

Evaluating schizotypy and alcohol usage as predictors of increased engagement in risky sexual behaviors in an undergraduate sample

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Abstract

The window of risk for developing a schizophrenia-spectrum disorder overlaps with young adulthood, a time of increased independence and self-sufficiency. Research suggests that this period is also associated with increased substance use and risky sexual encounters. The current study aimed to examine rates of alcohol usage and risky sexual behaviors in those demonstrating higher rates of schizotypy (i.e., risk indicator for schizophrenia). Data was collected at a midsized university in the Northeastern United States during the 2019–2020 and 2020–2021 academic years. A total of 385 undergraduate students enrolled in introductory psychology classes completed the study either in-person or online. The study consisted of questionnaires related to alcohol usage, rates of sexual risk behaviors, and schizotypal traits. Due to COVID-19 restrictions and the time period covered by the sexual risk measure (i.e., the *last six months*), the authors deemed it necessary to omit certain participants, leaving 179 participants in our main analyses. Participants who reported higher levels of alcohol usage and positive schizotypy demonstrated increased engagement in specific sexual risk behaviors, while higher levels of negative schizotypy may have acted as a protective factor against engagement in sexual risk. Descriptive data for participants collected during the pandemic period was provided for comparison and for the interest of future researchers looking at the pandemic period (n = 180). The current findings provide a snapshot (baseline rate) of sexual behavior and alcohol usage in a nonclinical sample with varying risk for psychosis that extends previous research involving clinical samples.

Keywords Schizotypy · Sexual behavior · Social participation · Substance use · Young adults

Background

The term *schizotypy* refers broadly to risk indicators for schizophrenia (Meehl, 1962), which can be viewed as milder manifestations of the three symptom clusters seen in schizophrenia (e.g., *positive*, *negative*, and *disorganized*). Positive symptomatology includes characteristics such as delusional beliefs and hallucinatory experiences. In contrast, negative symptoms involve a diminishment of functioning in certain domains such as the experience of pleasure (anhedonia) or social withdrawal, while disorganized symptoms involve disruptions in the effective speech, cognition, and behavior. The development of schizophrenia has not been pinpointed to one factor, rather it is thought to be a unique interaction of both genetics and environment.

Upwards of 70% of U.S. high school graduates will attend college (U.S. Bureau of Labor Statistics, 2017), which often comes with newfound freedoms and responsibilities. Beyond

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Studying schizotypy provides the opportunity to study the gene-environment effects on symptoms before a diagnosis may be present (Barrantes-Vidal et al., 2015). The presence of schizotypal traits does not ultimately mean a diagnosis of a schizophrenia-spectrum disorder, rather it displays characteristics related to an increased possibility of diagnosis (Lenzenweger, 2018). Therefore, utilizing schizotypy provides researchers with the opportunity to better understand the plethora of factors that come together to ultimately lead to development of a disorder. One possible factor that may influence symptomatology is the stress related to life transitions or experiences during the window of risk (ages 15–30) where onset of a schizophrenia-spectrum disorder is most common (American Psychiatric Association, 2013). This window overlaps with adolescence and young adulthood, where increasing levels of independence and self-sufficiency are generally expected in Western society.

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academic pressures, students are often confronted with many social pressures and decisions including engagement in intimate relationships. When combining these stressors with psychosis-related symptomatology, 'at-risk' individuals may be more likely to make poor health decisions, including engaging in risky sex (Brown et al., 2010). A sexual risk behavior (SRB) can include behaviors that increase the risk of contracting a STI or unwanted pregnancy, such as lack of contraception use, engaging in behaviors with strangers, and/ or engaging with multiple sexual partners at a given time (Desiderato & Crawford, 1995; Lam & Lefkowitz, 2013; Regan & Dreyer, 1999). One common SRB is inconsistent condom usage, which has been demonstrated in college samples (Lam & Lefkowitz, 2013), as well as those with firstepisode psychosis (Brown et al., 2010; Brown et al., 2022; Sanchez et al., 2019) and schizophrenia (Cournos et al., 1994). Additionally, a sample of patients with schizophrenia showed that those with higher rates of positive symptomatology were three times more likely to have had multiple sexual partners at a given time (Negash et al., 2019). The elevated rates of SRBs demonstrated within a clinical population may suggest that the onset of symptoms can negatively influence decision-making processes and create a higher risk for problematic sexual behaviors (Brown et al., 2010; Shield et al., 2005).

