Protective Factors and Adolescent Behavior Paradigm: New Analysis of the YRBS

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INTRODUCTION:

After two decades of collecting responses on protective factors on the Alaska Youth Risk Behavior Survey (YRBS), we need to move beyond hypothesis testing of the highly predictive, beneficial influence of protective factors on reducing the prevalence of problem behaviors to the establishment of models that generalize this interaction. This paper explores two propositions:

1. the presence of individual protective factors is associated with a decrease in the prevalence (i.e., an amelioration) of a problem behavior, and, as a corollary,
2. the presence of increasing numbers of protective factors is associated with increasing amelioration of problem behaviors.

These propositions are intended as unifying concepts and are not intended to explain the how or why the interactions work. Given the "dosage" response as the number of protective factors increases, we are emphasizing wholistic interventions that improve the prevalence of all protective factors rather than focusing on the benefits of individual factors. To further elucidate the influence of protective factors, we have also evaluated the interactions when a number of selected traumatic or formative problem behaviors (hereafter, referred to as risk experiences) is stratified. Indices of both protective factors and risk experiences were created for analysis. We are aware of limitations of the models of interaction between protective factors and some problem behaviors that preclude full generalization of a beneficial result.

In 2003, protective factor-based questions (unrelated to demography and problem behaviors) were added to the Alaska Youth Risk Behavior Survey (YRBS). The term 'factor' is intentional as the behavioral concept within each protective factor actively contributes to (i.e., influences) an improved outcome. Protective factor questions relate to a student's current perceptions and behaviors. The protective factor (PF) questions were based on national research[1] demonstrating significant influence on multiple adolescent problem behaviors (PB). The concept of protective factors was summarized as *student connectedness*. The number of PF questions has varied in interim YRBS surveys, with seven questions asked in the 2019 version. Indices were created to evaluate the impact of multiple protective factors and risk experiences, respectively.

Components of Alaska YRBS "Protective Factor Index"
- Feel like they matter to people in their community (agreed/strongly agreed)
- Able to control their emotions when they need to (agreed/strongly agreed)
- Able to remain quite or extremely calm when things go wrong (agreed/strongly agreed)
- Have 1+ parent who talks with them about school, about every day (agreed/strongly agreed)
- Have teachers who really care and give them encouragement (agreed/strongly agreed)
- Feel comfortable seeking help from 3+ adults, besides their parents
- Take part in organized after school/weekend activities 2+ times weekly

Further analysis examined eight risk experiences (RE) presently measured by Alaska's YRBS and recognized through national research.[1] The RE questions were selected from the problem behaviors measured by YRBS based on their enduring impact upon current behavioral choices.[1]

Components of Alaska YRBS "Risk Experiences Index"
- Ever been physically forced to have sexual intercourse when they did not want to
- Experienced sexual violence during the past year
- Experienced dating violence among those dating during the past year
- Had sexual intercourse for the first time before age 13 years
- Had their first drink of alcohol before age 13
- Tried marijuana for the first time before age 13 years
- Smoked a whole cigarette for the first time under 13
- Ever slept away from their parents or guardian's home because they were kicked out, ran away, were abandoned, or felt unsafe in their home during the past 12 months

We have chosen the standard epidemiological measure of odds ratios to evaluate the interaction of protective factors and problem behaviors that forms proposition 1. Given our intent to demonstrate the additive influence of protective factors, we have employed Bonferroni Correction for evaluating significance in the multiple comparisons. Linear regression was used for evaluating the incremental influences of protective factors upon problem behaviors that constitute proposition 2.

METHODOLOGY:

Participants in the Alaska Youth Risk Behavior Surveillance System (YRBSS) constitute the population being evaluated. Past analysis has primarily been conducted on the Alaska statewide traditional high school stratified random sample of students. In 2019, the traditional sample was comprised of 1,875 respondents representing all 29,364 traditional high school students. This report places primary emphasis on the prevalence estimates derived from the 2019 statewide traditional high school sample.

A foundation of the YRBSS is maintaining anonymity and data quality through requiring a minimum of 100 respondents in the denominator when presenting results. If limited to the statewide traditional high school sample size, detailed analyses related to propositions 1 and 2 would have to be suppressed. To overcome this limitation, we used the larger sample of all respondents to the 2019 YRBSS (referred to as the "local sample"). This sample is comprised of 7,456 total respondents to the 2019 Alaska YRBS high school survey. The local sample is nearly four times the size of the statewide traditional sample and is not limited to traditional high schools in order to maximize variability. The local sample encompasses the statistically sampled surveys of statewide traditional, alternative, and correctional high schools, as well as the ad hoc surveys conducted to provide information for participating school districts (see YRBS dashboards for additional sampling details at http://dhss.alaska.gov/dph/Chronic/Pages/yrbs/yrbs19.aspx.) To avoid competing with statewide prevalence estimates derived from the traditional sample, the non-randomly selected, local sample is not weighted, and the prevalence estimates produced from that sample are only representative of the 7,456 respondents.

The variables of analyses are the seven protective factors and the 67 problem behaviors chosen for their importance in 13 topic areas of health-related behaviors that contribute to the leading causes of death and disability among youth and adults.[2] Although results will be described for all 67 problem behaviors, only the five questions encompassing mental health topic area will appear in tables for brevity. Full results are available upon request from the authors.

A descriptive table illustrates the influence of presence and absence of each of the seven protective factors upon the prevalence of five problem behaviors within the Mental Health topic area using the statewide traditional high school sample (**Table 1**). [For ease of reading, all tables and figures appear at the end of the text**.**] Uniformly, the absence of a protective factor has a higher prevalence of a problem behavior than when that protective factor is present. This pattern holds across each of the protective factors although the magnitude of the differences in prevalence between presence and absence of a protective factor varies by both problem behavior and protective factor. The presence of protective factors is generally directional in terms of ameliorating the prevalence of problem behaviors but is not a constant amount. This is illustrated by plotting two of the mental health indicators, feeling sad and hopeless and seriously considering suicide. (**Figures 1 and 2**).

Indices were created for both protective factors and risk experiences by counting the occurrence of components for each respondent. The absence (or where a response was missing) of each protective factor received a score of 0 (zero) and its presence received a score of 1. Equal weight was given to each factor. The scores for each factor were summed for the seven protective factors (and similarly for the eight risk experiences), resulting in a range of responses from 0 through 7 (0 through 8 for risk experiences). It was necessary to rescale the response categories for the protective factor index into six levels (0 and 1, 2, 3, 4, 5, 6 and 7) due to the limited number (i.e., less than 100 respondents within the

Statewide Traditional High School sample) of responses at the extremes. The protective factor index was further collapsed into three categories of 0-2, 3-4, and 5-7. **Figures 3 and 4** illustrate the declining prevalence of problem behaviors as the numbers of protective factors present increases.

Similarly, the response categories for the risk experiences index were limited to 0, 1, 2, and 3+. The risk experiences index response categories were further collapsed when presenting results on the interaction between protective and risk variables restricted to the statewide traditional high school sample. **Figures 5 and 6** demonstrate the influence of an increasing number of risk experiences upon the greater magnitude of problem behaviors.

The factors comprising each index are multidimensional, can represent different domains, and are correlated to some degree (i.e., not independent). For example, the seven protective factors display weak to moderate correlations (i.e., from 0.035 to 0.416 for the local sample and 0.014 to 0.368 for the statewide traditional sample) among each other. The factors are not causative but are highly correlated with reducing, in the case of protective factors, and increasing, in the case of risk experiences, the occurrence of problem behaviors. This influence is magnified when the number of factors present increases.

