

Article

A Biopsychosocial Approach to Examining Alcohol Consumption among Youth during the COVID-19 Pandemic

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Abstract: This study investigated the relationship between biopsychosocial characteristics (age, sex, self-rated health, mental health, parental socio-economic status, family support, teacher support, peer support) and alcohol consumption (weekly alcohol consumption in the past three months, drunkenness in the past three months, and binge drinking in the past month) in adolescents during a crisis event. The study consisted of 1019 Israeli students aged 11–18. Questionnaires were distributed to the students between May and July 2021 during school. Teacher support among those who presented weekly alcohol consumption and drunkenness in the past three months was lower than in those who did not present such behavior. The effects of parental support differed only for drunkenness behavior, with those who engaged in drunken behavior presenting significantly less parental support. Our findings suggest that teacher support and mental health are the two major factors in preventing risky alcohol consumption behavior during a crisis, such as the COVID-19 pandemic, among adolescents.

Keywords: biopsychosocial approach; alcohol consumption; youth; crisis; trauma; COVID-19



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1. Introduction

Adolescence is widely recognized as the stage of development that occurs between childhood and adulthood and is characterized by the onset of puberty, as well as by unique neurobiological, social, and cognitive developments [1–3]. This period of transition is of particular interest because of transient increases in mortality rates due to risk-taking behavior; adolescence is also a time when major psychopathologies (substance use disorders, mood disorders) begin to emerge [4,5]. Adolescence is a time during which youth are at increasingly high risk of developing mental health disorders and can be particularly vulnerable to stress [6,7].

Engel's biopsychosocial model (1977) considers biological, psychological, and social factors as contributing to health and illness. Moreover, supportive social relationships have been shown to positively affect physical and mental health and function as a protective factor against adolescent substance use [8,9]. Adolescents have been identified as especially vulnerable to uncertainties and stress, and thus the association between exposure to crises and negative outcomes is even more relevant during times of crises, such as during the COVID-19 pandemic.

The World Health Organization defines a disaster as a severe disruption, ecological and psychosocial, that greatly exceeds the coping capacity of the affected community [10].

In addition, the United Nations International Strategy for Disaster Reduction defines a disaster as a serious disruption of the functioning of a community or a society causing widespread human, material, economic, or environmental losses that exceed the ability of the affected community or society to cope using its resources [11].

James and Gilliland (2013) characterize crises as the perception or the experience of an event or situation as an intolerable difficulty that exceeds the person's current resources and coping mechanisms [12]. Furthermore, trauma is defined by the Substance Abuse and Mental Health Services Administration (SAMHSA, 2014) as the result of an event, series of events, or set of circumstances that an individual experiences as physically or emotionally harmful or life-threatening and that has lasting adverse effects on the individual's functioning and mental, physical, social, emotional, or spiritual well-being [13,14].

Experiencing a sudden-onset disaster, such as a hurricane, wildfire, tsunami, terrorist attack, or disease outbreak, leaves survivors susceptible to adverse mental health outcomes, such as post-traumatic stress disorder, depression, and anxiety [12–15]. Adolescents who are exposed to such trauma or disasters in childhood often experience negative outcomes; this association between childhood trauma exposure and negative outcomes in adolescence is well-established and is even more relevant during times of crisis [16,17].

Recent studies indicate that, over the past two years, since the outbreak of the COVID-19 pandemic in March 2020, the impact on adolescents has been significant. The effects of the pandemic have led to a wide range of consequences, including significant increases in mental distress, screen addiction, and student dropout rates; decreased physical activity; reduced involvement in community activities; and increased alcohol use [18,19].

Risky behaviors among adolescents are a recognized worldwide phenomenon [20,21]. Many studies have indicated that, during adolescence, experiences of risky behaviors, such as drinking alcohol, using drugs and smoking tobacco, having unsafe sex, frequently missing school, and participating in delinquent behavior, increase dramatically [20–22].

Alcohol use among adolescents is prevalent and associated with many serious consequences [23,24]. A study found that about 29% of high school students (32% of girls, 26% of boys) had had at least one drink in the previous 30 days, and 14% of high school students (15% of girls, 13% of boys) had engaged in heavy episodic drinking in the previous 30 day [25].

Previous studies have shown that alcohol use during early adolescence is often a risk factor for the later development of alcohol dependence [25,26]. Adolescent use of tobacco, alcohol, and narcotics is a global health problem [27]. A recent study identified binge drinking as referring to drinking five or more drinks on the same occasion for males or four or more drinks for women [28]. In Europe, alcohol is the intoxicating substance most frequently used among adolescents in junior high schools. The European School Survey Project on Alcohol and Other Drugs showed that, among 15–16 year-old Europeans, 79% reported having consumed alcohol at least once during their lifetime and 13% reported alcohol inebriation during the 30 days before the survey [29,30].