Alcohol usage has commonly been studied in conjunction with SRBs, with previous research demonstrating that the consumption of alcohol has been associated with increased SRBs (Cooper, 2002). This increased vulnerability may be due to the lower inhibition levels experienced when under the influence of alcohol (Fielder & Carey, 2010). Furthermore, Lam and Lefkowitz (2013) found that sexually active students commonly consumed alcohol before or while engaging in sexual activity. While alcohol usage rates appear to be higher in those experiencing psychosis than the general population (Moore et al., 2012), little is known about the added risk involved with alcohol use in conjunction with SRBs. However, the findings from Negash et al. (2019) suggest that the current use of alcohol increases the engagement of SRBs in patients with schizophrenia.

There is a gap in current literature looking at both alcohol usage and sexual risk in relation to the subclinical end of the schizophrenia-spectrum. The aim of the current study is to fill that gap by examining alcohol usage and schizotypal traits as predictors of sexual risk behaviors in young adults during the average risk period for schizophrenia-spectrum disorder development. This study utilizes a nonclinical sample consisting of undergraduate students, which is an opportune sample as the age group overlaps with the window of risk. The current study aims to identify patterns of behavior that are present before a possible diagnosis, which could provide a benefit to early intervention

services. The existing, yet separate, literatures suggest that positive symptoms are associated with both increased alcohol use and SRB engagement. Thus, the authors of the current study hypothesized that higher levels of alcohol usage and greater levels of positive schizotypy symptoms would predict greater engagement in SRBs. Given the nature of negative symptoms (e.g., less social engagement), we predict that they may be a protective factor against SRBs. To our knowledge there is no existing literature examining the relationship between disorganized symptoms and SRBs, so given the characteristics of the disorganized subdomain we hypothesized that they would predict higher SRBs. The combined examination of the variables included in this study will add to the current literature surrounding factors that may influence sexual risk and may help identify patterns of behavior that are present before a possible diagnosis, which could provide a benefit to early intervention services.

Method

Participants

All participants were students enrolled in an Introduction to Psychology course at a midsized university in the Northeastern portion of the United States. A total of 385 undergraduate students completed the study during the 2019-2020 and 2020–2021 academic years. However, due to the ongoing pandemic, we ultimately decided to only include the portion that participated in the 2019–2020 academic year (n = 205)omitting n = 180 who participated in the 2020–2021 academic year. The decision to omit participants from the 2020-2021 academic year was due to the time period covered by the Sexual Risk Survey (i.e., the last six months). Therefore, only students in the 2019-2020 academic year were able to report on behaviors prior to quarantine/social distancing requirements. Of the 205 eligible participants, an additional 10 participants were excluded due to incomplete data and 16 participants due to infrequency items (those who answered more than one infrequency item wrong were excluded), bringing the final sample to 179 participants. Figure 1 illustrates the timeline of recruitment to analysis. Demographics information for both the 2019–2020 (n = 179) and 2020–2021 (n = 180) groups is included in Table 1 and total scores for all measures is included in Table 2 includes total scores for all measures. Descriptive data from the 2020-2021 group is provided for the interest of future researchers that may wish to examine the differential rates of engagement in sexual risk behaviors during the pandemic period.



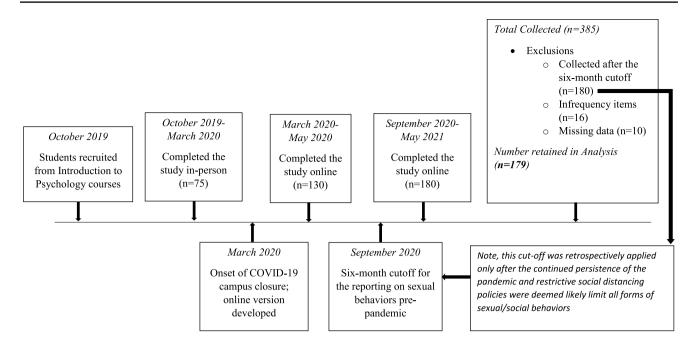


Fig. 1 Timeline of participant recruitment in relation to the COVID-19 pandemic

Table 1 Demographics information for pre-pandemic (n = 179) and pandemic (n = 180) periods

		Pre-pandemic N(%)	Pandemic N(%)
Sex	Male	98(55%)	67(37%)
	Female	81(45%)	113(63%)
Ethnicity	White/Caucasian	110(61%)	122(68%)
	Black or African American	30(17%)	20(11%)
	Hispanic or Latino	12(7%)	14(8%)
	Asian or Pacific Islander	9(5%)	8(4%)
	Native American or American Indian	1(0.06%)	1(0.06%)
	Multiracial	14(8%)	14(8%)
	Other	3(1.7%)	1(0.06%)
Age	Mean(SD)	19.25(1.22)	19(2.79)

Measures

Demographics Questionnaire Participants provided general demographic information at the start of the study including age, biological sex, gender, and ethnicity.

