Chapter 5

Protective Factors: The Role of Family Support, School Engagement, and Community Resilience

Kayla N. Ellefsen*

*PhD, Deputy Chief Toxicologist, Travis County Medical Examiner, Austin, TX, USA

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Abstract

Adolescent substance use remains a persistent public health concern; however, research examining protective factors within specific regional contexts, such as Northern Cyprus, is limited. We examine the associations between specific protective factors, including family support, school engagement, reading books for enjoyment, and active participation in sport, and substance use behaviors among high school students aged 15 to 16 years. A cross-sectional survey was administered in 2024 to adolescents attending secondary schools in Northern Cyprus. Correlation analyses and simple linear regressions were conducted to assess the relationships between each individual protective factor and substance use outcomes, including tobacco smoking, alcohol consumption, and cannabis use. School engagement demonstrated the strongest and most consistent statistically significant inverse associations with substance use, particularly smoking and alcohol use, and to a lesser extent, cannabis use (r= -0.10 to -0.28). Family support and reading for enjoyment were weakly but consistently associated with lower substance use, especially smoking, recent alcohol use, and binge drinking. Participation in sport yielded mixed results: a small protective effect was observed for smoking, whereas a positive association emerged with recent alcohol use. These results underscore school engagement as a key protective factor for adolescent substance use prevention in Northern Cyprus. While family dynamics and extracurricular activities also play contributory roles, their effects appear more modest. These findings support the development of multi-faceted, evidence-informed prevention strategies that integrate school, family, and structured leisure domains to reduce substance use risk among youth.

Keywords: *Protective factors, family support, adolescent substance use, school engagement, resilence*

5.1. Introduction

Despite an overall decline in adolescent substance use across Europe in recent years, the prevalence of alcohol and other drug use remains a significant concern for public health. Emerging trends such as the rising popularity of e-cigarettes, shifting perceptions of cannabis, and the continued accessibility of alcohol highlights the complex and evolving nature of this issue. According to the 2024 European School Survey Project on Alcohol and Other Drugs (ESPAD), while lifetime cigarette use among high school students decreased to 32%, this prevalence increased to 47% when e-cigarette use was included, reflecting a broader shift towards alternative nicotine products (ESPAD Group, 2025). Although alcohol consumption and binge drinking also decreased, early initiation and risky drinking behaviors remain problematic in several regions. Cannabis accounted for 12% lifetime use despite ongoing concerns about long term effects in adolescents, potentially due to its widespread perception as low risk.

North Cyprus mirrors these broader European trends but also presents its own unique patterns. As in many other regions, alcohol and tobacco consumption in adolescents is widespread in Northern Cyprus (Hatipoğlu, 2024). Although smoking rates declined from 39.8% to 29.5% from 2019 to 2023, e-cigarette use was 27.9% in 2023 (Bekiroğulları, 2024). Lifetime alcohol use, although much lower than the ESPAD average (73%), still affects nearly one in four students (24.7%) as outlined in Chapter 3 (ESPAD 2025). Despite the lowest adolescent alcohol usage rate to date, binge drinking among North Cyprus high school students remains high (21.5%). Like the European ESPAD countries, cannabis remains the most prevalent illicit drug in North Cyprus with lifetime use fluctuating in recent years (2.0-3.8%) (Bekiroğulları, 2024; Spargo, in press).

Cultural norms, media portrayal, and widespread substance accessibility play a significant role in making tobacco, alcohol, and cannabis the most used substances during adolescence (Bekiroğulları, 2024b). Beyond the individual health risks these substances pose, adolescent substance use

may contribute to broader societal challenges; including economic burdens from costs associated with health care, mental health services and treatment programs, as well as strains on healthcare systems, educational disengagement, juvenile delinquency and the need for ongoing policy reform (Hawkins et al., 1992; Room, 2005; Vakalahi, 2001). In response, earlier prevention research focused primarily on identifying risk factors associated with adolescent substance use to inform targeted prevention efforts. Comparatively, less emphasis was placed on understanding protective factors that may buffer against substance use initiation and escalation until recently.