Mental health problems, including psychiatric disorders, general psychological distress, and emotional and behavioral problems, have been estimated to affect 10–20% of children and adolescents [31].

Belongingness is an important psychological construct for mental health and well-being. Social inclusion is a feeling of being accepted, valued, encouraged, and welcomed by others in the social context [32]. Early initiation of alcohol use among adolescents can provide a useful indication of the potential future burden among adults, including increased risk for academic failure, mental health problems, antisocial behavior, physical illness, risky sexual behaviors, sexually transmitted diseases, early-onset dementia, and the development of alcohol use disorders [33].

According to Bronfenbrenner's ecological systems theory [34], the behaviors and well-being of developing individuals are influenced by biology and individual pre-dispositions in interaction with multiple layers of environmental influence: micro-systems (e.g., schools, families, peer networks), meso-systems (e.g., family–school interactions, peer–family in-

teractions), exo-systems (e.g., broader education, health systems), and macro-systems (e.g., prevailing social and cultural norms, chrono-systems, systems that encompass changes over time).

The influence of the family structure on adolescents' substance use has been thoroughly studied. Positive parenting can directly or indirectly influence adolescent drinking through buffering multiple risk factors, including negative peer influences [35,36].

Higher levels of perceived parental monitoring were associated with lower alcohol-use frequency through higher alcohol resistance self-efficacy [37] and lower perceived peer alcohol use [38].

In addition, it has been shown that teachers' support has a large impact and direct influence on students [39]. Teachers are most likely to be an important source of social support for adolescents. Teacher–student interaction is positively related to students' academic and social success [40].

Prior systematic reviews have linked school relational factors (e.g., supportive peer and teacher relationships) or closeness to others and to the school as a whole (e.g., cohesion, aspects of participation, and feelings of membership in the school community) with better mental health [41]. Two teacher support dimensions (i.e., autonomy and competence) have been found to be associated with improved school functioning as reflected by lower school dropout rates [42,43].

This study aimed to investigate the relationship between biopsychosocial characteristics and alcohol consumption (weekly alcohol consumption in the past three months, drunkenness in the past three months, and binge drinking in the past month) in a representative sample of Israeli youth during a crisis event. The present study focused on biological characteristics (age, sex, self-rated health), psychological characteristics (mental health), and social environment (parental socioeconomic status, family support, teacher support, peer support).

2. Materials and Methods

2.1. Research Design

This was a cross-sectional study design. The study consisted of 1019 Israeli students aged 11–18. Questionnaires were distributed to the students between May and July 2021 during school.

2.1.1. Participants

The target population of the study was students in grades 5–12 in Israeli schools. The sampling method was probabilistic random sampling within layers. Participating students were asked to fill out a questionnaire during one of their remote-session classes. The classes were sampled from the most updated list from the Israeli Ministry of Education by age group, geographical distribution by sector, and type of school. The sample included a total of 1019 Israeli students aged 11 to 18 (69% girls, 31% boys; chi-squared = 21.47; $p < 0.001$). The representation of students from 12th grade was the lowest ($n = 56$, 5.5% of the sample; chi-squared = 78.96; $p < 0.001$) (Table 1).

2.1.2. Procedure

The sampling method was probabilistic random sampling within layers. Participating students were asked to fill out a questionnaire during one of their classes. The classes were sampled from the most updated list from the Israeli Ministry of Education by age group, geographical distribution by sector, and type of school.

The study protocol was approved by the Ethics Committee of Bar Ilan University, confirmation number: RO10203. A preliminary letter regarding the survey was sent to the parents of the students. They were asked to confirm their children's participation. On the day of the survey, it was made clear to the students and their parents that the questionnaire was anonymous and that their names should not be written

The questionnaires were distributed to the students between May and July 2021.

Table 1. Sociodemographic characteristics of study participants ($n = 1019$).

