > Comparison
	High Risk	2.1	6.3	3.6	6.9	SGM+ASD, SGM, ASD > Comparison
Prescription Stimulant	Moderate Risk	21.7	29.6	26.5	29.5	SGM+ASD = ASD, SGM, Comparison; SGM > Comparison
	High Risk	0.6	11.1	0.8	15.9	SGM+ASD = ASD > SGM = Comparison
Methamphetamine	Moderate Risk	22.7	30.0	25.8	30.0	SGM+ASD = ASD = SGM = Comparison
	High Risk	7.1	40.0	6.3	30.0	SGM+ASD = ASD > SGM = Comparison

Inhalant	Moderate Risk	16.1	31.8	21.2	18.9	SGM+ASD = ASD, SGM, Comparison; SGM > Comparison
	High Risk	1.5	13.6	0.8	21.6	SGM+ASD, ASD > SGM, Comparison
Sedative	Moderate Risk	24.7	33.3	30.5	27.9	SGM+ASD = ASD, SGM, Comparison; SGM > Comparison
	High Risk	0.9	14.3	1.6	9.3	SGM+ASD, ASD > SGM, Comparison
Hallucinogen	Moderate Risk	21.4	33.3	27.0	30.8	SGM+ASD = ASD, SGM, Comparison; SGM > Comparison
	High Risk	0.7	5.6	0.4	10.8	SGM+ASD, ASD > SGM, Comparison
Heroin	Moderate Risk	27.2	25.0	35.4	23.1	SGM+ASD = ASD = SGM = Comparison
	High Risk	15.4	50.0	10.8	46.2	Comparison = ASD, SGM SGM+ASD > Comparison, SGM
Opioid	Moderate Risk	14.1	22.7	20.5	24.3	SGM+ASD = ASD, SGM, Comparison; SGM > Comparison
	High Risk	1.5	9.1	1.0	16.2	SGM+ASD, ASD > SGM, Comparison
Other Drug	Moderate Risk	61.3	57.1	49.7	57.1	SGM+ASD = ASD = SGM = Comparison
	High Risk	2.6	0.0	4.4	21.4	ASD = SGM, SGM+ASD, Comparison; SGM+ASD > Comparison

Table 6.
Mental Health Treatment

Mental Health Treatment	% within group				Pairwise Comparisons
	Comparison	**ASD**	**SGM**	**SGM+ASD**	
No Treatment	8.3%	9.1%	5.7%	5.3%	SGM+ASD = ASD, SGM, Comparison; Comparison > SGM
Medicine Only	27.2%	24.6%	18.1%	17.5%	Comparison > SGM+ASD, SGM; ASD = SGM+ASD, Comparison
Therapy Only	23.7%	18.5%	24.7%	16.9%	SGM, Comparison > SGM+ASD; ASD = SGM+ASD, SGM, Comparison
Both Medicine and Therapy	39.0%	44.4%	49.8%	56.2%	SGM+ASD, SGM > Comparison; ASD = Comparison, SGM
Other	1.8%	3.4%	1.7%	4.1%	SGM+ASD > ASD, Comparison; ASD = SGM, Comparison, SGM+ASD

Supplementary Table 1.
Demographics Continued

Variable	% within group				Pairwise Comparisons
	Comparison	**ASD**	**SGM**	**SGM+ASD**	
Enrollment					
Full-Time	95.2	90.1	94.7	88.5	SGM = Comparison > SGM+ASD = ASD
Part-Time	4.5	8.7	4.9	10.8	SGM+ASD = ASD > SGM = Comparison
Other	0.4	1.2	0.4	0.6	ASD > Comparison = SGM; SGM+ASD = ASD, SGM, Comparison
Race/Ethnicity					
White	67.2	79.0	71.0	82.4	SGM+ASD = ASD > SGM > Comparison
Asian/Asian-American	14.2	10.2	11.4	6.7	Comparison > ASD = SGM > SGM+ASD
Hispanic/Latino/a/x	13.4	9.5	14.2	9.2	SGM > Comparison > ASD = SGM+ASD
Black/African-American	7.6	5.1	7.4	4.5	Comparison = SGM = ASD = SGM+ASD
Biracial or Multiracial	3.5	3.5	6.4	8.2	SGM+ASD = SGM > ASD = Comparison
American Indian/Native Alaskan	2.1	4.2	2.2	3.5	ASD > SGM = Comparison; SGM+ASD = ASD, SGM, Comparison
Middle Eastern/North African (MENA)/Arab Origin	1.5	0.7	1.3	1.8	Comparison = ASD = SGM = SGM+ASD
Relationship Status					
Not in a relationship	56.2	75.2	58.5	65.6	ASD > SGM+ASD > SGM > Comparison
In a relationship but not married/partnered	41.4	22.8	39.5	31.7	Comparison > SGM > SGM+ASD > ASD

