Contents lists available at ScienceDirect

Children and Youth Services Review

Risk & protective factors for youth substance use across family, peers, school, & leisure domains

Tara C. Woodward [a], Megan L. Smith [a,*], Michael J. Mann [a], Alfgeir Kristjansson [b], Holly Morehouse [c]

[a] Boise State University, United States
[b] West Virginia University, United States
[c] Vermont Community Foundation, United States

ARTICLE INFO

ABSTRACT

Background: Adolescent substance use has long been a global public health issue. In this study, we explored developmental contexts that correspond with risk and protective factors associated with adolescent substance use. The developmental contexts of interest are the family domain, school domain, peer domain, and structured leisure domain. The leisure domain is of particular interest as it often corresponds with risk and protective factors different from those associated with the other domains. The purpose of this study was to assess whether the identified domains are associated with adolescent alcohol use and cannabis use.
Methods: This study used previously collected adolescent health and behavior surveillance data from (N = 3,407) 7th-12th graders in a Northeastern state in the fall of 2019. The data were used to assess whether the identified domains are associated with adolescent alcohol use and cannabis use. We analyzed each outcome variable using separate multiple regression models.
Results: In our model, the peer domain, specifically peer substance use behaviors and peer norms, were the strongest factors associated with substance use. Family and structured leisure offered similar levels of protection against substance use.
Conclusions: Implications for utilizing the peer and leisure developmental contexts to prevent adolescent substance use and recommendations for further research and investment are discussed.

1. Introduction

Adolescent substance use is a worldwide health issue because it is a high-risk behavior that has short- and long-term negative health effects, and it impacts physical, social, and emotional health (Sigfusdottir et al., 2008). Short-term negative effects include increased incidence of high-risk behaviors like; risky sexual behavior, hazardous activities resulting in injury, and both school and legal problems (Centers for Disease Control and Prevention [CDC], 2020). Long-term, early-onset adolescent substance use leads to not only a higher likelihood of addiction but also the development of non-communicable diseases like "heart disease, high blood pressure, and sleep disorders" (CDC, 2020). It is also directly associated with poor interpersonal relationships, psychological development, decreased academic success, and higher financial costs to

society (Hall et al., 2016). Research on the impact of substance use suggests that the extension of adolescence and young adult years will result in longer term recreational substance use, which may increase potential negative outcomes associated with use throughout the life course (Degenhardt et al., 2016). Because of this, further research needs to explore how to effectively prevent adolescent substance use.

1.1. Conceptual frame

Bronfenbrenner's Social Ecological Theory and Bioecological Model and Bandura's Social Cognitive Theory support the notion of exploring health behavior, particularly for adolescents, across four key domains of developmental contexts; family, school, peer, and leisure time (Ashiabi & O'Neal, 2015; Caldwell, 2011; Ettekal & Mahoney, 2017; Kristjansson

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et al., 2020; Rimer et al., 2005). These theories will allow us to conceptualize the forces that influence adolescent health behavior and will uncover the role land communities play in preventing or promoting substance use. By defining and understanding the contributions of these domains, we can also consider the value that should be invested in these areas.

1.2. Domains of developmental context

Research on adolescent development suggests that there are key domains of developmental context associated with adolescent substance use. These include; (1) the family, (2) schools, (3) peers, and (4) leisure time. Each of these four domains contribute unique risk and protective factors (Caldwell & Darling, 1999; Su & Supple, 2014; Su & Supple, 2016; T. Thorlindsson & Vilhjalmsson, 1991) and serve as possible intervention points. Researchers recommend continued investigation into these contexts in an effort to (a) discover which are most influential when preventing substance use, and (b) discern how to best use resources and make a positive impact in health promotion efforts for adolescents (Sigfusdottir et al., 2008, p. 8).

1.2.1. Family domain

Generally, research indicates that time spent with parents in adolescence is a good thing for adolescent development. The strength of the relationship (Goldstein et al., 2005), feelings of parental support (Su & Supple, 2014), closeness and openness in relationships (McCann et al., 2016), and perceptions of parental control are associated with substance use (Kapetanovic et al., 2019), and can protect against use (Kristjansson et al., 2016; Thorlindsson et al., 2007). Time spent with parents can also prevent an adolescent from the opportunity to engage with risky situations like using substances (Sigfusdottir et al., 2008). When relationships are overly controlled, permissive (Goldstein et al., 2005), or secretive (McCann et al., 2016) this can lead to rebellion and increased risk for engaging with substances.