Variable		Mean (Standard Deviation) OR n (%)
Grade: n (%) *	5th	126 (12.4) ^{c,e,h}
	6th	107 (10.5) ^{c,e,h}
	7th	165 (16.2) ^{a,b,d,f,g,h}
	8th	115 (11.3) ^{c,e,h}
	9th	181 (17.8) ^{a,b,d,f,g}
	10th	134 (13.2) ^{c,e,h}
	11th	135 (13.2) ^{c,e,h}
	12th	56 (5.5) ^{a,b,c,d,e,f,g}
Sex: n (%) *	Female	703 (69.0)
	Male	316 (31.0)
Socioeconomic status, score: mean (standard deviation)		4.17 (0.84)
Religion: n (%) *	Orthodox and religious	349 (34.2)
	Traditional and secular	670 (65.8)
	Non-immigrant	744 (73.0)
Immigration status: n (%) *	Immigrant	275 (27.0)

Notes: * Chi-squared test $p < 0.01$ (two-tailed); a, statistically significantly different from "5th grade"; b, statistically significantly different from "6th grade"; c, statistically significantly different from "7th grade"; d, statistically significantly different from "8th grade"; e, statistically significantly different from "9th grade"; f, statistically significantly different from "10th grade"; g, statistically significantly different from "11th grade"; h, statistically significantly different from "12th grade".

2.1.3. Data Collection

The average response rate was 25.5%. The research tool was an online, anonymous self-completion questionnaire. The questionnaire included the HBSC core questionnaire and new questions on the effects of COVID-19 [44]. The HBSC is a large, cross-national study that has examined health and lifestyle determinants of school-age children in 52 countries and regions for over 30 years. The methodology was consistent with that of the International HBSC Survey. The sampling error was $\pm 3.1\%$ at a 95% confidence level.

This study was approved by the Ethics Committee of Israel's Chief Scientist Office and the Israeli Ministry of Education.

2.2. Measures

2.2.1. Dependent Variables

The dependent variables included three alcohol consumption-related variables: weekly alcohol consumption in the past three months, drunkenness in the past three months, and binge drinking in the past month.

Weekly alcohol consumption: in the past three months: Weekly alcohol consumption in the past three months was assessed using four questions. Each question assessed consumption of different type of alcoholic beverage; namely, beer, wine, spirits/liquor, and alcopops. Answers to all questions were on a four-point scale, including the categories "1 = every day", "2 = at least every week, but not every day", "3 = less than once a week", and "4 = not at all". This variable was dichotomized, with options 1 and 2 reflecting at least weekly drinking of one or more type of alcoholic beverage (coded as 1) and 3 and 4 indicating less than weekly alcohol consumption in all four types of alcoholic beverages (coded as 0; [45]).

Drunkenness: in the past three months: Drunkenness in the past three months was assessed using the following question: "did it ever occur that you had drunk so much

alcohol that you get drunk?”. Answers were on a five-point scale, ranging from “1 = never got drunk” to “5 = more than 10 times”. The created binary variable included youth who had never got drunk in the past three months (response number 1; coded as 0) and a second category of those who did (responses 2–5; coded as 1).

Binge drinking: in the past month: Binge drinking in the past month was assessed using the following question: “In the past 30 days, if you drunk alcohol, on how many days you drunk 5 or more alcoholic beverages within couple of hours?”. Answers were on a six-point scale, ranging from “1 = never had 5 drinks in few hours” to “6 = had 5 drinks in few hours 4 times or more”. The question was dichotomized into those who had not experienced binge drinking (response number 1) and those who had (responses 2 to 6).

2.2.2. Independent Variables

Biological characteristics: Three biological characteristics were assessed: age, sex, and overall self-rated health. Sex was established via participants’ reports of their self-identified sex (boy, girl). Age was reflected from the participant’s grade (5th through 12th). Self-rated health was established via the question: “How would you describe your health in the past year?”. Answers ranged from 1 (“not good”) to 4 (“excellent”).

Psychological characteristics: Participants’ psychological health was established via an eight-item non-clinical measure of mental health. The measure has excellent psychometric properties and is widely used and well-validated [46–48]. Participants were asked: “In the last six months, how often have you had the following: headache, stomachache, back ache, feeling low, irritability or bad team-per, feeling nervous, difficulties in getting to sleep, and feeling dizzy”. The answer to each question ranged from 1 (“about rarely or never”) through 5 (“almost every day”). Previous research [47,48] has suggested that the scale reflects two dimensions—one psychological and one somatic. The scale can be used at the single-item level [49] or at the sum-score level [47]. Accordingly, a total score was calculated, with higher scores representing less favorable emotional health [50].

Social environment: Four measures of social environment were assessed: parental socioeconomic status, family support, teacher support, and peer support. The following describes of each of these measures.

Parental socioeconomic status: Participants were asked to rate their family’s financial situation before the COVID-19 outbreak with optional responses of “1 = very poor”, “2 = fairly poor”, “3 = moderate”, “4 = good”, and “5 = very good”.