Sexual Risk Survey, (Turchik & Garske, 2009) The Sexual Risk Survey (SRS) is a 23-item questionnaire that measures rates of various risky sexual practices within the past six months. It contains five subscales: impulsive sexual acts (e.g., "How many times have you left a social event with someone you just met?"; $\alpha = .852$), acts involving uncommitted partners (e.g., "How many people have you had sex

with that you know but are not involved in any sort of relationship with?"; $\alpha = .899$), general risky acts (e.g., "How many times have you given or received fellatio (oral sex on a man) without a condom?"; $\alpha = .819$), intent to engage in risky sexual acts (e.g., "How many times have you gone out to bars/parties/social events with the intent of "hooking up" and engaging in sexual behavior but not having sex with someone?"; $\alpha = .787$), and risky anal acts (e.g., "How many times have you had anal sex without a condom?"; $\alpha = .375$). If the participant had not participated in the activity described, they were instructed to select "0". Raw scores were then categorized into ordinal categories for scoring, with 0 being no sexual risk and 4 being the highest bracket of sexual risk. The Sexual Risk Survey is specifically designed for use in a college population (Turchik et al., 2015).



¹ All Cronbach's Alpha values reported in this paper are based on data from the current study (n=179).

Table 2 Comparison of mean (M) & standard deviation (SD) scores for measures of interest for pre-pandemic (n=179) and pandemic (n=180) periods

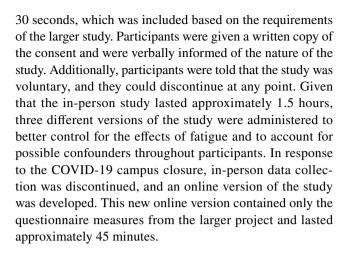
	Pre-pandemic M(SD)	Pandemic M(SD)	t-score
Impulsive acts	.913(.978)	.563(.665)	3.784***
Risky anal acts	.149(.389)	.130(.500)	.401
General risky acts	.925(.931)	.807(1.155)	1.030
Uncommitted acts	.799(.891)	.475(.601)	-3.899***
Intent to Act	.718(1.098)	.210(.507)	5.392***
Positive Schizo- typy	2.293(.695)	2.630(.717)	-4.476
Negative Schizo- typy	2.922(.705)	3.198(.765)	-3.522
Disorgan- ized Schizotypy	2.737(.832)	3.042(.900)	-3.306
Alcohol	9.67(3.138)	8.61(2.930)	3.218

Schizotypal Personality Questionnaire-Brief Revised, (Cohen et al., 2010) The Schizotypal Personality Questionnaire-Brief Revised (SPQ-BR) is a 32-item measure reporting levels of schizotypal traits, with higher scores indicating greater risk for schizophrenia (i.e., schizotypy). It contains three subscales: positive (α =.88), negative (α =.823), and disorganized (α =.87). The SPQ-BR uses a Likert-scale with 1 being strongly disagree and 5 being strongly agree. Research on the use of the SPQ-BR has shown strong validity and reliability (Callaway et al., 2014).

WHO-ASSIST, (Humeniuk et al., 2010) The WHO-ASSIST assesses substance use patterns and the influence of it on the lives of participants. It includes nine different categories of substance use with the addition for participants to provide other substances not listed. Participants initially respond with a "yes" or "no" endorsement for each category. For categories that are endorsed, participants then complete six additional items related to their perceptions of use and possibly stopping use of the substance. For this study, only the alcohol subscale ($\alpha = .705$) was examined.

Procedures

The study was approved by the university Institutional Review Board. Participants had an option to participate in their choice of ongoing studies or complete an alternative assignment. If this study was selected, participants signed up for in-person timeslots lasting approximately 1.5 hours. Please note that the current paper reviews a subset of data collected in the larger project. Inclusion criteria consisted of being age 18 or older without a history of epilepsy, seizures, brain damage, or loss of consciousness for more than



Statistical Analysis

The study conducted was a cross-sectional design. Response distributions were evaluated for normality and reliability. Independent samples t-tests were performed prior to analyses to examine possible group differences between in-person and online participants for ethnicity, sex, and all variables of interest (2019–2020 only; n = 179). A series of hierarchical linear regression analyses were performed for each subscale of the SRS. The first step included biological sex and ethnicity as independent variables, followed by alcohol usage, and finished with the three schizotypy subscales (positive, negative, disorganized). All analyses were conducted on data from the 2019–2020 academic year (n = 179).