5.2. Literature Review

The influence of personal, family, peer, school and community variables on adolescent substance use is complex, as these variables interact to generate both risk and protective influences on substance use (Hawkins et al., 1992; Luthar et al., 2000; Nawi et al., 2021; Sameroff, 2000; Stone et al., 2012; Vakalahi, 2001). Risk factors are associated with a higher likelihood of initiating or escalating substance use, whereas protective factors may buffer, mediate, or moderate the effects of such risks. Social control theory suggests that adolescents with strong attachment, commitment, involvement, and societal beliefs are less likely to engage in delinquent behaviors (Hirschi, 1969). As such, numerous studies, both longitudinal and cross-sectional, examined the relationship between substance use and factors like family connectedness, academic engagement and bonding, participation in sport, religion, and structured leisure activities (Hawkins et al., 1992; Heradstveit et al., 2023; Ismail et al., 2024; King & Chassin, 2004; Li et al., 2011; Oesterle et al., 2008; Patrick & Schulenberg, 2014; Perkins & Jones, 2004; Steiner et al., 2019; Stone et al., 2012). Identifying how these factors function as protective influences is critical for developing more effective preventative strategies and informing policy aimed at reducing adolescent substance use.

A substantial body of research found that strong family relationships and school bonding are protective against adolescent substance use. These factors are consistently associated with lower rates of tobacco use (Morojele & Brook, 2001), alcohol use (Dever et al., 2012; Locke & Newcomb, 2004; Maggs et al., 1997; Oesterle et al., 2008), and cannabis use (Dever et al., 2012; Maggs et al., 2008;

Sampasa-Kanyinga et al., 2022; Schulenberg et al., 2005). For example, Steiner et al. reported that adolescents with high family and school connectedness had approximately 65% lower odds of prescription drug misuse and other illicit drug use in adulthood, compared to those with low connectedness (Steiner et al., 2019). Similarly, Rose et al. found a significant protective relationship between school connectedness (including belonging, bonding, attachment, and engagement) and substance use in their recent meta-analysis on adolescent health risks (Rose et al., 2024). Li et al. also showed that increases in both behavioral and emotional school engagement were predictive of lower use of tobacco, alcohol, and cannabis among adolescents (Li et al., 2011).

While family and school-related protective factors are well established, research on sport participation and leisure activities in relation to adolescent substance use is limited and conflicting. Outcomes often vary depending on the structure, intensity, and the context of participation (Albertos et al., 2021; Dever et al., 2012; Terry-McElrath et al., 2011; Zenic et al., 2023). In some cases, sport involvement is associated with increased risk of alcohol use. For instance, Devcic et al. found that longer involvement, higher achievement, and quitting individual sports predicted increased levels of heavy drinking among adolescents in Croatia (Devcic et al., 2018). Similarly, Terry-McElrath et al. reported that participation in American high school athletic teams was linked to significantly greater use of alcohol and smokeless tobacco (Terry-McElrath et al., 2011). However, they also noted that increased physical activity (such as exercise outside of team sports) was associated with reduced use of cigarettes, alcohol, and cannabis.

Leisure activities show similar complexity to participation in sport. Albertos et al. found that unstructured leisure activities (hanging out with friends, shopping, sport matches, etc.) were linked to increased heavy and frequent alcohol use among adolescents in The Netherlands, Spain, and Peru (Albertos et al., 2021). In contrast, structured leisure activities exhibited no significant effects, while family-based leisure was associated with reduced risk of both yearly alcohol use and binge drinking. These findings highlight the importance of distinguishing between types of leisure involvement when evaluating their protective potential.

Building on these previous studies, there remains a need to examine how specific protective factors, such as family support, school engagement, and structured extracurricular activities, relate to substance use within regional

adolescent populations, particularly in Northern Cyprus. This study aims to address this gap by investigating how these protective factors correlate with substance use behaviors in adolescents. Long term monitoring of these factors can further inform prevention strategies and enhance the effectiveness of public health policy in the region.

5.3. Methodology

5.3.1. Research Aims and Questions

The primary aim of this study is to examine the relationships between selected protective factors (family support, school engagement, reading books for enjoyment, and active participation in sport) and substance use among 15- to 16-year-old students in North Cyprus. Substance use indicators include 30-Day cigarette use frequency, lifetime cannabis use, cannabis use in the last 12-months, cannabis use in the last 30 days, last day drank alcohol, heavy episodic drinking (binge drinking) frequency and intoxication frequency. More specifically, the following research questions were addressed:

i. Are there statistically significant relationships between individual protective factors (family support, school engagement, reading books for enjoyment, and active participation in sport) and substance use outcomes (smoking, alcohol, and cannabis use)?

ii. To what extent can these protective factors individually predict substance use behaviors in adolescents?