Family support: Mothers’ and fathers’ support was assessed by asking about the nature of communication with the mother and father. Answers ranged from “1 = no contact with mother or father” to “5 = very comfortable contact with mother or father”. This question was asked separately for mothers and fathers and a total score was calculated. The total score ranged from 2 to 10, with higher scores representing better family support.

Teacher support: Social support from teachers was assessed through the following three items: “I feel that my teachers accept me as I am”, “I feel that my teachers care about me as a person”, and “I feel a lot of trust in my teachers”. Answers were scored on a five-point scale ranging from “1 = not at all” to “5 = a lot” [49]. The total score ranged from 3 to 15 [51].

Peer support: Friends’ support was measured using the Multidimensional Scale of Perceived Social Support [52]. The scale is composed of four questions: “My friends really try to help me”, “I can count on my friends when things go wrong”, “I have friends with whom I can share my joys and sorrows”, and “I can talk about my problems with my friends”. Response options range from “1 = very strongly disagree” to “7 = very strongly agree”. The scale has been well-validated and used in multiple studies in different cultural contexts [52,53].

2.3. Data Analysis

2.3.1. Sociodemographic Characteristics of Study Participants

Descriptive statistics (means, standard deviations, ranges, percentages) for the participants' sociodemographic characteristics were calculated. For categorical variables, statistical differences in percentages were calculated using chi-squared tests.

2.3.2. Biological, Psychological, and Social Characteristics According to Alcohol Consumption Group

In the three dependent variables (weekly alcohol consumption in the past three months, drunkenness in the past three months, and binge drinking in the past month), participants were categorized into one of two groups: those presenting the behavior and those not presenting the behavior. The percentage of participants in each group was calculated and compared using chi-squared tests. It was hypothesized that, in comparison to participants not presenting alcoholic consumption behavior, among participants presenting alcoholic consumption behaviors a higher prevalence of older participants and males would be found. In addition, the mean self-rated health, mental health, socioeconomic status, and support (teacher, peer, parents) would be statistically significantly lower among participants presenting alcoholic consumption behavior. Participants' biological, psychological, and social characteristics in the two groups were compared using chi-square tests for categorical variables or independent t-tests for continuous variables.

2.3.3. Correlations between Alcohol Consumption Behaviors and Prediction of Alcohol Consumption

Correlations between all three alcohol consumption behaviors were investigated using Spearman correlation coefficients. Variables that were found to be significantly different in the three alcohol consumption groups (i.e., presenting or not presenting alcohol consumption, drunkenness, or binge drinking) were entered into three separate multiple binary logistic regression models, one for each dependent variable. The binary multiple logistic regression modeling was used to determine the extent to which study variables (biological, psychological, social) predicted weekly alcohol consumption in the past three months, drunkenness in the past three months, and binge drinking in the past month. In this respect, the dependent variables were coded as 0 (i.e., not presenting alcohol consumption, drunkenness, or binge drinking) and 1, (i.e., presenting alcohol consumption, drunkenness, or binge drinking). Moreover, the regression analysis-calculated odds ratios were used in order to calculate the prevalence ratio. Such a procedure can be undertaken for a rare disease/condition (e.g., one with a prevalence of approximately 10% or less). As the prevalence of alcoholic consumption was very small (13% and less), estimation of the prevalence ratio from the odds ratio (PR from OR) was undertaken.

2.3.4. Power Analysis

Post hoc power analysis using the study's average effect sizes for differences in continuous variables between participants presenting/not presenting the various alcoholic consumption behaviors (mean Cohen's *d* effect size = 0.31) was conducted. Using the aforementioned mean effect size; t-tests to test family; two-tailed tests; alpha error probability = 0.05; mean number of participants in the first group of participants not presenting alcoholic consumption behavior, mean *n* = 934; and mean number of participants in the second group of participants presenting alcoholic consumption behavior, *n* = 84, the study's calculated power was 0.82. Power analysis was conducted using G*Power 3.0.10. All data analyses, except for power analysis, were performed using IBM Statistical Package for Social Science (IBM-SPSS), version 19 (IBM Corp., Armonk, NY, USA).

3. Results

3.1. Sociodemographic Characteristics of Study Participants

The sample included a total of 1019 Israeli students aged 11 to 18 (69% girls, 31% boys; chi-squared = 21.47; $p < 0.001$). The representation of students from 12th grade was the lowest ($n = 56$, 5.5% of the sample; chi-squared = 78.96; $p < 0.001$). In terms of religion, most study participants were traditional and secular (66%). For additional information, refer to Table 1.