ANALYSIS:

Initial analyses are based upon the odds ratio. In epidemiology, the odds ratio is used most often to quantify the relationship between exposures and outcomes. In our study, outcomes have been replaced by problem behaviors and the exposure is presence of protective factors. To protect from Type 1 errors (rejecting the null hypothesis when true) when conducting multiple comparisons, the Bonferroni Correction was employed for evaluating the significance of the odds ratios for the seven protective factors using the p-value of 0.007 (i.e., p<=0.05/7). The same process was used to evaluate the significance of the odds ratios for the eight risk experiences.

Tables 2A and 2B show the results for the mental health behaviors for the statewide traditional high school and local high school samples. Twenty-five of the 35 (71.4%) comparisons were significant for the statewide traditional high school sample, while the four times larger local high school sample, 34 of the 35 (97.1%) comparisons were significant. Besides imparting which cells are significant by the green backgrounds, the tables provide the potential reduction in the prevalence of the problem behaviors if the protective factor were universally present. The reduction varies by the protective factor and type of problem behavior. Within the mental health category, respondents who agree that they matter to people within their community were most influential, followed by those having 3+ adults in whom to confide, and then those with engaged parents. The prevalence under each protective factor can be subtracted from the overall prevalence as a measure its potential influence. Note that individually no single protective factor can eliminate the existence of a problem behavior, but reductions as high as 25% to 50% are possible.

Table 3A summarizes the distribution of the benefits of the protective factors by problem behavior topic area for the local sample. The local sample consists of 7,456 high school students from districts across Alaska in which pair-wise interactions of protective factors and risk experiences with a large selection of problem behaviors can be explored. The size of the unweighted ad hoc local sample allowed us to explore the interaction of the presence/absence of factors with problem behaviors at the individual level. The larger local sample size helps to normalize the distribution of interactions.

Evaluating the impact of protective factors started with identifying significant (i.e., p<=0.007) odds ratio analysis pair-wise of the seven protective factors by 67 problem behaviors for 469 pair-wise comparisons. This table also illustrates the four topic areas where less than 75% of the protective factors were significant: sexual behavior (57.1%), alcohol use (65.3%), body weight (14.3%), and nutrition and physical activity (71.4%). In the other 9 topic areas, 75% to 100% of protective factors were significant. Only organized activities (with 58.2%) among the protective factors benefited less than 75% of the problem behaviors.

There were 365 significant positive influences from protective factors in the local sample (**Table 3A**), representing over three-quarters (77.8%) of the 469 pair-wise comparisons. A comparable summary of the statewide traditional high school sample would reveal that 137 of the 469 (almost one-third (29.2%) pair-wise comparisons displayed significant reductions (**Table 3B**). The two samples illustrate the high rate of beneficial influences of the individual protective factors in reducing the prevalence of problem behaviors. This finding stresses the validity of proposition 1: the presence of protective factors is associated with a reduction in the prevalence of problem behaviors. The optimal value of emphasizing protective factors is illustrated when evaluating them in combination.

Linear regression was used to evaluate the incremental nature of the protective factor index. When viewing the components of the Mental Health topic area all five behaviors had significant ($p < 0.05$) Wald F demonstrating that a linear regression exists for both the statewide traditional high school (**Table 4A**) and local high school (**Table 4B**) samples.

This pattern of influence of the protective factor index upon reductions in prevalence of problem behaviors exists across all problem behavior areas [See **Tables B1-B5** for results for the protective factors index and 67 problem behaviors for the local sample.] Only seven of 67 (10.4%) problem behaviors in the statewide sample did not have linear regressions significant at the $p < 0.05$ level suggesting the cumulative beneficial influence of additional protective factors. Eighteen of the 67 (26.8%) problem behaviors show a consistent trend in the limited statewide traditional sample. Forty-one of 67 (61.2%) problem behaviors in the local sample of 7,456 surveys show a consistently decreasing trend in prevalence with increases in the protective factor index. Only 3 of 67 (4.4%) problem behaviors in the local sample did not have significant linear regressions. These findings support proposition 2: an increase in the number of protective factors present reduces the prevalence of problem behaviors.

RESULTS:

- Analysis of protective factors and risk experiences with 67 problem behaviors in the Alaska YRBSS confirmed national research across multiple problem behavior areas, particularly in the domain of mental health.

- Individual protective factors were associated with lower prevalence across multiple problem behavior areas, measured by the YRBS.

- There appears to be an incremental influence demonstrating continued reduction in problem behavior prevalence as the number of protective factors increases. While the presence of a single protective factor demonstrated reduced prevalence, it is the combination of multiple protective factors that is associated with lowest prevalence of problem behaviors.

- The more risk experiences students reported, the higher the prevalence of problem behaviors measured by YRBS. Even one risk experience demonstrated increased prevalence across most problem behaviors.

- The presence of five or more protective factors is associated with the reduced presence of risk experiences in most cases. Protective factors appear to buffer the influence of risk experiences on current problem behaviors across student populations including urban and rural subpopulations.

CONCLUSIONS:

- Given the significant beneficial influence protective factors have <u>across</u> adolescent problem behaviors, focused pubic and behavioral health interventions should target increasing protective factors across the spectrum of individual, family, school, and community domains.

- Alaska would benefit from a unified, operationalized protective factor framework for program and service implementation, including standardized assessment and evaluation measures.

- National best-practice research demonstrates the inter-relatedness of protective factors. A focus on one protective factor alone, will not be effective; emphasis needs to be placed on building several protective factors.

- Each protective factor measured by Alaska's YRBS is actionable at the individual, school, program or community level. Several of the implementation best practices are described within Healthy Alaskans 2030 strategic plan (https://www.healthyalaskans.org).

- *More Matters: Strategies to Increase Protective Factors among Alaska Adolescents* (https://safealaskans.org/our-work/ideas-in-action/shared/) is a compilation of the recommendations, best practices and personal actions to increase adolescent protective factors from recent Alaska and national resources.[3]

REFERENCES:

1. Judd, B. (2020) *Shared Risk and Protective Factors Impacting Adolescent Behavior and Positive Development.* (http://safealaskans.org/wp-content/uploads/2020/08/Shared-Factors-for-Adolescents-June-2020.pdf). An updated summary of the research.

2. Centers for Disease Control and Prevention. Youth Risk Behavior Surveillance System (YRBSS). (https://www.cdc.gov/healthyyouth/data/yrbs/index.htm) Division of Adolescent and School Health. Accessed December 23, 2020.