5.3.2. Research Design and Data Collection

This study was conducted across the entire northern region of Cyprus, targeting secondary school students aged 15–16 years. The total number of students in the target population was 3901.

Formal approval to conduct the research was obtained from the Ministry of Education of Northern Cyprus. All necessary permissions were

documented in writing and duly signed. Following the ministry's authorization, schools were informed of the study's implementation.

Parental consent forms were distributed throughout the schools. Only students whose parents submitted signed consent forms were eligible to participate. On the day of data collection, students were further asked if they were willing to participate voluntarily. Only those who assented were included in the study.

Data collection was conducted by a trained research team under the supervision of Dr. Zafer Bekiroğulları, who provided specific training on administering the ESPAD questionnaire. The team visited each school and facilitated the data collection in a controlled environment, ensuring consistency across sites.

To uphold anonymity and confidentiality, no personal identifiers such as names were collected. Students were brought together in a designated location within their schools and completed the questionnaire simultaneously. Participants were assured that their responses were anonymous and inaccessible to school personnel or parents. The data collection process commenced in October 2024 and was completed by December 2024.

This procedure adhered strictly to the ethical guidelines and methodology established by the European School Survey Project on Alcohol and Other Drugs (ESPAD).

5.3.3. Measures

The self-reported outcome measures in this study included data on questions regarding substance use (cigarette, alcohol, and cannabis) and protective factors (family support, school engagement, reading books for enjoyment, and active participation in sport). Surveys were performed using the ESPAD questionnaire and responses were self-reported by students.

Current cigarette use was defined as smoking within the past 30 days. Alcohol use was evaluated as recent use, heavy episodic drinking or binge drinking, and drunkenness/intoxication. Binge drinking was defined as the intake of five or more drinks on a single occasion in the past 30 days, whereas

alcohol intoxication was defined as experiencing drunkenness on at least one occasion in the past 30 days. Cannabis use was evaluated as lifetime cannabis use, high risk cannabis use (cannabis use in the past year), and current cannabis use (consumption within the past 30 days).

5.3.4. Data Analysis

Pearson Correlation Analysis was applied to examine the relationships between individual protective factors (family support, school engagement, reading books for enjoyment, active participation in sport) and substance use (smoking, alcohol, and cannabis). Additionally, simple linear regression analysis was utilized to determine to what extent significantly correlated protective factors can individually predict substance use behaviors in adolescents.

5.3.5. Ethical Consideration

The study was conducted in accordance with the Declaration of Helsinki and approved by the ethics committee of the Northern Cyprus Prime Minister's Anti-Drug Commission (No. 2024-09-30), which comprises members who are experts in their respective fields. All participants and their legal guardians were thoroughly informed about the study's purpose and procedures, and written consent was obtained from the guardians prior to participation. The data collected for the study were anonymized and processed to safeguard the privacy of participants and prevent the inclusion of any personal information.

5.4. Findings

Pearson Correlation Analysis (Table 5.1) was performed to examine the relationships between individual protective factors and substance use among North Cyprus students ages 15-16. The extent to which these individual

protective factors can predict substance use behaviors also was evaluated using Simple Linear Regression Analysis (Tables 5.2-5.5).

Table 5.1. Relationships Between Individual Protective Factors and Substance Use Among High School Students in North Cyprus