3.2. Biological, Psychological, and Social Characteristics According to Alcohol Consumption Group

For all three alcoholic consumption behaviors evaluated, the prevalence of those not consuming alcohol was statistically significantly greater than of those consuming alcohol (chi-squared test $p < 0.0001$; Figure 1). The percentage of males presenting the two alcohol consumption behaviors was significantly greater than that of females ($p < 0.05$; Table 2).

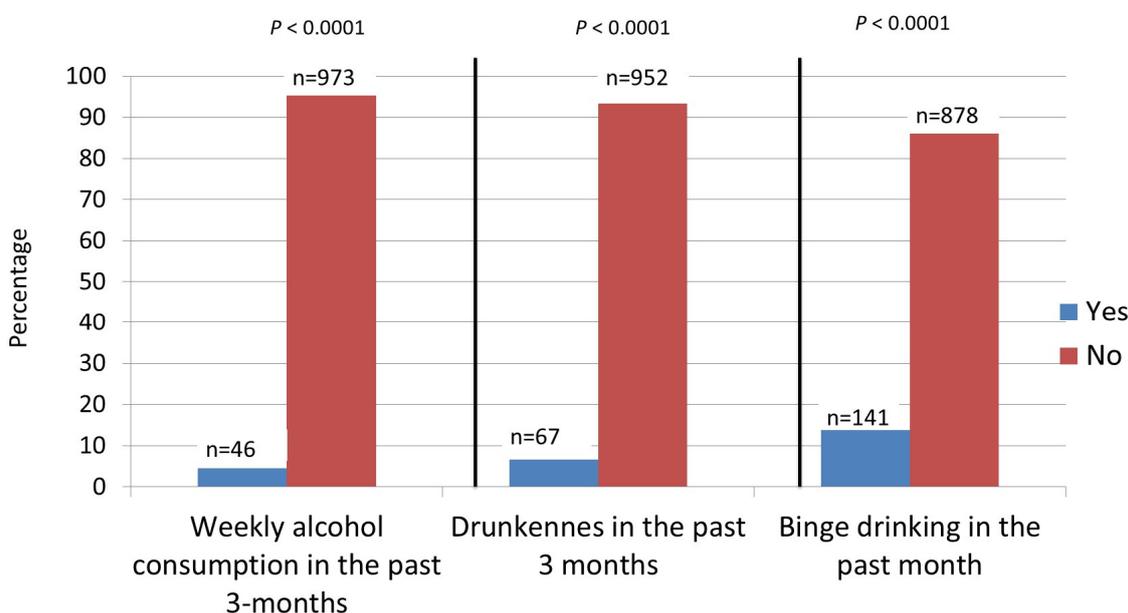


Figure 1. Alcohol consumption characteristics (n = 1019).

Table 2. Biological, psychological, and social characteristics according to alcohol consumption group (n = 1019).

Variables		Weekly Alcohol Consumption in the Past Three Months		Drunkenness in the Past Three Months		Binge Drinking in the Past Month	
		No (n = 973): Mean (SD) OR n (%)	Yes (n = 46): Mean (SD) OR n (%)	No (n = 952): Mean (SD) OR n (%)	Yes (n = 67): Mean (SD) OR n (%)	No (n = 878): Mean (SD) OR n (%)	Yes (n = 141): Mean (SD) OR n (%)
Grade: n (%)	Elementary (5th + 6th grades; n = 233)	226 (97.0)	7 (3.0)	221 (94.8)	12 (5.2)	217 (93.1) ^{b,c}	16 (6.9) ^{b,c}
	Middle (7th to 9th grades; n = 461)	442 (95.9)	19 (4.1)	432 (93.7)	29 (6.3)	405 (87.9) ^{a,c}	56 (12.1) ^{a,c}
	High school (10th to 12th grades; n = 325)	305 (93.8)	20 (6.2)	299 (92.0)	26 (8.0)	256 (78.8) ^{a,b}	69 (21.2) ^{a,b}
Sex: n (%)	Female (n = 703)	681 (96.9)	22 (3.1) **	666 (94.7)	37 (5.3) **	604 (85.9)	99 (14.1)
	Male (n = 316)	292 (92.4)	24 (7.6) **	286 (90.5)	30 (9.5) **	274 (86.7)	42 (13.3)
Self-rated health, score: mean (SD)		3.21 (0.85)	2.93 (1.10) *	3.23 (0.84)	2.79 (1.05) **	3.22 (0.85)	3.09 (0.91)
Mental health, score: mean (SD)		21.29 (8.77)	28.17 (9.85) **	21.23 (8.77)	26.82 (9.65) **	21.16 (8.76)	24.36 (9.48) **

Table 2. Cont.