1.2.2. School domain

Adolescents typically spend a large majority of their time at school. Most students in the United States attend school a minimum of 4–5 h a day beginning in Kindergarten, and 5–7 h from 1st to 12th grade, for approximately 180 days a year (National Center for Education Statistics, 2008). Many students spend additional time at school, playing sports, participating in extracurricular activities, attending events, and more. Studies also suggest that increased connection to school is associated with a decreased likelihood of engaging with substances (Su & Supple, 2016), and that there is a corresponding association between general school acceptance or disapproval of substance use and student body population use (Kristjansson, Sigfusdottir, & Allegrante, 2013; Kumar, et al, 2002; Su & Supple, 2016).

1.2.3. Peer domain

The peer group is a heavily influential domain of adolescent development (Caldwell & Darling, 1999; Su & Supple, 2014). Due to growing independence and to the increase in the amount of time spent with peers and away from parents, studies suggest that one of the strongest predictors of substance use is peer acceptance of use, perceived peer use, and reported peer use (Kristjansson et al., 2008; Su & Supple, 2014). When members of a peer group engage with substances, other members of the peer group are more likely to use substances as well (Su & Supple, 2014). This highlights the importance of where and how adolescents spend their time, especially when unsupervised by adults (Caldwell & Darling, 1999).

1.2.4. Leisure domain

Adolescents spend approximately 40–50% of their waking hours outside of school, in "leisure" hours (Bartko & Eccles, 2003; Sharp et al., 2015). Leisure can be described as any activity that is intrinsically

motivated, done in ones' free time, and for play, enjoyment, pleasure, or exploration (Caldwell, 2011; Sharp et al., 2015). This large portion of an adolescent's life can contribute either positively or negatively to development depending on how leisure time is spent (Ashiabi & O'Neal, 2015; Hansen et al., 2003). The literature suggests that adolescent use can be associated with certain aspects of leisure, including some of the most often-studied aspects: the type of leisure, its duration or frequency, and with who leisure time is spent with (Bartko & Eccles, 2003; Caldwell & Witt, 2011; Darling, 2005; Eccles & Barber, 1999; Mahoney & Stattin, 2000). Two types of leisure that are commonly studied include structured and unstructured (Mahoney & Stattin, 2000; Sharp et al, 2015). Structured is generally defined as having a curriculum, supervised by adults, and having a desired outcome or goal (Caldwell & Witt, 2011). Unstructured leisure is generally defined as activities that are unsupervised by an adult, have minimal supervision, or lack goals of developing skills (Caldwell & Witt, 2011). Literature suggests that both of these types of leisure can be beneficial to development (Caldwell & Witt, 2011). Oftentimes, research regarding structure type suggests that structured leisure is associated with protective factors that may protect against substance use (Caldwell & Witt, 2011; Thorlindsson et al., 2007; Mahoney & Stattin, 2000). This is attributed to the opportunities for goal setting, relationship building, and exposure to positive role models that are found in structured leisure (Anderson et al., 2007; Caldwell, 2011; Caldwell & Witt, 2011; Gottfredson et al., 2007; Mahoney & Stattin, 2000). Conversely adolescents who do not participate or who participate very little in structured activities are more likely to report higher engagement with some substances (Thorlindsson et al., 2007). It is important to note that in some cases, structured leisure (such as participation in sports) has been associated with risk factors like substance use, or other deliquent behaviors (Eccles & Barber, 1999). However, the literature is inconclusive on associations of sports and substance use or deliquency, and more research is needed to understand this (Jugl et al., 2021; Spruit et al., 2016).

Compared to unstructured leisure, structured leisure is associated with more prosocial behaviors, academic success, and a lower likelihood of substance use (Caldwell, 2011; Sigfusdottir et al., 2020). The protective factors associated with structured leisure suggest that it can serve as a buffer against high-risk situations, including substance use (Badura et al., 2018; Kristjansson et al., 2020) When provided positive role models, access, and opportunity to participate in structured leisure time afterschool, adolescents are less likely to engage in risky behaviors (Sigfusdottir et al., 2020). Though there is a rich literature on leisure and the role it can play in adolescent development, less is known about structured leisure time being used specifically as a tool in preventing adolescent substance use (Kristjansson et al., 2020; Sigfusdottir et al., 2009). Understanding the breadth of the potential positive benefits of leisure time may help to identify future opportunities to reduce the occurrence and burden of adolescent substance use, thus improving the quality of life for all community members.