3. Judd, B. (2021) *More Matters: Strategies to Increase Protective Factors among Alaska Adolescents.* (https://safealaskans.org/our-work/ideas-in-action/shared/)

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Table 1. Influence of Presence/Absence of Protective Factors upon Prevalence of Mental Health Indicators
Alaska Statewide Traditional High School YRBS Survey 2019**

Mental Health Indicators
Percentage of students with problem behavior:

PROTECTIVE FACTOR	Presence or Absence of Protective Factor	Strongly agree or agree that feel alone'.	Felt so sad or hopeless for two weeks in a row to stop usual activities'.	Seriously considered suicide during past year'.	Made a suicide plan during the past year'.	Attempted suicide one or more times during the past year'.
Combined	Overall	27.4%	38.1%	25.3%	21.6%	19.7%
Feel they matter to people	Present	14.0%	24.6%	25.3%	13.1%	17.8%
Feel they matter to people	Absent	39.4%	51.0%	35.4%	29.8%	22.0%
Able to control emotions	Present	21.2%	31.9%	19.7%	18.5%	15.7%
Able to control emotions	Absent	39.1%	51.7%	37.0%	28.4%	28.3%
Able to remain calm	Present	21.8%	32.1%	19.6%	18.3%	17.8%
Able to remain calm	Absent	35.3%	48.5%	34.8%	26.6%	22.8%
Parent discusses school	Present	20.0%	30.4%	19.8%	16.1%	16.8%
Parent discusses school	Absent	31.9%	42.8%	28.9%	25.2%	22.0%
Agree teachers really care	Present	22.2%	32.8%	19.9%	17.3%	18.2%
Agree teachers really care	Absent	34.6%	46.2%	33.4%	28.0%	22.6%
Can seek help from 3+ adults	Present	13.7%	25.9%	16.2%	14.2%	17.6%
Can seek help from 3+ adults	Absent	40.2%	50.2%	34.1%	29.5%	22.5%
Participate in organized activities	Present	25.4%	35.3%	23.9%	20.0%	19.3%
Participate in organized activities	Absent	28.8%	41.1%	26.8%	23.1%	21.1%

Notes:
Data weighted by Finalwt variable.
* This table was produced by Charles J. Utermohle, PhD, (Thule@Alaska.net),
who is solely responsible for the analysis, interpretation, and conclusions. The opinions expressed herein
 do not reflect those of the Alaska Department of Health and Social Services, Division of Public Health,
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The Alaska YRBS is describe http://dhss.alaska.gov/dph/Chronic/Pages/yrbs/default.aspx

Table 2 A and B. Potential Reduction in Behaviors witin Mental Health Indicators When Significant Odds Ratios Exist for Protective Factors*

A. Alaska 2019 Statewide Traditional High School YRBS Survey (N=1,875)**
Potential Reduction in Problem Behavior Prevalence by Protective Factor

MENTAL HEALTH INDICATORS	Overall Prevalence of Problem Behavior in Traditional HS Students (Weighted)	Strongly agree or agree that matter to people in community	Always or frequently able to control emotions	Able to remain quite or extremely calm when things go wrong	Parents discuss school about every day	Strongly agree or agree that teachers care	Have 3+ adults comfortable seeking help from	2+ Days in organized activities
Strongly agree or agree that feel alone'.	27.3%	13.4%	6.0%	5.2%	7.3%	5.1%	13.7%	Not Significant
Felt so sad or hopeless for two weeks in a row to stop usual activities'.	38.1%	13.8%	6.6%	6.4%	7.6%	5.4%	12.4%	Not Significant
Seriously considered suicide during past year'.	25.3%	10.8%	5.8%	5.9%	5.6%	5.5%	9.1%	Not Significant
Made a suicide plan during the past year'.	21.6%	8.7%	3.3%	3.2%	5.6%	4.3%	7.8%	Not Significant
Attempted suicide one or more times during the past year'.	19.7%	Not Significant	4.3%	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant

Notes:
The 2019 Alaska Statewide Traditional High School sample of 1,875 respondents represents 29,364 students.
Only relationships with significant tests of independence and odds ratios are presented. Blank cells indicate the lack of a significant relationship.
The Bonferroni correction of the significance (p<=0.05) of the risk behavior divided by the 7 protective factors is applied (i.e., evaluated at p<=0.007).
Green cells represent significantly reduced risk at p<=0.007.
Proportion of reduced risk is total prevalence of the problem behavior minus risk prevalence with protective factor present.
The problem behavior prevalence rate may differ for each combination of problem behavior with protective factor from the overall prevalence of the problem behavior.

B. Alaska 2019 Local High School YRBS Survey (N=7,456) (Unweighted)**
Potential Reduction in Problem Behavior Prevalence by Protective Factor

MENTAL HEALTH INDICATORS	Prevalence of Problem Behavior Among Local HS Respondents (Unweighted)	Strongly agree or agree that matter to people in community	Always or frequently able to control emotions	Able to remain quite or extremely calm when things go wrong	Parents discuss school about every day	Strongly agree or agree that teachers care	Have 3+ adults comfortable seeking help from	2+ Days in organized activities
Strongly agree or agree that feel alone'.	27.8%	12.4%	6.3%	6.1%	8.3%	5.0%	13.9%	4.6%
Felt so sad or hopeless for two weeks in a row to stop usual activities'.	41.8%	13.3%	7.0%	7.4%	6.7%	5.5%	11.2%	4.1%
Seriously considered suicide during past year'.	25.0%	10.3%	5.2%	4.9%	5.0%	4.7%	9.0%	2.7%
Made a suicide plan during the past year'.	21.8%	9.3%	4.5%	3.4%	5.0%	4.1%	7.3%	2.6%
Attempted suicide one or more times during the past year'.	17.8%	4.3%	3.6%	2.6%	3.7%	2.2%	4.0%	Not Significant

Notes:
The 2019 Alaska Local High School sample of 7,456 respondents is unweighted and represents 7,456 students.
Only relationships with significant tests of independence and odds ratios are presented.
The Bonferroni correction of the significance (p<=0.05) of the risk behavior divided by the 7 protective factors is applied (i.e., evaluated at p<=0.007).
Green cells represent significantly reduced risk at p<=0.007.
Proportion of reduced risk is total prevalence of the problem behavior minus risk prevalence with protective factor present.
The problem behavior prevalence rate may differ for each combination of problem behavior with protective factor from the overall prevalence of the problem behavior.
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The authors appreciate access to these data through a data use agreement to conduct our independent research.
The Alaska YRBS is described at: http://dhss.alaska.gov/dph/Chronic/Pages/yrbs/default.aspx

Table 3 A and B. Potential Reduction in Prevalence of Problem Behaviors When Significant Odds Ratios Exist for Protective Factors - Alaska YRBS Local High School Respondents, 2019*
Counts Indicate Significance of p<=0.007

A.   Alaska 2019 Local High School YRBS Survey (N=7,456) (Unweighted)**
Number of Protective Factors with Significant Reductions

PROBLEM BEHAVIOR TOPIC AREAS	Number of Problem Behaviors	Strongly agree or agree that matter to people in community	Always or frequently able to control emotions	Able to remain quite or extremely calm when things go wrong	Parents discuss school about every day	Strongly agree or agree that teachers care	Have 3+ adults comfortable seeking help from	2+ Days in organized activities	Number of Factors with Significantly Reduced Risk (p< 0.007)	Percentage of Factors with Significantly Reduced Risk (p< 0.007)
Academic Achievement	1	1	1	1	1	1	1	1	7	100.0%
Unintentional Injuries	4	2	4	4	4	4	4	2	24	85.7%
Violence	7	6	6	6	6	7	6	0	37	75.5%
Sexual Violence	4	4	4	4	4	4	4	1	25	89.3%
Sexual Behavior	7	4	5	3	5	2	5	4	28	57.1%
Mental Health	5	5	5	5	5	5	5	4	34	97.1%
Cigarette Smoking and Other Tobacco Products	9	6	9	8	9	7	9	8	56	88.9%
Alcohol Use	7	6	3	4	6	6	5	2	32	65.3%
Marijuana Use	6	6	5	5	6	6	6	6	40	95.2%
Other Drug Use	5	5	5	4	5	5	5	1	30	85.7%
Body Weight	3	2	0	0	0	0	0	1	3	14.3%
Nutrition and Physical Activity	7	7	5	5	4	3	4	7	35	71.4%
Sleep and Housing	2	2	2	2	2	2	2	2	14	100.0%