Variables	Weekly Alcohol Consumption in the Past Three Months		Drunkness in the Past Three Months		Binge Drinking in the Past Month	
	No (<i>n</i> = 973): Mean (SD) OR n (%)	Yes (<i>n</i> = 46): Mean (SD) OR n (%)	No (<i>n</i> = 952): Mean (SD) OR n (%)	Yes (<i>n</i> = 67): Mean (SD) OR n (%)	No (<i>n</i> = 878): Mean (SD) OR n (%)	Yes (<i>n</i> = 141): Mean (SD) OR n (%)
	Socioeconomic status, score: mean (SD)	4.16 (0.83)	4.23 (1.07)	4.18 (0.83)	3.98 (1.05)	4.17 (0.84)
Teacher support, score: mean (SD)	1.52 (0.68)	1.13 (0.77) **	11.17 (3.14)	9.16 (3.77) **	11.08 (3.22)	10.78 (3.23)
Peer support, score: mean (SD)	20.73 (6.30)	19.54 (8.22)	20.71 (6.32)	20.23 (7.45)	20.71 (6.46)	20.49 (6.00)
Parental support: mean (SD)	8.07 (1.24)	8.06 (1.9)	8.10 (1.92)	7.56 (1.12) **	8.06 (1.72)	8.09 91.95)

Notes: * Significant at $p < 0.05$ (two-tailed); ** significant at $p < 0.001$ (two-tailed); a, statistically significantly different from “elementary school” ($p < 0.05$; two-tailed); b, statistically significantly different from “middle school” ($p < 0.05$; two-tailed); c, statistically significantly different from “high school” ($p < 0.05$; two-tailed); SD, standard deviation.

The mental health of those presenting the three alcohol consumption behaviors was less favorable than those not presenting such behaviors. The self-rated health of those presenting weekly alcohol consumption in the past three months and drunkenness in the past three months was less favorable than those not presenting such behaviors. Similarly, teacher support in those presenting the two alcohol consumption behaviors was less than those not presenting such behavior. Parental support differed only in drunkenness behavior, with those who experienced drunkenness presenting significantly less parental support. Finally, the effects of grade differed significantly only for drunkenness behavior, with the percentage of this behavior increasing with age (6.9%, 12.1%, and 21.2% of youth in elementary, middle, and high school, respectively). No significant differences in socioeconomic status or peer support were observed among the three alcohol consumption behaviors.

3.3. Correlations between Alcohol Consumption Behaviors and Prediction of Alcohol Consumption

All three alcohol consumption behaviors significantly correlated with one another according to the Spearman correlation coefficient, ranging from 0.47 (correlations between weekly alcohol consumption and binge drinking in the past month) to 0.64 (correlations between weekly alcohol consumption and drunkenness in the past three months ($p < 0.001$).

Table 3 shows a summary of multiple binary logistic regression analyses of the variables predicting weekly alcohol consumption, drunkenness in the past three months, and binge drinking in the past month. The Hosmer–Lemeshow test showed that all variables were a good fit for selection into the multiple logistic regression ($p < 0.25$) model. For weekly alcohol consumption in the past three months, the final regression model was statistically significant (chi-squared = 52.78, $p < 0.001$) and explained 17% of the variance in weekly alcohol consumption (Nagelkerke $R^2 = 0.17$). The odds of presenting weekly alcohol consumption behavior were higher among males (odds ratio = 0.23; $p < 0.001$). In addition, having more mental health problems and less teacher support also predicted weekly alcohol consumption (odds ratio = 1.09 and 0.86, respectively; $p < 0.001$).

The final regression model of drunkenness was also significant (chi-squared = 53.09, $p < 0.001$) and explained 14% of the variance in drunkenness in the past three months (Nagelkerke $R^2 = 0.14$). The odds of presenting drunkenness in the past three months were lower among females (odds ratio = 0.33; $p < 0.001$). In addition, having more mental health problems and less teacher support predicted weekly drunkenness in the past three months (odds ratio = 1.08 and 0.87, respectively; $p < 0.001$).

Table 3. Summary of multiple binary logistic regression analysis for prediction of alcohol consumption.