Married/partnered	2.4	1.9	2.0	2.7	SGM+ASD = ASD = SGM, Comparison
Current Residence					
Campus or university housing	42.8	47.4	49.2	48.1	SGM+ASD = ASD = SGM > Comparison
Off-campus or other non-university housing	38.1	19.7	33.3	27.5	Comparison > SGM SGM+ASD > ASD
Parent/guardian/other family home	18.5	32.0	16.6	22.7	ASD > SGM+ASD > Comparison = SGM
Temporarily staying with a relative, friend, or "couch surfing" until I found housing	0.2	0.2	0.4	1.0	SGM+ASD = SGM > Comparison = ASD; ASD = SGM+ASD, SGM, Comparison
Currently do not have a place to live	0.0	0.2	0.1	0.4	SGM+ASD > SGM, ASD > Comparison
Other	0.4	0.5	0.5	0.2	Comparison = ASD = SGM >SGM+ASD
Primary source of health insurance					
Covered by parent/guardian's plan	75.1	77.1	74.6	75.9	ASD = SGM = SGM+ASD = Comparison
College/University Student Health Insurance Plan	12.0	8.6	11.8	8.0	Comparison = ASD = SGM; Comparison > SGM+ASD
Covered by employer-based plan (or spouse's/partner's employer-based plan)	1.6	1.2	1.4	1.4	Comparison = ASD = SGM = SGM+ASD
Medicaid, Medicare, SCHIP, or VA/Tricare Coverage	4.6	6.3	5.2	6.5	SGM+ASD = ASD = SGM= Comparison; SGM+ASD > Comparison
I do not have health insurance	3.1	1.8	3.4	3.3	Comparison = ASD = SGM = SGM+ASD
Bought a plan of my own	1.4	1.4	1.2	1.2	Comparison = ASD = SGM = SGM+ASD
I have insurance but do not know the primary source	1.3	1.9	1.3	1.8	Comparison = ASD = SGM = SGM+ASD
I do not know if I have health insurance	0.9	1.6	1.1	1.8	Comparison = ASD = SGM = SGM+ASD

Supplementary Table 2
Bivariate Associations

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Age	-															
2. FS	.02**	-														
3. CD-RISC 2	.02**	.46**	-													
4. K6	-.03**	-.58**	-.39**	-												
5. ULS	-.06**	-.49**	-.27**	.53**	-											
6. NSSI	-.05**	-.26**	-.16**	.30**	.18**	-										
7. SBQ-R	-.03**	-.47**	-.25**	.55**	.39**	.43**	-									
8. Suicide Attempts	-.03**	-.12**	-.07**	.13**	.08**	.21**	.24**	-								
9. ASSIST Tobacco	-.08**	-.09**	-.06**	.15**	.06**	.10**	.12**	.06**	-							
10. ASSIST Cannabis	-.08**	-.14**	-.09**	.20**	.13**	.14**	.20**	.07**	.35**	-						
11. ASSIST Cocaine	-.11**	-.14**	-.15**	.10**	.08**	.20**	.08**	.14**	.25**	.27**	-					
12. ASSIST Alcohol	.06**	-.11**	-.08**	.17**	.09**	.13**	.16**	.06**	.33**	.33**	.35**	-				
13. ASSIST Meth	-.17**	-.22**	-.32**	.07	.02	.40**	.04	.31**	.33**	.45**	.77**	.44**	-			
14. ASSIST Inhalants	-.12**	-.15**	-.20**	.09**	.01	.25**	.02	.19**	.21**	.30**	.70**	.30**	.90**	-		
15. ASSIST HA	-.18**	-.15**	-.12**	.12**	.09**	.20**	.13**	.14**	.22**	.35**	.62**	.29**	.77**	.75**	-	
16. ASSIST Heroin	-.16*	-.18**	-.23**	.08	.02	.45**	.07	.37**	.42**	.51**	.82**	.51**	.83**	.86**	.81**	-
17. ASSIST Other	-.09*	-.12**	-.11**	.14**	.06	.04	.04	.10*	.01	-.10	.50**	.08	.93**	.66**	.34**	.77**