1.3. The current study

The current study explored the relations between risk and protective factors within the core domains of family, peers, school and leisure time, and substance use outcomes. The analysis sought to satisfy the need for increased exploration of the potential negative substance use outcomes associated with youth not accessing structured leisure activities (Sharp et al., 2015, p. 74). Additionally, we sought to understand if health promotion approaches implemented in other cultures are effective in the United States (Bartko & Eccles, 2003; Sigfusdottir et al., 2008). To date, there have been no extensive reviews or studies to the authors knowledge in the United States that directly compare structured leisure and the broader contexts of (1) the family, (2) schools, (3) peers, and (4) other leisure time domains with their potential impacts on adolescent use of alcohol and cannabis. Our research question is "What are the unique patterns of association across family, school, peer, and leisure

time factors on adolescent substance use of (A) alcohol and (B) cannabis?".

2. Methods

This study used cross-sectional data from Planet Youth: Youth and Welfare's, "A Survey of Life and Living Conditions of Youth Survey" created by the Icelandic Center for Social Research and Analysis (ICRSA). The study occurred in six communities within three counties of a Northeastern state that represent a range of environment types including urban and moderately rural to very rural. Data were collected in the fall of 2019. The surveys were distributed to 13 total middle and high schools (7 middle schools, 3 high schools, and 3 combined middle and high schools) with school sample size varying from 34 − 826 students per school. 3,407 responses were completed with an 82% average response rate. All present and consented students completed the electronic questionnaire at school on the same day under teacher supervision, received instruction to complete the entire questionnaire, and were advised to ask their teacher if they had questions. Questionnaires were completed with passive parental consent upon approval from school administrations and IRB. Passive Consent procedures included multiple communications to parents about the survey including an informational meeting, several emails, a flier home, and a text to parents who had opted into a school text service. All of these messages described the content of the survey, the confidentiality of the survey, benefits and risks of their child's participation and made opting-out easy and quick to accomplish (by way of a quick signature on the paper flier sent home, or by calling/emailing the principal of the school or the principal investigator of the study).

2.1. Sample

The sample included 3,407 middle and high school students in 7th–12th grades (Mean age = 14.8, SD 1.7, distribution by grade: 7th–16%, 8th–15%, 9th −21%, 10th–19%, 11th–17%, 12th–13%). The sample was 47.6% female, 48.3% male, and 4.1% identified their gender as other/non-conforming. The sample identified as majority white with 87.3% identifying as white. Additional descriptive information can be found in Table 1.

2.2. Measures

All included survey measures have been validated internationally and used in prior studies (Kristjansson et al., 2008; Sigfusdottir et al., 2009).

2.2.1. Dependent variables
Both dependent variables were measured on a 5-point Likert scale, thus we treated them as continuous outcome variables, which is consistent with data analysis procedures across many disciplines, (for theoretical and statistical rationale see Norman, 2010).

2.2.1.1. Alcohol use. was assessed with the following question: How

often have you become drunk? (In your lifetime), 1 = "Never", 2 = "1–2 times", 3 = "3–5 times", 4 = "6–9 times", 5 = "10–19 times", 6 = "20–39 times" and 7 = "40 times or more".

2.2.1.2. Cannabis use. was assessed with the following question: How often if ever have you used any of the following drugs? Cannabis (hashish or marijuana) 1 = "Never", 2 = "1–2 times", 3 = "3–5 times", 4 = "6–9 times", 5 = "10–19 times", 6 = "20–39 times", 7 = "40 times or more".

2.2.2. Control variables
The following variables are known to be associated with substance use in adolescents, so we included them as control variables in our model. Our control variables are **Gender** (assessed with 0 = "Male" and 1 = "Female"), **Grade** (assessed using grade level in school), **Race** (dummy coded as with 0 = "Not-White" and 1 = "White"), and **Socio-economic status (SES)** (using relative wealth assessment question, "How well off financially do you think your family is in comparison to other families in your country?" response options ranged from 1 = Much worse to 7 = Much Better).

2.2.3. Independent variables
All independent variables were measured as protective factors, thus we ensured that all variables' high values indicated positive protection. For example, more structured leisure time was indicated by higher values on those items. Please see descriptions of each variable for specific details.