Dependent Variables	Independent Variables	Coefficient	Prevalence Ratio	Wald	95% Confidence Interval
Weekly alcohol consumption in the past three months [†]	Constant	−2.83 **	-	12.68	-
	Sex (Males compared to females)	−1.45 **	0.41	19.51	0.12–0.44
	Self-rated health	−0.08	0.95	0.20	0.64–1.31
	Mental health	0.09 **	1.12	20.97	1.05–1.14
	Teacher support	−0.14 **	0.88	9.92	0.79–0.94
	Model summary	Chi-squared = 52.78 **, Nagelkerke R ² = 0.17			
	Drunkenness in the past three months ^{††}	Constant	−2.202 *	-	5.26
Sex (females compared to males)		−1.08 **	0.55	15.34	0.19–0.58
Self-rated health		0.20	1.32	1.82	0.91–1.65
Mental health		0.05 **	1.11	12.37	1.02–1.09
Teacher support		−0.12 **	0.90	10.44	0.81–0.90
Parental support		−0.05	0.95	0.57	0.81–1.09
Model summary		Chi-squared = 53.09 **, Nagelkerke R ² = 0.14			
Binge drinking in the past month ^{†††}	Constant	−3.87 **	-	118.62	-
	Grade	0.25 **	0.56	28.17	1.17–1.41
	Mental Health	0.03 **	1.11	13.56	1.01–1.05
	Model summary	Chi-squared = 45.66 **, Nagelkerke R ² = 0.08			

Note: * Significant at $p < 0.05$ (two-tailed); ** significant at $p < 0.001$ (two-tailed); [†] the values represent prediction of at least weekly alcohol consumption; ^{††} the values represent prediction of at least one episode of drunkenness; ^{†††} the values represent prediction of at least once binge drinking episode in the past month.

The final regression model of binge drinking was also significant (chi-squared = 45.66, $p < 0.001$) and explained 8% of the variance in drunkenness in the past three months (Nagelkerke R² = 0.08). The odds of presenting binge drinking in the past month were higher among older children (odds ratio = 1.28; $p < 0.001$) and among those with a less favorable mental health score (odds ratio = 1.03; $p < 0.001$).

4. Discussion

This study examined the relationship between biopsychosocial characteristics and alcohol consumption (weekly alcohol consumption in the past three months, drunkenness in the past three months, and binge drinking in the past month) in a representative sample of Israeli youth aged 11–18 in 2021 during the COVID-19 pandemic. The present study focused on biological characteristics (age, sex, self-rated health), psychological characteristics (mental health), and social environment (parental socioeconomic status, family support, teacher support, peer support). Findings revealed that all independent variables, except socioeconomic status and peer support, significantly differed between participants engaging in vs. not engaging in risky behaviors of alcohol consumption.

The regression model revealed that, for weekly alcohol consumption and drunkenness in the past three months, the odds of presenting weekly alcohol consumption behaviors were higher among males. In addition, having more mental health problems and less teacher support also predicted both weekly alcohol consumption and drunkenness. For binge drinking, the regression analysis revealed that the odds of engaging in this behavior increased with both age and mental health issues.

Above all, the present study found mental health to be a significant predictor of all three alcohol consumption behaviors in adolescents. The association between mental health disorders and adolescents' substance use has been well-established [54]. A study from Brazil indicated that depressive symptoms were associated with early onset of alcohol consumption, frequent consumption, and frequent intoxication in both girls and boys [55]. Results of a study from China showed that adolescents increased their use of alcohol and cannabis during the COVID-19 pandemic and that more than one-fifth of junior high

and high school students reported experiencing mental health problems, such as anxiety, depression, and stress. These findings suggest that negative coping was a risk factor for psychological and mental health problems, which, in turn, predicted increased use of alcohol and cannabis [56].

Teacher support was found to be a significant predictor of weekly alcohol consumption and drunkenness. This finding is in line with other studies that have stressed the importance of teacher support and connectedness to adolescents' mental health and health behaviors [57,58]. The fact that the present study was conducted during the peak period of the pandemic, after a long lockdown in which distant learning took place, further emphasizes the important role of the educational staff in maintaining personal relationships with their students in times of crisis.

In addition, male adolescents reported a higher rate of weekly alcohol consumption and drunkenness compared with their female peers. This finding corroborates other studies that demonstrated small moderating effects of sex on motives for drinking alcohol and showed that the link between enhancement motives and alcohol seems slightly stronger among boys, whereas coping motives are more strongly linked to alcohol consumption among girls [59]. Moreover, a cross-sectional study of European adolescents found that boys drink more frequently than girls [60]. These differences can be explained by distinct social and peer influences experienced by boys and girls toward drinking [61]. Nevertheless, a recent study indicated that, although males still outpace females for most alcohol-related measures, sex gaps are narrowing and the differences continue to become smaller [62]. This finding may explain why the present study did not find sex differences in binge drinking.

Family support was found to be significantly higher among those not presenting drunkenness behaviors than those who did present them. Parent–child connectedness and communication have been highlighted as potential protective factors against substance use and misuse in adolescence [63]. Indeed, parents are more likely to have frequent conversations and set rules with their children when their connectedness is high [64,65]. In addition, setting clear rules and boundaries in the house, having open communication, and having a good parent–child relationship are all associated with reduced use of illicit substances among adolescents [66].