Results

Scores were normally distributed for all study variables except one (i.e., risky anal subscale which was positively skewed and showed a low internal reliability). Results including the risky anal subscale should be interpreted cautiously because of this. It is believed that these findings are partly because the subscale only included four questions, as well as the stigma that exists around anal sexual acts, which may have impacted people's answers. There were no significant group differences found between in-person and online participants, as well as no significant mean score differences between biological sexes on any measures. No ethnicity differences were found for the SPQ-BR; however, ethnicity differences were found for alcohol use scores as well as all subscales of the SRS. Data for ethnicity did not meet the assumption of homogeneity of variances, so all differences were examined using the Games-Howell test. For alcohol use scores, impulsive acts, and risky anal acts the White/Caucasian group scored significantly higher than both the Hispanic/Latino group and the Asian/Pacific Islander group. For uncommitted acts, general risky acts, and intent to act, the White/Caucasian group and



Table 3 Linear regression model for the prediction of the Sexual Risk Survey subscales

		$R^2\Delta$	Predictor	В	Std. Error	Beta
Impulsive acts	Step 1	.031	Biological Sex	.112	.151	.056
			Ethnicity	095	.040	177*
	Step 2	.219***	Alcohol	.154	.022	.483***
	Step 3	.051*	Positive	.259	.113	.178*
			Negative	351	.110	263**
			Disorganized	.092	.102	.075
Uncommitted acts	Step 1	.027	Biological Sex	.070	.135	.039
			Ethnicity	079	.036	166*
	Step 2	.220***	Alcohol	.138	.019	.484***
	Step 3	.024	Positive	.189	.103	.146
			Negative	190	.100	159
			Disorganized	.036	.093	.034
General risky acts	Step 1	.011	Biological Sex	.029	.143	.015
			Ethnicity	054	.038	108
	Step 2	.099***	Alcohol	.096	.022	.324***
	Step 3	.067**	Positive	.219	.114	.161
			Negative	364	.111	292**
			Disorganized	013	.103	011
Intent to act	Step 1	.036*	Biological Sex	103	.166	047
			Ethnicity	103	.044	175*
	Step 2	.140***	Alcohol	.135	.025	.386***
	Step 3	.015	Positive	.109	.134	.068
			Negative	210	.130	143
			Disorganized	.133	.120	.099
Risky anal acts	Step 1	.002	Biological Sex	008	.059	010
			Ethnicity	008	.016	037
	Step 2	.008	Alcohol	.011	.010	.091
	Step 3	.112***	Positive	.103	.049	.184*
	-		Negative	210	.047	409***
			Disorganized	.103	.044	.228*

^{*} p < .05, ** p < .01, *** p < .001

the Black/African American group both scored significantly higher than the Asian/Pacific Islander group. These findings suggest a possible influence of ethnicity on engagement in sexual risk, as well as alcohol consumption. A hierarchical linear regression analysis was constructed to examine the unique contributions of schizotypy and alcohol use for each subscale of the SRS, while controlling for demographic variables. For impulsive sexual acts, the full model was found to explain 30.2% of the variance ($R^2 = .302$, F(3,171) = 4.157, p = .007), with ethnicity, alcohol usage, positive schizotypy, and negative schizotypy all significantly predicting impulsive sexual acts. Higher scores on alcohol usage and positive schizotypy predicted increased impulsive risky activity, while increased scores on the negative subscale predicted the opposite. For participation in general risky activity, the full model was found to explain 17.7% of the variance $(R^2 = .177, F(3,171) = 4.675,$ p = .004), with increased alcohol usage and decreased levels of negative schizotypy predicting increased general risky activity.

For participation in risky anal activity, the results indicated that the model explained 12.1% of the variance ($R^2 = .121$, F(3,171) = 7.241, p < .001), with greater alcohol usage and disorganized schizotypy, and *lower* levels of negative schizotypy predicting more engagement in risky anal behaviors. Table 3 contains additional information regarding these analyses.