2.2.3.1. Leisure domain. was assessed by measuring structured leisure time, we used reported frequency of weekly participation in supervised out-of-school activities. This question included five prompts including "Arts, drama, or musical instrument (band classes)", "Sports or sports teams (swim team, soccer, football, dance)", "Religious organizations", "Volunteering in the community", "Go to a community center like the Boys and Girls Club or another such After-School program." The nine possible response options included from "Not available in my community (1)," "Less than once per week (2)," and "7 times per week (9)". Scores from these items were summed to create a score for "structured leisure.".

2.2.3.2. Peer domain. was measured with two variables; one indicating perceptions of peer substance use norms and one indicating negative peer behaviors. **Peer substance use norms** were measured with three items including "It is important for me to drink alcohol in order to gain respect from my peers." Response options ranged from 1 "Increases respect a lot" to 5 "Decreases respect a lot." Values across the three items were averaged to create a mean score. Cronbach's alpha for the peer substance use norm scale was 0.92. The **negative peer behavior scale** included seven items created to indicate students' perceptions of their peers' behaviors. Sample items included "How many of your friends do you believe…smoke cigarettes?", and "…drink alcoholic beverages?" Responses were on a five-point Likert scale ranging from "All," to "None" high values mean less negative peer behavior in order to keep independent variables in consistent direction. Cronbach's alpha was 0.92 for the scale in this sample.

2.2.3.3. Family domain. was measured with two variables; time spent with family and parental monitoring. **Time spent with parents** was measured using two items which were averaged together: "I spend time with my parents/caregiver outside school hours on weekdays," and " I spend time with my parents/caregiver during the weekends." Response options ranged from 1 "Almost Never" to 5 "Almost Always." **Parental Monitoring** was measured with a mean score consisting of 9 items which had a Cronbach's alpha of 0.86. Sample items included, "My parents/caregivers know where I am in the evenings" and "My parents/

Table 1
Descriptive Information for Key Study Variables.

Variable	N	M	SD	Range
Structured Leisure	2948	13.00	6.32	5–45
Peer Behavior	2833	1.97	0.89	1–5
Peer Norms	2755	2.28	1.10	1–5
School Adults	3106	3.77	0.89	1–5
School Enjoyment	3028	3.40	1.22	1–5
Parent Time	3241	3.96	1.02	1–5
Parent Monitoring	3211	3.28	0.56	1–4
Cannabis Use	2668	1.90	1.90	1–7
Alcohol Use	2680	1.66	1.50	1–7

caregivers know my friends." Responses were on a four- point Likert scale ranging from "Applies very poorly to me", to "Applies very well to me.".

2.2.3.4. School domain. was assessed using two subscales from the School as a Protective Factor scale created by the authors of the survey (Mann et al., n.d.). For **Protective Adults,** a mean score was created using 15 items. Cronbach's alpha was 0.95. Items included, "The adults at my school care about me" with response options ranging from 1 "Strongly Disagree" to 5 "Strongly Agree." These feelings are associated with protective factors against substance use. **School Enjoyment** was measured using 5 items with a Cronbach's alpha of 0.95. Items included, "My school is a place where learning is fun." Response options ranged from 1 "Strongly Disagree" to 5 "Strongly Agree.".

2.3. Data analysis plan

Two separate multiple regression models were analyzed to assess associations across family, peer, school, and leisure domains with alcohol or cannabis use. Control variables were entered on the first step, and then key study variables were entered on the second step. Models were assessed using fit statistics and parameters were assessed using significance levels of 0.05.

3. Results

3.1. Associations of key study variables with alcohol use

The results of the regression indicated that the independent variables accounted for 31% of the variance in alcohol use (R^2 = 0.31, F (11, 2409) = 99.58, p <.001). Of the control variables in the model, higher grades (β = 0.16), girls (β = 0.04), and those identifying as white (β = 0.04) were significantly associated with higher lifetime alcohol use. Of the key study variables representing potential protective factors, peer behavior (β = −0.39), peer norms (β = −0.11), parental monitoring (β = −0.06), and structured leisure time (β = −0.04) were all significantly protective of lifetime alcohol use. School domains were not significantly associated with use. Table 2 summarizes analysis results for the multiple regression model for adolescent alcohol use.