Note. ASSIST = Alcohol, Smoking, and Substance Involvement Screening Test, HA = Hallucinogen, FS = Diener Flourishing Scale, CD-RISC 2 = Connor-Davidson Resilience Scale, ULS = UCLA Loneliness Scale, K6 = Kessler-6, NSSI = Non-Suicidal Self-Injury, SBQ-R = Suicide Behavior Questionnaire-Revised
** = Correlation is significant at .01 level; * = Correlation is significant at .05 level

Supplementary Table 3
Mental health treatment characteristics

	Group Counts			
	Comparison	**ASD**	**SGM**	**SGM+ASD**
Autism Spectrum Disorders				
No treatment	0	47	0	60
Medicine only	0	16	0	13
Therapy only	0	74	0	82
Both medicine and therapy	0	39	0	45
Other Treatment	0	4	0	5
Depression Disorders				
No treatment	409	9	274	10
Medicine only	1406	29	856	38
Therapy only	1523	28	1266	44
Both medicine and therapy	3250	79	2908	138
Other Treatment	54	1	32	1
Anxiety Disorders				
No treatment	786	16	377	14
Medicine only	2240	41	971	36
Therapy only	2360	34	1595	54
Both medicine and therapy	3834	94	2860	140
Other Treatment	98	2	46	2
Trauma Disorders				
No treatment	99	6	78	3
Medicine only	76	3	68	5
Therapy only	524	6	558	23
Both medicine and therapy	393	12	506	35
Other Treatment	10	1	10	5
Substance-Related Abuse or Addiction				
No treatment	29	5	31	4
Medicine only	3	1	0	1
Therapy only	74	1	66	3
Both medicine and therapy	25	2	15	3
Other Treatment	5	0	12	1
Bipolar Disorders				

No treatment	34	5	38	6
Medicine only	92	3	95	6
Therapy only	70	2	69	5
Both medicine and therapy	290	11	365	25
Other Treatment	3	0	5	0
Personality Disorders				
No treatment	16	3	17	7
Medicine only	14	0	27	2
Therapy only	54	1	77	9
Both medicine and therapy	89	3	139	13
Other Treatment	1	0	2	1
Eating Disorders				
No treatment	167	6	119	5
Medicine only	50	4	22	3
Therapy only	508	3	409	14
Both medicine and therapy	213	5	183	8
Other Treatment	28	0	21	1
Gambling Disorder				
No treatment	0	1	0	2
Medicine only	0	1	0	1
Therapy only	2	1	1	1
Both medicine and therapy	0	0	4	1
Other Treatment	0	0	0	0
Insomnia				
No treatment	259	6	180	17
Medicine only	482	14	309	21
Therapy only	130	4	115	6
Both medicine and therapy	264	5	267	18
Other Treatment	24	2	22	1
Obsessive-Compulsive and Related Disorders				
No treatment	129	5	89	6
Medicine only	183	3	108	14
Therapy only	340	10	266	24
Both medicine and therapy	544	14	426	39
Other Treatment	6	0	9	1

Attention Deficit/Hyperactivity Disorder				
No treatment	270	12	171	11
Medicine only	1381	54	591	44
Therapy only	134	12	136	30
Both medicine and therapy	552	35	405	44
Other Treatment	11	1	8	4
Psychotic Disorders				
No treatment	3	2	4	0
Medicine only	10	1	9	4
Therapy only	5	1	14	2
Both medicine and therapy	22	2	37	8
Other Treatment	0	0	0	1