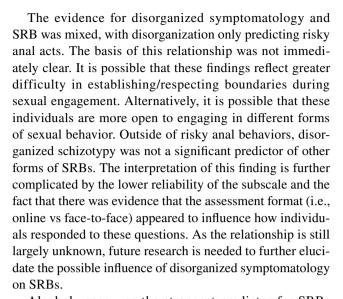
Discussion

The hypotheses for the current study were partially supported, with evidence for a significant association between increased positive schizotypy scores and two SRBs (i.e., impulsive acts and risky anal acts). Similarly, the association between positive schizotypy and two other SRBs was approaching significance (i.e., general risky acts (p = 0.057); acts with uncommitted partners (p = 0.068)). This pattern of findings is generally consistent with higher rates of SRBs



reported in individuals with clinical psychosis (Brown et al., 2010; Brown et al., 2011; Brown et al., 2022), suggesting that SRBs may be present before clinical symptoms emerge. Higher engagement in SRBs may represent a form of added health vulnerability for at-risk individuals whose mental health issues may contribute to behaviors with unintended consequences (e.g., contracting a sexually transmitted infection and/or a possible unwanted pregnancy). To our knowledge, there are no specific psychoeducational programs addressing SRBs in those at risk for psychosis. It may be beneficial to incorporate elements regarding safe sexual practices into existing services, especially since lack of knowledge is cited as a reasoning behind increased SRBs (Shield et al., 2005). One meta-analytic study (Higgins et al., 2006) found that mental health programs that incorporated sexual education had clients who exhibited an increased knowledge of sexual behavior and engagement in safer practices when compared to clinics not offering this program. These programs may have a positive impact on peer support, providing an environment where participants are able to discuss sensitive topics. This may be especially relevant for clients experiencing first-episode psychosis who report less peer support and higher rates of SRBs (Brown et al., 2011). Thus, implementing the intervention in a group treatment setting will likely foster an environment where clients feel comfortable discussing a wide range of normative sexual experiences.

Negative symptomatology appeared to serve as a protective factor against sexual risk. Lower scores on negative schizotypy were significantly associated with three out of five SRBs (i.e., impulsive acts, risky anal acts, and general risky acts) and was approaching significance with one additional SRB (i.e., acts with uncommitted partners (p = 0.060)). While previous research has not specifically examined the role negative symptoms play in SRBs, we believe the pattern of findings for negative schizotypy may be due to lower levels of motivation for social engagement (Kalin et al., 2015). Additionally, deficits in social functioning can contribute to more problematic/awkward interpersonal interactions in those with elevated levels of negative symptomatology (Gardner et al., 2017). Thus, it is possible these motivational/interpersonal deficits may have contributed to reduced levels of sexual engagement reported amongst participants with greater negative schizotypy. While there may be indirect benefits associated with decreased socialization/sexual engagement (e.g., lower risk of obtaining a STI or an unwanted pregnancy), there are also important potential costs to the individual (e.g., missed opportunities to develop the social-cognitive skills underlying intimate relationships). Increased discussion regarding safe sexual practices, preferences (including asexuality), and respecting/maintaining health boundaries, may contribute to better wellbeing and mental health outcomes.



Alcohol usage was the strongest predictor for SRBs in all but one of our regression models (i.e., risky anal acts), accounting for 10-22% of the variance, supporting previous findings linking the consumption of alcohol to increased engagement in SRBs within a college population (Fielder & Carey, 2010; Neal & Fromme, 2007). This finding highlights the importance of raising awareness about risks associated with increased alcohol consumption. Various techniques have been employed on college campuses to address the overconsumption of alcohol. Glassman et al. (2010) analyzed the use of a social marketing intervention on a college campus that aimed to decrease high-risk drinking. The study implemented posters around a college campus with information regarding the consequences of overconsumption of alcohol as well as providing possible alcohol-free alternative activities. Results found that students reported decreased high-risk drinking, and the university saw fewer alcohol-related violations (Glassman et al., 2010). As previous research displays a connection between alcohol usage and SRBs, it may be useful to implement programs regarding safe sexual practices in addition to safer alcohol consumption. Eisenberg et al. (2013) found that college campuses with ample sexual health resources reported lower levels of unsafe sexual practices among its students. Along the lines of expanding resources, increasing access to contraceptives may aid in eliminating a barrier to engaging in safe practices. One college incorporated condom vending machines throughout the campus and within months of implementation the student body demonstrated an increased awareness and use of these machines (Francis et al., 2016). As these initiatives have demonstrated success within college campuses, it may be useful to implement the same additions to mental health clinics, further expanding knowledge of safer alcohol consumption and safe sexual practices, as well as easier access to contraceptives. These initiatives could aid



in eliminating barriers to safe sexual behavior within more vulnerable populations.