3.2. Associations of key study variables with cannabis

Results indicated that the independent variables included in this model explained 28% of the variance in adolescent cannabis use (R^2 = 0.28, F (11, 2405) = 85.96, p <.001). For the control variables in the model, higher grades (β = 0.13), and those identifying as white (β=0.04) were significantly associated with higher lifetime cannabis use. For the key study variables representing potential protective factors, peer behavior (β = -0.36), peer norms (β = -0.10), parental time (β = -0.09), parental monitoring (β = -0.04), and structured leisure time (β = -0.05) were all significantly protective of lifetime cannabis use. Notably, the school domains, gender, and SES were not significant. Table 3 summarizes analysis results for the multiple regression model for adolescent cannabis use.

4. Discussion

This study had three key findings related both to the selected variables and alcohol and cannabis use. First, the peer domain seemed to be most associated with alcohol and cannabis use, with both peer use norms and negative peer behavior significantly protecting against use in our model. The literature indicates that peer substance use norms and perceived peer use is one of the strongest predictors of adolescent substance use. For example, a study focusing on the associations between cigarette smoking and social factors found that peer use and perceptions of peer use had the strongest positive correlation with adolescent use (Kristjansson et al, 2008). It is generally recognized that associating with peers who use substances increases the risk factors for individual adolescent use (Su and Supple, 2014). This study supports the idea that peers can be highy infuential regarding substance use behaviors, and spending time with peers who do not use substances can be protective against cannabis and alcohol use.

Second, variables in the family domain seemed to be the next most important protective factor for adolescent substance use. Parental monitoring significantly contributed negatively to alcohol use, and both parental monitoring and time spent with a parent contributed significantly negatively to cannabis use. Multiple studies we referred to suggested that parental control, parental support, and lack of secrecy are often associated with reduced adolescent alcohol and drug use (Kristjansson et.al, 2013, McCann et al., 2016, Bjarnason et al., 2005).

Third, participation in structured leisure activities demonstrated protection for alcohol and cannabis use. Structured leisure is often associated with positive youth development and research suggests those who participate in structured leisure may have a lesser risk of participating in risky behavior compared to those who do not (Caldwell, 2011). Our study supports the notion that participation in structured leisure does offer benefits against adolescent substance use. It also supports studies that suggest that multifaceted health promotion strategies that incorporate structured leisure can decrease adolescent use rates (Kristjansson et al., 2020; Sigfusdottir, et al, 2009). While not all unsupervised

Table 2
Associations Across Domains with Adolescent Lifetime Alcohol Use.

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	**SE**	**Beta**	**t**	**Sig.**
(Constant)	−0.20	0.33		−0.54	0.59
Gender	0.15	0.06	0.04	2.33	0.02
Grade	0.18	0.02	0.16	8.55	0.00
Race	0.31	0.13	0.04	2.45	0.01
SES	−0.03	0.03	−0.02	−1.24	0.22
Leisure Structured	−0.01	0.01	−0.04	−2.09	0.04
Peer Use Norms	−0.19	0.03	−0.11	5.75	0.00
Peer Behavior	−0.85	0.04	−0.39	19.79	0.00
School Adults	−0.03	0.05	−0.01	−0.55	0.58
School Enjoyment	−0.01	0.04	−0.00	−0.12	0.91
Parent Time	−0.07	0.04	−0.03	−1.77	0.08
Parental Monitoring	−0.20	0.06	−0.06	−3.03	0.00

Dependent variable = Adolescent alcohol use; R^2 =.31

Table 3
Associations Across Domains with Adolescent Cannabis Use.

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	**SE**	**Beta**	**t**	**Sig.**
(Constant)	0.43	0.34		−1.60	0.21
Gender	−0.04	0.07	−0.01	−0.62	0.54
Grade	0.15	0.02	0.13	6.77	0.00
Race (white)	0.29	0.13	0.04	2.19	0.03
SES	0.02	0.03	0.02	0.89	0.37
Leisure Structured	−0.02	0.01	−0.05	−3.03	0.00
Peer Use Norms	−0.18	0.04	−0.10	5.12	0.00
Peer Behavior	−0.78	0.04	−0.36	17.78	0.00
School Adults	−0.06	0.05	−0.03	−1.2	0.23
School Enjoyment	0.01	0.04	0.00	0.14	0.89
Parent Time	−0.17	0.04	−0.09	−4.54	0.00
Parental Monitoring	−0.15	0.07	−0.04	−2.27	0.02

Dependent variable = Adolescent cannabis use; R^2 =.28

activities present high levels of risk in existing research (Caldwell, 2011; Sharp et al., 2015), existing findings often suggest that risk factors for adolescents engaging in unsupervised activity are higher than for adolescents who do not spend as much time unsupervised.