SUMMARY OF 67 PROBLEM BEHAVIORS	Blank	Matter to others	Control Emotions	Stay Calm	Parents discuss school	Teachers Care	Caring Adults	Organized Activities	Number of Factors with Significantly Reduced Risk (p< 0.007)	
Number with significant reductions		56	54	51	57	52	56	39	**365**	
% of Problem Behaviors (67) Reduced		83.6%	80.6%	76.1%	85.1%	77.6%	83.6%	58.2%	77.8%	

B.   Alaska 2019 Statewide Traditional High School YRBS Survey (N=1,875)**
Number of Protective Factors with Significant Reductions

SUMMARY OF 67 PROBLEM BEHAVIORS	Blank	Matter to others	Control Emotions	Stay Calm	Parents discuss school	Teachers Care	Caring Adults	Organized Activities	Number of Factors with Significantly Reduced Risk (p< 0.007)
Number with significant reductions		22	29	18	12	28	20	8	137
% of Problem Behaviors (67) Reduced		32.8%	43.3%	26.9%	17.9%	41.8%	29.9%	11.9%	29.2%

Notes:
A. The 2019 Alaska Local High School sample of 7,456 students is unweighted and represents just the 7,456 respondent. It includes students enrolled in traditional, alternative, and correctional high schools.
 It is being used as a large sample of indiviudal Alaska high school students and is not presented as a representative sample.
B. The 2019 Alaska Statewide Traditional High School sample of 1,875 respondents represents 29,364 students.
Only relationships with significant tests of independence and odds ratios are presented. Blank cells indicate the lack of a significant relationship. The Bonferroni correction of the significance (p<=0.05) of the risk behavior divided by the 7 protective factors is applied (i.e., evaluated at p<=0.007).
Counts represent significantly reduced risk at p<=0.007. There were 365 instances out of the 469 (i.e., 7 factors by 67 questions) cells for an overall positive impact of 77.8%.
Problem behavior indicators (column A) in *italics* indicate prevalence rate is based upon a subset of respondents.
Variable names of problem behaviors and protective factors are indicated in brackets.
* This table was produced by Charles J. Utermohle, PhD, (Thule@Alaska.net), who is solely responsible for the analysis, interpretation, and conclusions.
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Table 4 A and B. Prevalence of Mental Health Indicators by Protective Factors Index (6)*

A. Alaska 2019 Statewide Traditional High School YRBS Survey (N=1,875)**

MENTAL HEALTH INDICATORS	Prevalence of Problem Behavior Among Statewide Traditional HS Respondents (Weighted)	Prevalence of Problem Behavior by Number of Protective Factors Present						Wald F Sig. Linear Regression
		0 1	2	3	4	5	6 7	
Strongly agree or agree that feel alone'.	27.3%	56.5%	40.3%	33.3%	20.3%	15.0%	6.5%	0.000
Felt so sad or hopeless for two weeks in a row to stop usual activities'.	38.1%	57.9%	55.3%	44.4%	32.3%	24.0%	15.7%	0.000
Seriously considered suicide during past year'.	25.3%	43.6%	38.4%	27.5%	22.0%	14.7%	7.3%	0.000
Made a suicide plan during the past year'.	21.6%	35.0%	31.3%	25.9%	16.7%	15.1%	7.5%	0.000
Attempted suicide one or more times during the past year'.	19.7%	28.1%	20.2%	24.5%	16.9%	14.1%	14.7%	0.002

B. Alaska 2019 Local High School YRBS Survey (N=7,456)**

MENTAL HEALTH INDICATORS	Prevalence of Problem Behavior Among Local HS Respondents (Unweighted)	Prevalence of Problem Behavior by Number of Protective Factors Present						Wald F Sig. Linear Regression
		0 1	2	3	4	5	6 7	
Strongly agree or agree that feel alone'.	27.8%	54.2%	47.4%	32.6%	22.4%	14.3%	6.0%	0.000
Felt so sad or hopeless for two weeks in a row to stop usual activities'.	41.8%	62.2%	56.7%	50.4%	37.7%	29.5%	18.3%	0.000
Seriously considered suicide during past year'.	25.0%	42.3%	36.3%	29.1%	21.9%	17.0%	7.1%	0.000
Made a suicide plan during the past year'.	21.8%	36.4%	32.3%	25.8%	18.7%	14.9%	6.2%	0.000
Attempted suicide one or more times during the past year'.	17.8%	27.5%	22.9%	21.0%	15.0%	13.3%	8.7%	0.000

Notes:

The 2019 Alaska Statewide Traditional High School sample of 1,875 respondents represents 29,364 students.

The 2019 Alaska Local High School sample of 7,456 respondents represents 7,456 students.

Index: Absent or missing = 0, present = 1 for each of the seven protective factors.

Prevelance in RED indicates deviaton from descending trends as the number of protective factors increases. This only occurred for attempted suicide for the statewide traditional high school sample.

If the significance level of the Wald statistic is small (less than 0.05) then the regression coefficient is useful to the model.

Only, 7 of 67 (10.4%) problem behaviors in the statewide sample did not have linear regressions significant at the p<0.05 suggesting the cumulative influence of additional protective factors.

Eighteen of the 67 (26.8%) problem behaviors show a consistent trend in this limited sample. Forty-one of 67 (61.2%) problem behaviors in the local sample of 7,456 surveys show a consistent decreasing trend in prevalence with increases in the protective factor index .

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Figure 1. Prevalence of Feeling Sad and Hopeless among Trad. HS students 2019*
Comparison with/without Protective Factors (PF)
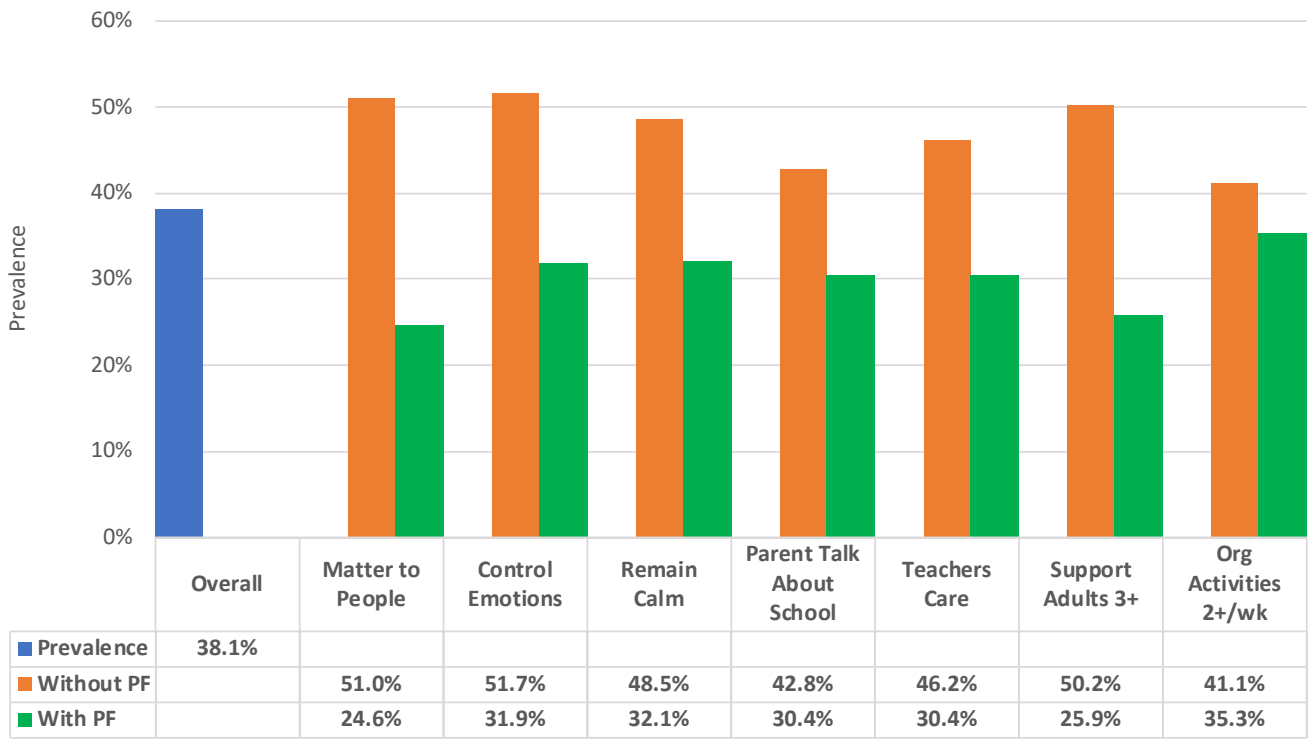
	Overall	Matter to People	Control Emotions	Remain Calm	Parent Talk About School	Teachers Care	Support Adults 3+	Org Activities 2+/wk
Prevalence	38.1%							
Without PF		51.0%	51.7%	48.5%	42.8%	46.2%	50.2%	41.1%
With PF		24.6%	31.9%	32.1%	30.4%	30.4%	25.9%	35.3%