Protective Factor	**Variable**	**Correlation (r)**
Family Support	School Engagement	0.08**
	Reading Books for Enjoyment	0.10**
	Active Participation in Sport	0.07**
	Cigarette Use (30-Day)	-0.14**
	Alcohol Use	
	Last Day Drank (Recency)	-0.06*
	Heavy Episodic Drinking (30-Day Binge)	-0.06**
	Intoxication Frequency (Drunkenness)	-0.07**
School Engagement	Active Participation in Sport	-0.09**
	Cigarette Use (30-Day)	-0.28**
	Alcohol Use	
	Last Day Drank (Recency)	-0.24**
	Heavy Episodic Drinking (30-Day Binge)	-0.20**
	Intoxication Frequency (Drunkenness)	-0.17**
	Cannabis Use	
	Lifetime Cannabis Use	-0.12**
	12-Month Cannabis Use	-0.10**
Reading Books for Enjoyment	Active Participation in Sport	0.14**
	Cigarette Use (30-Day)	-0.08**
	Alcohol Use	
	Last Day Drank (Recency)	-0.13**
	Heavy Episodic Drinking (30-Day Binge)	-0.12**
Active Participation in Sport	Cigarette Use (30-Day)	-0.06**
	Alcohol Use	
	Last Day Drank (Recency)	0.12**
Family Support	School Engagement	0.08**
	Reading Books for Enjoyment	0.10**
	Active Participation in Sport	0.07**
	Cigarette Use (30-Day)	-0.14**
	Alcohol Use	
	Last Day Drank (Recency)	-0.06*
	Heavy Episodic Drinking (30-Day Binge)	-0.06**
	Intoxication Frequency (Drunkenness)	-0.07**

Protective Factor	Variable	Correlation (r)
School Engagement	Active Participation in Sport	-0.09**
	Cigarette Use (30-Day)	-0.28**
	Alcohol Use	
	Last Day Drank (Recency)	-0.24**
	Heavy Episodic Drinking (30-Day Binge)	-0.20**
	Intoxication Frequency (Drunkenness)	-0.17**
	Cannabis Use	
	Lifetime Cannabis Use	-0.12**
	12-Month Cannabis Use	-0.10**
Reading Books for Enjoyment	Active Participation in Sport	0.14**
	Cigarette Use (30-Day)	-0.08**
	Alcohol Use	
	Last Day Drank (Recency)	-0.13**
	Heavy Episodic Drinking (30-Day Binge)	-0.12**
Active Participation in Sport	Cigarette Use (30-Day)	-0.06**
	Alcohol Use	
	Last Day Drank (Recency)	0.12**

Note: ** Significance $p<0.01$.* Significance $p<0.05$.

5.4.1. Family Support

Family support was significantly negatively correlated with cigarette use (r=-0.14, p<0.01) and alcohol use, including last day drank (r=-0.06, p<.05), heavy episodic drinking frequency (r=-0.06, p<.01), and intoxication frequency (r=-0.07, p<.01) (Table 5.1), although associations were weaker. No statistically significant relationships were observed between family support and cannabis use in this study. Significant, but weak, positive associations were observed between family support and the remaining protective factors including school engagement (r=0.08, p<.01), reading books for enjoyment (r=0.10, p<.01) and active participation in sport (r=0.07, p<.05).

Based on linear regression analyses, cigarette use and alcohol use (including last day drank, heavy episodic drinking and intoxication frequency) were predicted by family support (Table 5.2). Significant relationships were established between family support and decreases in substance use, specifically smoking [F (1, 1367) =28.89, p<0.001, R^2=-0.08, $R^2_{adjusted}$=0.02]

and alcohol use (last day drank [F (1, 1367) =4.87, p<0.05, R2=0.004, R2adjusted=0.003], heavy episodic drinking [F (1, 1367) =5.67, p<0.05, R2=0.004, R2adjusted=0.003], intoxication frequency [F (1, 1261) =7.06, p<0.05, R2=0.006, R2adjusted=0.005]). Based on the regression coefficients, a single unit increase in family support decreased smoking by 0.08, recent alcohol use by 0.04, heavy episodic drinking by 0.03, and intoxication frequency by 0.02, respectively.