Finally, it was surprising that no factors in the school domain were significant in our model. Other studies suggest that an increased connection to school is associated with decreased risk for substance use (Su & Supple, 2016). However, in the same study, they found that school culture that tolerated substance use within the school was a stronger indicator than influence of parents or peer group (Su & Supple, 2016). It is possible there are other factors within the school domain, not measured in our study, that do provide protection for adolescent substance use.

4.1. Implications for public health practice

Taken individually our study suggests small but significant associations between three of the four domains and substance use. This suggests that health promotion practice and policy should continue to design, implement, and research multi-domain approaches to prevention. Based on this study, and existing research, we believe there may be promise in further exploring integrating structured leisure activities into health promoting prevention strategies for adolescents (Sigfusdottir et al., 2020). We know that structured leisure provides unique opportunities for positive youth development. It is also possible that structured activities can provide a synergistic effect with the potentially important peer domain. Structured activities, done well, may create social norms around substance use behaviors for peers, thus promoting more positive peer behavior and less peer use (Beier, 2018). The study provides support for the notion that multiple risk and protective factors are at play simultaneously which reinforces the importance of comprehensive prevention approaches that are not limited to single risk or protective factors and outcomes. Additionally, this study adds to a growing body of literature on employing the Icelandic Prevention Model (Kristjansson et al., 2020; Sigfusdottir et al., 2020) that calls for multi- risk and protective factors, and multi-outcome approaches to prevention.

Public health professionals should consider approaching youth substance use prevention with a focus on increasing community capacity to provide a variety of structured leisure activities supervised by professionally trained staff, and places for peers to interact in pro-social environments. Prevention efforts have allowed us to see that, when designing interventions, increasing access to structured leisure successfully reduces rates of adolescent substance use (Sigfusdottir et al., 2020). Our study, in combination with existing research, provides some support for the notion that multiple developmental domains should be recognized as influential when considering interventions and when designing environments to be protective against adolescent substance use.

4.2. Limitations and recommendations for Future research

While there are limitations in this study, including the cross-sectional design, the challenge of measuring multi-faceted developmental domains, and the lack of ethnically/racially diverse youth represented in the sample due to geography, our study still provides support for the importance of a multi-faceted approach to substance use prevention for youth. Future research should consist of longitudinal studies on communities to further understand the impact of multi-domain approaches to meeting the needs of adolescents, particularly when it comes to substance use. Future studies could measure potential synergistic effects of positive impacts of multiple domains in combination. It will also be useful to incorporate measures of program quality and features offered in each community to identify their impact on youth health outcomes. Future studies should also explore the multiple factors that may influence why a youth may participate very little or not at all in structured activities, the different types of domains in which youth use their time

(subtypes of unstructured and structured activities), and any associations with increased risk of engaging with substances (Sharp et al., 2015; Thorlindsson et al., 2007). Recommendations also include looking at the type of unstructured activity, or other domains of time use to better understand any substance use associations, and risk and protective factors of specific activities. Additionally with the current evolving legalization of non-medical adult use cannabis use across the United States, conducting longitudinal studies in states likely to legalize cannabis would help assess the impact of legalization policies on adolescent cannabis use.

5. Conclusion

Taken together, our study provides additional support for the multi-domain approach to meeting the needs of young people, with three of our four measured domains showing significant associations with substance use. Professionals who seek to make change in adolescent substance use should continue to measure, and work to provide support, across all four of these domains. Countless programs, campaigns, and initiatives have worked to decrease adolescent substance use. Even so, the rates of use and occurrences of adverse health outcomes remain a global public health issue. Providing increased investment in health promotion methods that are evidence-based and beneficial to multiple aspects of adolescent development, such as structured leisure time and pro-social peer environments, may help us decrease substance use rates and help adolescents thrive.

CRediT authorship contribution statement

Tara Woodward: Conceptualization, Writing – original draft, Writing – review & editing. **Megan L. Smith:** Methodology, Data curation, Writing – review & editing. **Michael J. Mann:** Conceptualization, Writing – review & editing. **Alfgeir Kristjansson:** Writing – review & editing. **Holly Morehouse:** Writing – review & editing.

Declaration of Competing Interest

Data availability

Data will be made available on request.

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