The present study did not find an association between family support and weekly alcohol consumption or binge drinking. Furthermore, significantly and positively correlated, family support did not emerge as a predicting factor of drunkenness behavior in the regression analysis. These rather surprising results could be explained by the fact that, in the present study, family support was measured with two questions concerning children's ease of communication with their parents. Although quality of communication with parents has been proven to be a protective factor in preventing risky behaviors [63], it may not represent the full scope of familial support.

In addition, given the fact that the survey was conducted during the COVID-19 pandemic, a time when many parents were forced to juggle both work commitments and childcare at the same time, the type and quality of communication with parents may have been temporarily affected, impairing the well-established association between parental support and risky behaviors. A possible explanation may be found in a study in which parents reported different effects of the lockdowns and social distancing restrictions in the relationships with their children: while some parents valued the opportunity to spend more time with their children, other parents experienced difficulties in coping with their behavior at home [67].

Contrary to our expectations, peer support and socioeconomic status did not correlate with any of the alcohol consumption behaviors. It is possible that the social distancing restrictions imposed adversely impacted the social connectedness and relationships of the adolescents with their peers, impairing their protective role. Another possible explanation why peer support was not associated with alcohol consumption builds on the argument that adolescents' peer groups may also encourage substance-use and risk-taking behaviors [68], creating a counterproductive effect for peer support.

As for socioeconomic status, whereas many studies have found that low socioeconomic status is associated with a higher risk of substance use [69,70], the evidence concerning the association between socioeconomic status and alcohol consumption is inconsistent [71,72]. Our results did not show an association between socioeconomic status and alcohol consumption. We suggest that the COVID-19 crisis may have influenced and lowered the expected relationship. Support for this possible explanation can be found in a recent study that demonstrated a greater decrease in well-being during the COVID-19 pandemic among families with higher socioeconomic status [73]. Such a decrease in well-being have been linked to mental health problems, which, in turn, predicted increased alcohol consumption during the pandemic [74].

The current study's results also indicated that the predictors of binge drinking were different from those of weekly alcohol consumption and drunkenness. More adolescents reported experiencing binge drinking than drunkenness and weekly alcohol consumption; this behavior increased with age but did not differ by sex. The differential determinants of binge drinking compared to weekly alcohol consumption and drunkenness may suggest that it is a unique risk-taking behavior. Indeed, the findings of other studies have shown that binge drinking in adolescence is associated with the development of alcohol-use disorder [75,76].

5. Conclusions

Our findings suggest that teacher support and mental health were the two major factors in preventing risky behavior of alcohol consumption during the COVID-19 pandemic among adolescents. Teacher support emphasized the importance of having a "significant adult" in the adolescent's life, especially in times of uncertainty and traumatic events that disrupt their familiar social environments. State budgets should be allocated to build intervention programs to address the consequences of crises that affect adolescents, with an emphasis on strengthening and encouraging those at risk of suffering from mental health problems, as well as educational and therapeutic responses. There is an additional need for targeted and tailored intervention programs for parents and teachers, in which they will be given tools on how to strengthen their relationships and communication as a resilience factor in preventing alcohol consumption among adolescents. In addition, since, in this study, the questionnaire did not include questions about the students' reasons for drinking alcohol, we recommend that future research ask the question. The reasons may affect the students' drinking behavior.

6. Strengths and Limitations

One of the strengths of the present study was the fact that, despite the complex period of COVID-19, the questionnaire was delivered to a representative sample of students across Israel. In contrast, many studies have been conducted online during the pandemic that included a group of adolescents who were looking to participate in this type of online research (they needed to register on the site) and, therefore, they were not necessarily a representative sample. This study also had a few limitations. First, the study employed a cross-sectional design, which does not make it possible to infer causal relationships. Indeed, the associations established may be bi-directional in nature, such that alcohol consumption behaviors may impact social relationships and mental health [77]. A future longitudinal design is suggested to better reflect the direction of the associations in the present study. Second, the measures were limited to adolescents' self-reporting, without further testing. Therefore, several tools should be implemented to increase data reliability and prevent biases, such as personal interviews. Third, it is important to keep in mind that the sample was taken roughly a year and a half after the beginning of the COVID-19 pandemic, and it is possible that at this point there were students who dropped out of school. Hence, the sample may be skewed towards students who remained connected to the school and not to those students who dropped out. In such a situation, the results may have been even more severe.

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