Table 5.2. The Predictive Level of Family Support on Substance Use

	b	95% CI (LL, UL)		*t*	*p*	R^2
Smoking	-0.08	-0.11	-0.05	-5.38	0.000	0.08
Last Day Drank	-0.04	-0.09	-0.005	-0.09	0.028	0.004
Heavy Episodic Drinking	-0.03	-0.05	-0.005	-2.38	0.017	0.004
Intoxication Frequency	-0.02	-0.03	-0.005	-2.65	0.008	0.006

5.4.2. School Engagement

Stronger negative correlations were observed between school engagement and cigarette and alcohol use compared to those observed with family support (Table 5.3). Significantly weak-moderate relationships existed between school engagement and smoking (r=-0.28, p<.01), last day drank (r=-0.24, p<.01), heavy episodic drinking frequency (r=-0.20, p<.01) and intoxication frequency (r=-0.17, p<.01). Additionally, school engagement was significantly weakly correlated with decreased cannabis use, including lifetime cannabis use (r=-0.12, p<.01) and 12-month cannabis use (r=-0.10, p<. 01). A significant correlation between school engagement and 30-day cannabis use was not observed. Interestingly, school engagement was negatively associated with active participation in sport (r=-0.09, p<.01).

Similarily, cigarette use, alcohol use and cannabis use (lifetime use and 12-month use) were predicted by school engagement based on liner regression analysis (Table 5.3). Significant relationships were established between school engagement and decreases in smoking [F (1, 1201)=108.13, p<0.001, R2=0.08, R2adjusted=0.08], last day drank [F (1,1201)=73.68, p<0.001,

R2=0.06, R2adjusted=0.06], heavy episodic drinking [F (1,1201)=48.67, p<0.001, R2=0.04, R2adjusted=0.04], intoxication frequency [F (1,1227)=33.34, p<0.001, R2=0.03, R2adjusted=0.03], lifetime cannabis use [F (1,1195)=17.13, p<0.001, R2=0.01, R2adjusted=0.01], and 12-month cannabis use [F (1,1162)=13.04, p<0.001, R2=0.01, R2adjusted=0.01]. Based on the regression coefficients, a single unit increase in school engagement decreased smoking by 0.45, recent alcohol use by 0.52, heavy episodic drinking by 0.24, intoxication frequency by 0.10, lifetime cannabis use by 0.06, and 12-month cannabis use by 0.06, respectively.

Table 5.3. The Predictive Level of School Engagement on Substance Use

	b	95% CI (LL, UL)		*t*	*p*	R^2
Smoking	-0.45	-0.54	-0.37	-10.40	0.000	0.08
Last Day Drank	-0.52	-0.63	-0.40	-8.58	0.000	0.06
Heavy Episodic Drinking	-0.24	-0.31	-0.17	-6.97	0.000	0.04
Intoxication Frequency	-0.10	-0.14	-0.07	-5.77	0.000	0.03
Lifetime Cannabis Use	-0.06	-0.09	-0.03	-4.13	0.000	0.01
12-Month Cannabis Use	-0.05	-0.07	-0.02	-3.61	0.000	0.01

5.4.3. Reading Books for Enjoyment

Reading books for enjoyment was significantly negatively correlated to cigarette use (r=-0.08, p<.01), recent alcohol use (r=-0.13, p<.01), and heavy episodic drinking (r=-0.12, p<.01), though associations were weak (Table 5.1). A significant weakly positive relationship was observed between reading books for enjoyment and active participation in sport (r=0.14, p<.01). No other statistically significant correlations were observed for this protective factor.

Linear regression analyses also found that reading books for enjoyment predicted cigarette and alcohol use including last day drank and heavy episodic drinking (Table 5.4). Significant relationships were established between reading for enjoyment and decreases in smoking [F (1,1438) =10.30, p<0.05, R2=0.01, R2adjusted=0.01], last day drank [F (1,1438) =24.76,

p<0.001, R2=0.02, R2adjusted=0.02], and heavy episodic drinking [F (1,1438) =21.16, p<0.001, R2=0.02, R2adjusted=0.01]. A single unit increase in reading for enjoyment decreased smoking by 0.08, recent alcohol use by 0.18, and heavy episodic drinking by 0.10.

Table 5.4. The Predictive Level of Reading Books for Enjoyment on Substance Use

	b	95% CI (LL, UL)		*t*	*p*	R^2
Smoking	-0.08	-0.14	-0.03	-3.21	0.001	0.01
Last Day Drank	-0.18	-0.25	-0.11	-4.97	0.000	0.02
Heavy Episodic Drinking	-0.10	-0.14	-0.06	-4.60	0.000	0.02

5.4.4. Active Participation in Sport

Similarly to the other protective factors examined, active participation in sport was significantly weakly correlated with decreases in smoking (r=-0.06, p<.01) (Table 5.1). A significant positive relationship was observed between active participation in sport and recent alcohol use (r=.12, p<.01), though weakly correlated. No additional statistically significant relationships were observed between active participation in sport and substance use.