* Percentage of students who in the past year, felt so sad or hopeless almost every day for two weeks or more in a row that they stopped doing some usual activities.

Alaska YRBS 2019 Statewide Traditional High School sample (N 1,875)

Figure 2. Prevalence of Seriously Considering Suicide among traditional HS students 2019*
Comparison with/without Protective Factors (PF)
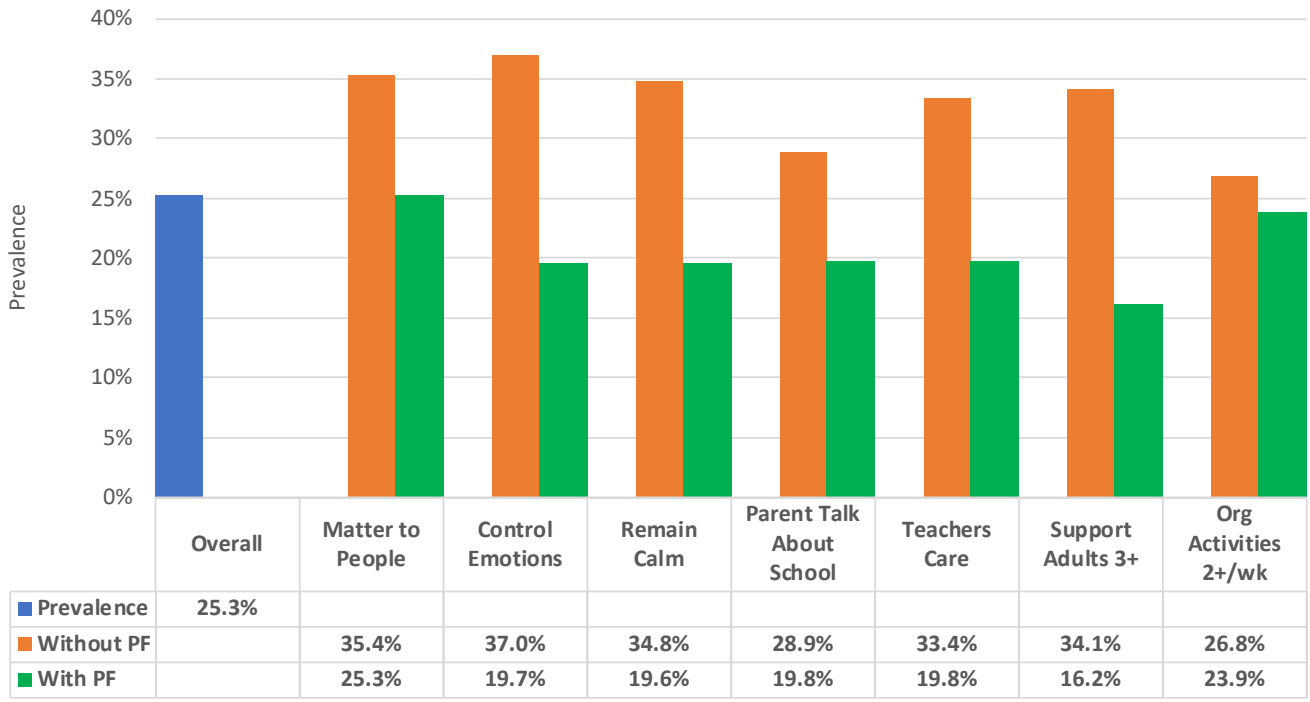
	Overall	Matter to People	Control Emotions	Remain Calm	Parent Talk About School	Teachers Care	Support Adults 3+	Org Activities 2+/wk
Prevalence	25.3%							
Without PF		35.4%	37.0%	34.8%	28.9%	33.4%	34.1%	26.8%
With PF		25.3%	19.7%	19.6%	19.8%	19.8%	16.2%	23.9%

* During the past 12 months, did you seriously consider attempting suicide?
Alaska YRBS 2019 Statewide Traditional High School sample (N 1,875)

Figure 3. Prevalence of Feeling Sad and Hopeless among Trad. HS students 2019*
Reporting 0-7 PROTECTIVE Factors (PF)

	Overall	0-2 PF	3-4 PF	5-7 PF
Prevalence	38.1%			
PF		56.5%	38.2%	19.6%

* Percentage of students who in the past year, felt so sad or hopeless almost every day for two weeks or more in a row that they stopped doing some usual activities.
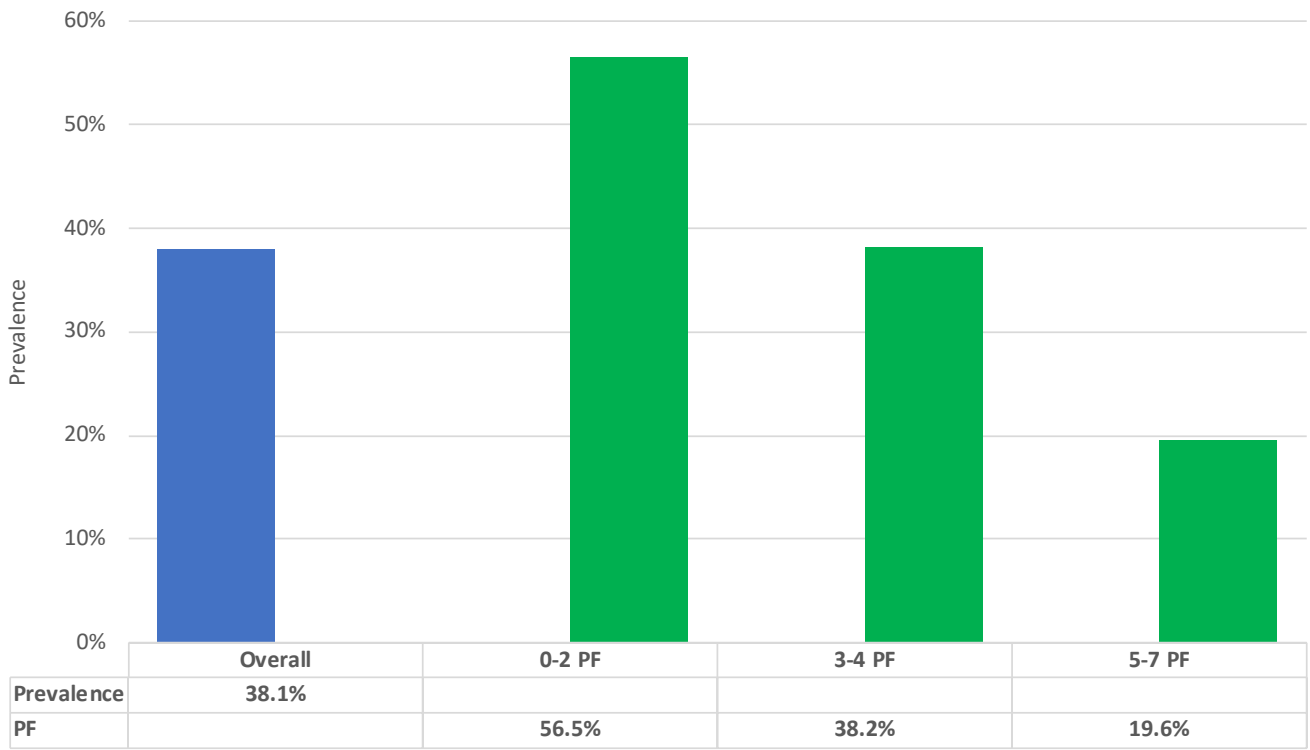Alaska YRBS 2019 Statewide Traditional High School sample (N 1,875)