To our knowledge, only one previous study has examined the relationship between substance use, comorbid psychiatric disorder (primarily depression), and engagement in risky sexual behavior (i.e., Villalobos-Gallegos et al., 2019). While this study reported that alcohol use was strongly associated with sexual risk behaviors, the sample did not report any patients with schizophrenia spectrum disorder symptomatology. Thus, the current study extends this literature by demonstrating a similar pattern of sexual risk with alcohol usage in relationship to schizotypal symptoms. Brown et al. (2022) did find that within a sample experiencing first episode psychosis, those who reported consuming alcohol were eight times more likely to also be engaging in sexual behaviors compared to those who reported not consuming alcohol. This finding demonstrates a positive relationship between alcohol consumption and engagement in sexual behavior within a clinical sample, a building block for future research to use when looking at sexual behaviors, and more specifically sexual risk, within a clinical sample. These findings, as well as the current study findings, all add to the current literature and provides a framework for further research involving those who may be at risk for developing a schizophrenia spectrum disorder, or who may already have a diagnosis.

There are several limitations to the current research findings. First, the sample was cross-section and collected at a mid-sized public university in the Northeastern United States. Therefore, the methodology and the nature of the current sample limit our ability to make any causal statements and our findings may not generalize fully to other settings or population samples. Second, the risky anal subscale of the SRS displayed a low Cronbach's alpha, so any results featuring it should be interpreted cautiously. It is believed that this may be due to the stigma that exists around anal sexual behavior. Third, the study did not question participants on their sexual orientation. As this was the first study combining alcohol use, sexual risk, and schizotypy, the study aimed to provide a baseline for rates of sexual risk within this population. Thus, additional research is still needed to clarify if sexual orientation may also affect specific sexual risk behavior beyond levels of schizotypy. Fourth, the study found ethnicity differences for some forms of sexual risk as well as alcohol usage. These findings were not further interpreted by the researchers, and it is unclear what role ethnicity plays in the engagement in sexual risk.

Future research may aim to address the limitations of this study by utilizing a more generalizable sample. The current sample was comprised of undergraduate students, with the average age being around 19. Previous research has found that this age group may partake in greater levels of sexual behavior, so the current findings may not be extended to a general adult population. Additionally, research may aim to incorporate factors that may influence levels of engagement in sexual behavior, such as sexual orientation and ethnicity. Those in a heterosexual relationship may partake in different sexual behaviors compared to a homosexual relationship, so the level of risk may differ depending on sexual preferences (Blair et al., 2018). The current study found that there were ethnicity differences on various forms of sexual risk and alcohol usage, so future research may aim to examine the role that ethnicity plays in these factors. Furthermore, the current study only examined alcohol usage within the sample, but future research may aim to address the impact of substances other than alcohol. Given the difference seen in sexual risk scores between the 2019-2020 and 2020-2021 participant groups, future research may aim to incorporate sexual risk into research regarding psychological well-being during the COVID-19 pandemic, as previous research has already demonstrated an increased rate of anxiety within young adults during the onset of the COVID-19 pandemic (Aki et al., 2020). This research may help provide a clearer image on the impact COVID-19 has had on social lives during the lockdown periods. The pandemic period also yielded a shift in technology use (Vargo et al., 2021). Future research may evaluate technology use and its relation to sexual behavior before/during the pandemic periods, as technology allows people to engage in sexual behaviors without physical interaction with another person (i.e., cybersex, watching pornography; Rokach, 2020). Upon building on the current findings, it may be useful to replicate these studies within a clinical sample to see if trends identified within a general population sample extend into those experiencing a schizophrenia-spectrum disorder.

In conclusion, the study found higher rates of positive schizotypy and alcohol usage to be predictors of specific forms of sexual risk, while negative schizotypy acted as a protective factor against sexual risk. As this was the first study incorporating both alcohol usage and schizotypy as predictors of sexual risk behaviors, the study provides important baseline knowledge that can be used for future research to extend upon. Clinical implications may include utilizing psychoeducational interventions that aim to address safe and unsafe sexual behavior, especially in those exhibiting higher levels of risk. Additionally, having more open conversations regarding how to engage in safe sexual practices may aid in working towards a decrease in sexual risk behaviors.

Declarations

The authors do not have any relevant financial or non-financial interests to disclose.



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