Finally, cigarette use and day last drank were predicted by active participation in sport based on linear regression analyses (Table 5.5). Significant relationships were observed between active participation in sport and smoking [F (1,1454) =6.17, p<0.05, R2=0.004, R2adjusted=0.004], as well as last day drank [F (1,1454) =21.51, p<0.001, R^2=0.02, $R^2_{adjusted}$=0.01]. According to the regression coefficients, a unit increase in sport activity decreased smoking by 0.06, whereas a unit increase in sport activity increased recent alcohol use by 0.16.

Table 5.5. The Predictive Level of Active Participation in Sport on Substance Use

	b	95% CI (LL, UL)		*t*	*p*	R^2
Smoking	-0.06	-0.11	-0.01	-2.48	0.013	0.004
Last Day Drank	0.16	0.09	0.23	4.63	0.000	0.02

5.5. Discussion

The identification of protective factors that mitigate adolescent substance use is essential for developing targeted prevention strategies. This study investigated the associations between several potential protective factors, including family support, school engagement, reading books for enjoyment, and active participation in sport, and substance use behaviors among high school students in Northern Cyprus. The findings of this study suggest that while no single factor offers complete protection against substance use, school engagement demonstrated the most consistent and robust associations, particularly in relation to smoking and alcohol consumption.

School engagement emerged as the strongest protective factor against multiple types of substance use in this population, although only weak to moderate negative associations were observed (r= -0.10 to -0.28). The most substantial effects observed were for smoking and recent alcohol use (Table 5.3), with school engagement accounting for 6% and 8% of the variance in these behaviors, respectively. Associations with cannabis use, both lifetime and the last 12-months, were smaller but remained statistically significant. Notably, none of the other protective factors were significantly associated with cannabis use. This may reflect the relatively lower prevalence of cannabis use among adolescents in this population, as highlighted in Chapter 3 (Spargo, in press).

These findings align with prior international research demonstrating the protective influence of school engagement on adolescent health behaviors. Numerous studies similarly reported that students who feel connected to their school environments, whether through a sense of belonging, bonding, attachment, or engagement, are less likely to engage in substance use (Dever et al., 2012; Li et al., 2011; Oesterle et al., 2008; Rose et al., 2024; Schulenberg et al., 2005; Steiner et al., 2019. The consistency of this association across diverse contexts suggests school engagement may be a

universally relevant prevention target, even if its strength varies by substance type and region.

Interestingly, Dever et al. (2012) found that school bonding was a weaker protective factor for alcohol and cannabis use compared to parental monitoring. Previous research also identified that parental influence is one of the most significant predictors of adolescent substance use, with positive parent-child interactions, support, and monitoring buffering against substance use risk (Vakalahi, 2001). In contrast, the present study found that perceived family support was only weakly associated with smoking and alcohol use (r= -0.06 to -0.14), accounting for just 0.4% to 2% of the variance (Table 5.2). However, family support was positively correlated with other protective factors, including school engagement, reading books for enjoyment, and participation in sport, suggesting that family support may indirectly protect adolescents by fostering other healthy behaviors and positive engagement.

While smaller in effect size than school engagement, family support and reading for enjoyment were consistently associated with reduced smoking, alcohol use, and binge drinking (Tables 5.2-5.4). This suggests that, although not sufficient on their own, these factors may contribute to the broader protective landscape. Reading for pleasure was associated with significantly lower odds of trying cigarettes and alcohol by age 14 in a recent longitudinal study from the United Kingdom (Mak & Fancourt, 2020). Authors hypothesized that reading may promote cognitive development, emotional regulation, and resilience which may indirectly reduce risk-taking behaviors. Similarly, structured adult-supervised leisure activities, such as sports, clubs, or volunteering, were shown to buffer adolescents against tobacco and alcohol use (Albertos et al., 2021; Caldwell & Faulk, 2012). Notably, Albertos et al. found that while unstructured leisure activities increased alcohol use, family leisure activities significantly reduced the risk of regular and binge drinking (Albertos et al., 2021). Together, these findings emphasize the importance of a supportive home environment and prosocial leisure activities in mitigating adolescent vulnerability to substance use.