Figure 4. Prevalence of Seriously Considering Suicide among traditional HS students 2019*
Reporting 0-7 PROTECTIVE Factors (PF)

	Overall	0-2 PF	3-4 PF	5-7 PF
Prevalence	25.3%			
PF		40.9%	24.7%	10.8%

During the past 12 months, did you seriously consider attempting suicide?
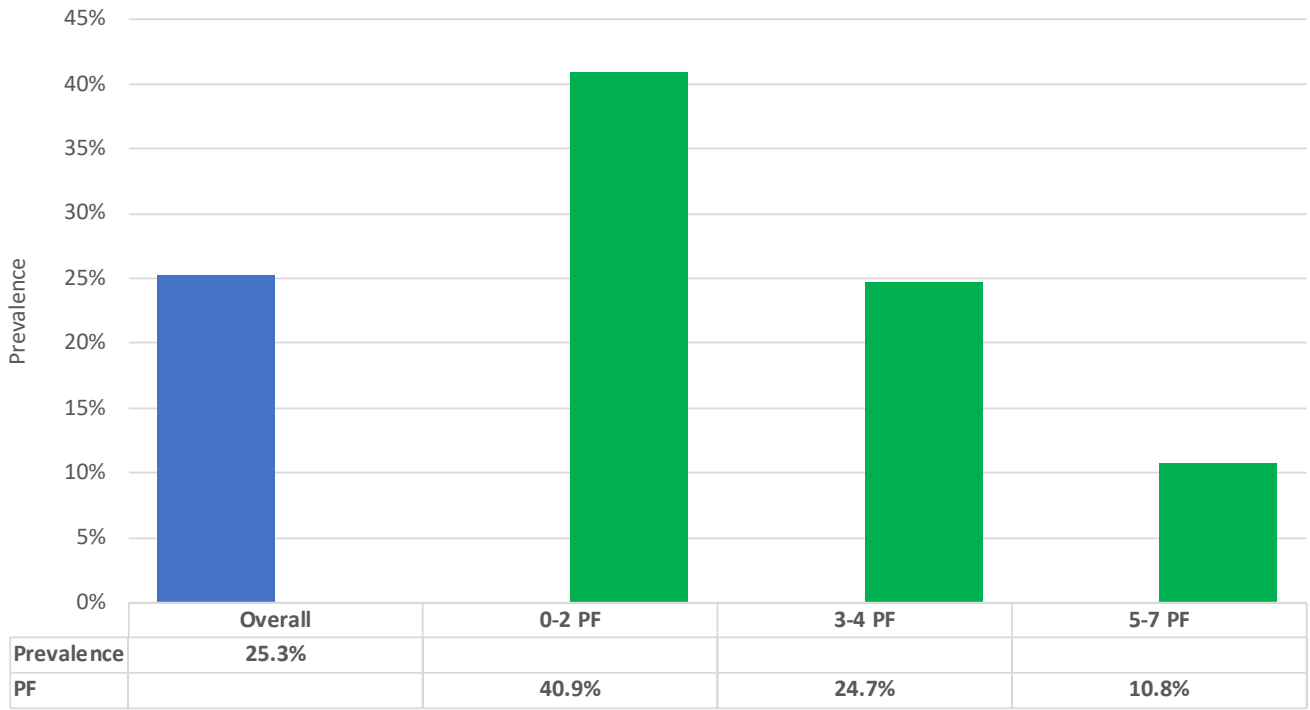*Alaska YRBS 2019 Statewide Traditional High School sample (N 1,875)*

Figure 5. Prevalence of Feeling Sad and Hopeless among traditional high school students 2019* Reporting 0-8 Risk Experiences (RE)

	Overall	0 RE	1 RE	2 RFE	3+ RE
lence	38.1%				
		26.6%	52.2%	50.1%	71.9%

*tage of students who in the past year, felt so sad or hopeless almost every day for two weeks or more in a row
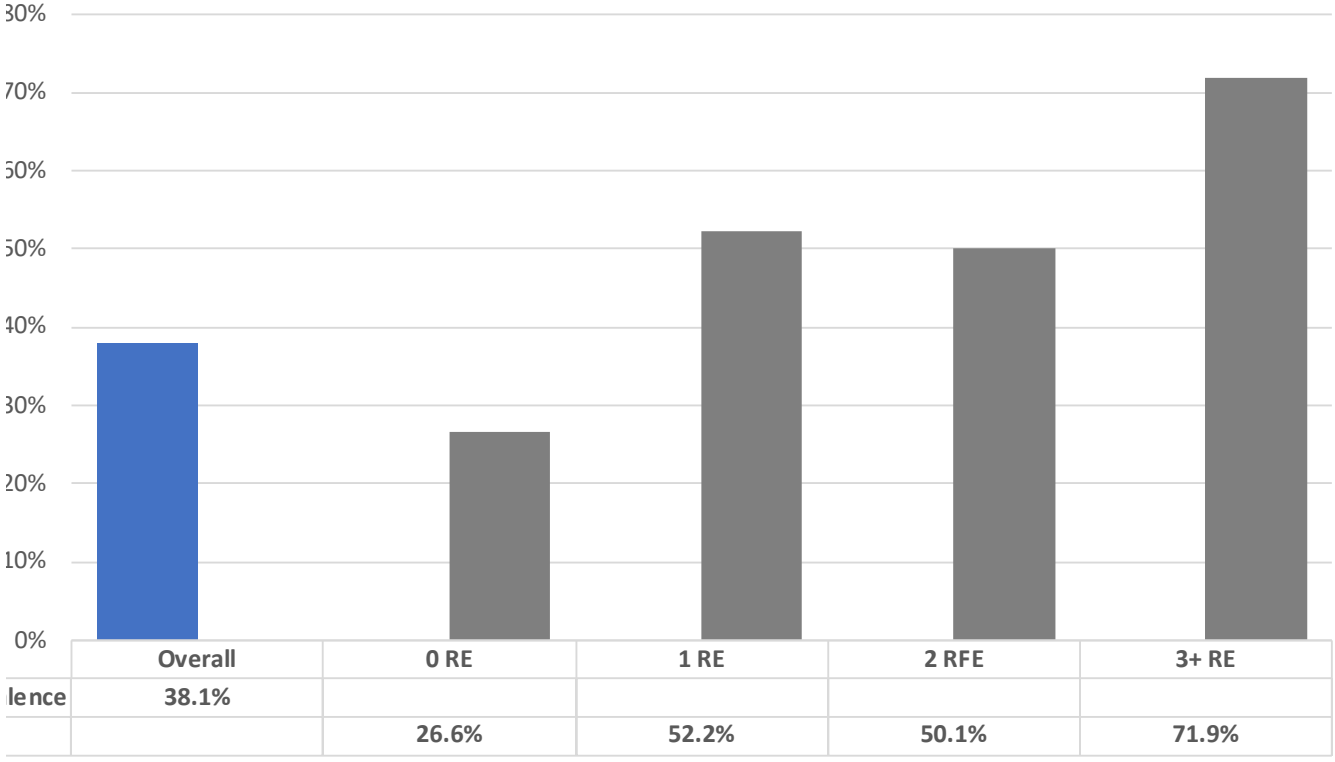stopped doing some usual activities.
BS 2019 Statewide Traditional High School sample (N 1,875)