Although structured leisure activities such as reading and family engagement generally exhibit protective effects, not all extracurricular activities provide uniform benefits. In particular, the role of participation in sport appears more nuanced and complex, with variable associations across different substance use behaviors (Albertos et al., 2021; Devcic et al., 2018; Dever et al., 2012; Terry-McElrath et al., 2011; Zenic et al., 2023). In the current study, participation in sport was weakly negatively associated with smoking, suggesting a modest protective effect, but was positively associated with recent alcohol use, indicating a potential risk factor (Table 5.1). While both associations were statistically significant, their strength of effects were small (Table 5.5).

This pattern reflects previous paradoxical research findings suggesting that the social context of sport may simultaneously promote healthy behaviors, such as reduced smoking and cannabis use, while also exposing adolescents to environments where alcohol use is more normalized and celebratory in nature (Devcic et al., 2018; Dever et al., 2012; Terry-McElrath et al., 2011; Zenic et al., 2023). Interestingly, increases in physical activity outside of team sports, along with participation in individual sports, were associated with reductions in alcohol use (Devcic et al., 2018; Terry-McElrath et al., 2011), highlighting the role of team-based dynamics in shaping substance use patterns. Athletics may deter adolescent smoking due to physical performance demands, while team-based competitive settings may encourage or normalize alcohol use as part of the social culture. These nuanced findings provide a foundation for comprehensive prevention strategies incorporating family support, school engagement, and structured extracurricular activities. Although this study provides valuable insights into protective factors associated with adolescent substance use in Northern Cyprus, longitudinal and intervention studies are needed to clarify causality and assess the effectiveness of prevention strategies targeting these protective factors.

5.6. Conclusions

Among high school students in Northern Cyprus, no single protective factor alone strongly predicted or prevented substance use; specifically smoking, alcohol, and cannabis use. However, school engagement demonstrated the most robust protective effect among adolescents in this study, particularly against smoking and alcohol use, and to a lesser extent, cannabis use. Family support and reading for enjoyment also showed consistent, albeit smaller, protective associations with substance use behaviors. These findings suggest that integrated prevention strategies that combine school engagement initiatives, family-based interventions, and structured extracurricular activities may be most effective in fostering protective environments for adolescents. Notably, while participation in sport was generally linked with positive youth outcomes, it was also associated with increased risk of alcohol use, a common paradox in adolescent health. This highlights the importance of targeted prevention efforts within sports settings, such as coach-led messaging and team-based alcohol education programs, to mitigate this risk and promote healthy behaviors among young athletes. Together, these findings emphasize the need for multifaceted, evidence-informed prevention approaches that can be integrated into schools, families, and youth programming, providing policymakers with the necessary framework for reducing substance use among adolescents in Northern Cyprus.

5.7. Challenges and Limitations

Although these survey results offer valuable insights into the relationship between select protective factors and substance use among high school students in Northern Cyprus, this study is not without limitations and caution is warranted in interpreting results. The reliance on self-reported data introduces potential recall errors and social desirability bias, potentially leading to underreporting of substance use behaviors, especially among adolescents. Additionally, the sample population is geographically and

demographically narrow, limiting the generalizability of these findings to broader populations. Cultural, economic, and socio-political differences across regions may significantly influence substance use patterns, making it difficult to extrapolate these results beyond the studied region.

The cross-sectional study design also precludes the ability to assess causality or observe changes over time, meaning recent trends or emerging patterns may not fully be captured. Although a longitudinal approach may provide deeper insights, such studies are often cost-prohibitive. Additionally, the absence of comparable data from previous years prevents the identification of long-term trends between protective factors and substance use behaviors in adolescents. Another important limitation is the complex and often interrelated nature of protective factors; therefore, examining them in isolation may not account for their interactive effects. Furthermore, the study did not incorporate the rising prevalence of e-cigarette use, which may influence the observed associations between protective factors and smoking behaviors. These limitations highlight the need for further, more robust, research to better understand the role of protective factors in youth substance use patterns and to inform effective targeted prevention strategies.

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