Figure 6. Prevalence of Seriously Considering Suicide among traditional high school students 2019* Reporting 0-8 Risk Experiences (RE)

	Overall	0 RE	1 RE	2 RE	3+ RE
Prevalence	25.3%				
RF		15.8%	32.9%	39.6%	60.9%

During the past 12 months, did you seriously consider attempting suicide?
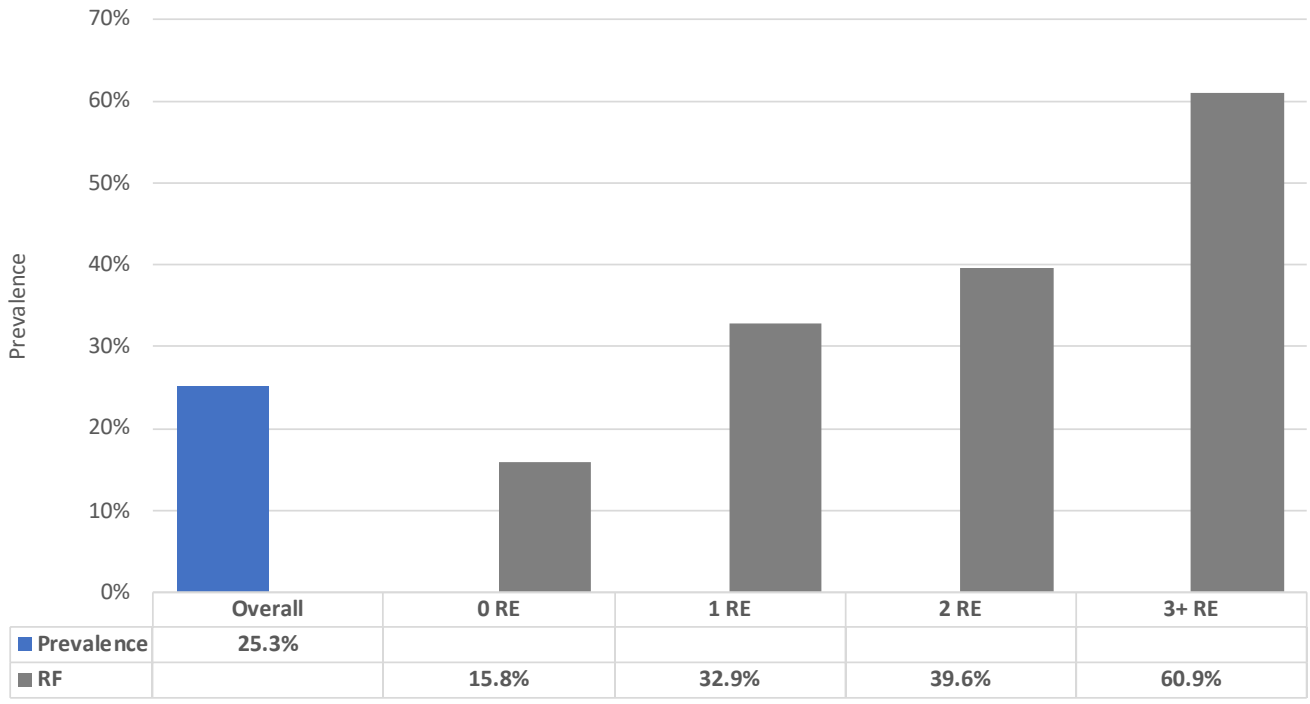*Alaska YRBS 2019 Statewide Traditional High School sample (N 1,875)*

Table A1. Potential Reduction in Prevalence of Miscellaneous Problem Behaviors When Significant (p<=0.007) Odds Ratios Exist for Protective Factors -
Alaska YRBS Local High School Respondents, 2019*
Alaska 2019 Local High School YRBS Survey (N=7,456) (Unweighted)**

Protective Factors with Significant Reductions Shown in Green Cells

TOPIC AREA	PROBLEM BEHAVIORS	Strongly agree or agree that matter to people in community	Always or frequently able to control emotions	Able to remain quite or extremely calm when things go wrong	Parents discuss school about every day	Strongly agree or agree that teachers care	Have 3+ adults comfortable seeking help from	2+ Days in organized activities
Academic Achievement	'Academic achievement - Ds/Fs'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Sleep and Housing	Got 8 less than hours of sleep on an average school night'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Sleep and Housing	Who ever slept away from their parents or guardians home because they were kicked out, ran away, were abandoned, or felt unsafe in their home during the past 12 months'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant

Notes:

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Only relationships with significant tests of independence and odds ratios are presented. Blank cells indicate the lack of a significant relationship.   The Bonferroni correction of the significance (p<=0.05)
of the risk behavior divided by the 7 protective factors is applied (i.e., evaluated at p<=0.007).
Green cells represent significantly reduced risk at p<=0.007. There were 365 instances out of the 469 (i.e., 7 factors by 67 questions) cells for an overall positive impact of 77.8%.
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Table A2. Potential Reduction in Prevalence of Injury and Violence Problem Behaviors When Significant (p<=0.007) Odds Ratios Exist for Protective Factors -
Alaska YRBS Local High School Respondents, 2019*
Alaska 2019 Local High School YRBS Survey (N=7,456) (Unweighted)**

Protective Factors with Significant Reductions Shown in Green Cells

TOPIC AREA	PROBLEM BEHAVIORS	Strongly agree or agree that matter to people in community	Always or frequently able to control emotions	Able to remain quite or extremely calm when things go wrong	Parents discuss school about every day	Strongly agree or agree that teachers care	Have 3+ adults comfortable seeking help from	2+ Days in organized activities
Unintentional Injuries	Rarely or never wore a helmet when riding a bicycle'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Unintentional Injuries	Rarely or never wore a seatbelt in a car driven by someone else'.	Not Significant	Significant	Significant	Significant	Significant	Significant	Significant
Unintentional Injuries	Rode with driver who had been drinking past 30 days'.	Significant	Significant	Significant	Significant	Significant	Significant	Not Significant
Unintentional Injuries	Drove one or more times when they had been drinking alcohol past 30 days'.	Not Significant	Significant	Significant	Significant	Significant	Significant	Not Significant
Violence	Did not go to school because felt unsafe'.	Significant	Significant	Significant	Significant	Significant	Significant	Not Significant
Violence	Were in a physical fight one or more times on school property during the past year'.	Significant	Significant	Significant	Significant	Significant	Significant	Not Significant
Nutrition and Physical Activity	Could get and be ready to fire a loaded gun'.	Not Significant	Not Significant	Not Significant	Not Significant	Significant	Not Significant	Not Significant
Violence	Bullied on school property in past year'.	Significant	Significant	Significant	Significant	Significant	Significant	Not Significant
Violence	Bullied off school property in past year'.	Significant	Significant	Significant	Significant	Significant	Significant	Not Significant
Violence	Electronically bullied during the past year'.	Significant	Significant	Significant	Significant	Significant	Significant	Not Significant
Violence	Bullied on or off school property, or electronically bullied during the past year'.	Significant	Significant	Significant	Significant	Significant	Significant	Not Significant
Sexual Violence	Ever been physically forced to have sexual intercourse when they did not want to'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Sexual Violence	Experienced sexual violence during the past year'.	Significant	Significant	Significant	Significant	Significant	Significant	Not Significant
Sexual Violence	*Experienced dating violence among those dating during the past year'.*	Significant	Significant	Significant	Significant	Significant	Significant	Not Significant
Sexual Violence	*Experienced sexual violence among those dating during the past year'.*	Significant	Significant	Significant	Significant	Significant	Significant	Not Significant

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Table A3. Potential Reduction in Prevalence of Sexual Behavior and Mental Health Problem Behaviors When Significant (p<=0.007) Odds Ratios Exist for Protective Factors -
Alaska YRBS Local High School Respondents, 2019*
Alaska 2019 Local High School YRBS Survey (N=7,456) (Unweighted)**

Protective Factors with Significant Reductions Shown in Green Cells

TOPIC AREA	PROBLEM BEHAVIORS	Strongly agree or agree that matter to people in community	Always or frequently able to control emotions	Able to remain quite or extremely calm when things go wrong	Parents discuss school about every day	Strongly agree or agree that teachers care	Have 3+ adults comfortable seeking help from	2+ Days in organized activities
Sexual Behavior	Ever had sexual intercourse'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Sexual Behavior	Had sexual intercourse for the first time before age 13 years'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Sexual Behavior	Had sexual intercourse with 4 or more individuals'.	Significant	Significant	Not Significant	Significant	Not Significant	Significant	Significant
Sexual Behavior	Did not use birth control pills, an IUD or implant, or a birth control shot, patch, or ring to prevent pregnancy among sexually active'.	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Sexual Behavior	Among students who had sexual intercourse during the past 3 months, did not use effective birth control during last sexual intercourse.'	Not Significant	Significant	Not Significant	Significant	Not Significant	Significant	Not Significant
Sexual Behavior	Drugs or alcohol before sexual intercourse among sexual active'.	Not Significant	Significant	Significant	Significant	Not Significant	Not Significant	Significant
Sexual Behavior	Among students who had sexual intercourse during the past 3 months, the percentage who did not use a condom during last sexual intercourse'.	Significant	Not Significant	Not Significant	Not Significant	Not Significant	Significant	Not Significant
Mental Health	Strongly agree or agree that feel alone'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Mental Health	Felt so sad or hopeless for two weeks in a row to stop usual activities'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Mental Health	Seriously considered suicide during past year'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Mental Health	Made a suicide plan during the past year'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Mental Health	Attempted suicide one or more times during the past year'.	Significant	Significant	Significant	Significant	Significant	Significant	Not Significant

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Table A4. Potential Reduction in Prevalence of Substance Use and Misuse Problem Behaviors When Significant (p<=0.007) Odds Ratios Exist for Protective Factors -
Alaska YRBS Local High School Respondents, 2019*
Alaska 2019 Local High School YRBS Survey (N=7,456) (Unweighted)**

Protective Factors with Significant Reductions Shown in Green Cells

TOPIC AREA	PROBLEM BEHAVIORS	Strongly agree or agree that matter to people in community	Always or frequently able to control emotions	Able to remain quite or extremely calm when things go wrong	Parents discuss school about every day	Strongly agree or agree that teachers care	Have 3+ adults comfortable seeking help from	2+ Days in organized activities
Cigarette Smoking and Other Tobacco Products	Smoked a whole cigarettes for the first time before age 13 years'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Cigarette Smoking and Other Tobacco Products	Smoked cigarettes on at least one of the past 30 days'.	Significant	Significant	Significant	Significant	Not Significant	Significant	Significant
Cigarette Smoking and Other Tobacco Products	Used smokeless tobacco on at least one of the past 30 days'.	Not Significant	Significant	Significant	Significant	Significant	Significant	Not Significant
Cigarette Smoking and Other Tobacco Products	Think smoking one or more packs of cigarettes per day has no risk of harm'.	*Not Significant*	Significant	Significant	Significant	Not Significant	Significant	Significant
Cigarette Smoking and Other Tobacco Products	Parents consider it a little bit wrong or not wrong at all for them to smoke cigarettes'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Cigarette Smoking and Other Tobacco Products	Think their friends feel it would be a little bit wrong or not wrong at all for them to smoke cigarettes'.	Significant	Significant	Not Significant	Significant	Significant	Significant	Significant
Cigarette Smoking and Other Tobacco Products	Ever used electronic vapor products (e-cigarettes, e-cigars, e-pipes, vape pipes, vaping pens, e-hookahs, and hookah pens such as blue, NJOY, or Starbuzz).'	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Cigarette Smoking and Other Tobacco Products	Used electronic vaping products (e-cigarettes, e-cigars, e-pipes, vape papes, vaping pens, e-hookahs, and hookah pens such as blue, NJOY, or Starbuzz) on at least one of the past 30 days (current vaping use)	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Cigarette Smoking and Other Tobacco Products	Think using electronic vapor products every day has slight risk or no risk of harm.'	Not Significant	Significant	Significant	Significant	Significant	Significant	Significant
Alcohol Use	Had at least one drink of alcohol during their life'.	Significant	Not Significant	Not Significant	Significant	Significant	Significant	Not Significant
Alcohol Use	Had their first drink of alcohol before age 13'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Alcohol Use	Had at least one drink of alcohol in the past 30 days'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Alcohol Use	Binge drinking (2017) on at least one of the past 30 days'.	Significant	Not Significant	Significant	Significant	Significant	Significant	Not Significant
Alcohol Use	Parents consider it a little bit wrong or not wrong at all for them to have one or two alcohol drinks per day'.	Significant	Significant	Significant	Significant	Significant	Not Significant	Not Significant
Alcohol Use	Think their friends feel it would be a little bit wrong or not wrong at all for them to have one or two of an alcoholic beverage nearly every day'.	Significant	Not Significant	Not Significant	Significant	Significant	Significant	Not Significant
Alcohol Use	*Among students who drank alcohol during the past 30 days, those who usually got the alcohol they drank by having someone give it to them'.*	*Not Significant*	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Marijuana Use	Used marijuana ever'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Marijuana Use	Tried marijuana for the first time before age 13 years'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Marijuana Use	Used marijuana one or more times during past 30 days'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Marijuana Use	Used marijuana three or more times during past 30 days'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Marijuana Use	Parents who consider it a little bit wrong or not wrong at all for them to smoke marijuana'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Marijuana Use	Think their friends feel it would be a little bit wrong or not wrong at all for them to use marijuana'.	Significant	Not Significant	Not Significant	Significant	Significant	Significant	Significant
Other Drug Use	Used prescription pain medication one or more times during their life'.	Significant	Significant	Significant	Significant	Significant	Significant	Not Significant
Other Drug Use	Used prescription pain medication one or more times during the past 30 days'.	Significant	Significant	Significant	Significant	Significant	Significant	Not Significant
Other Drug Use	Used benzodiazepine one or more times during their life'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Other Drug Use	Used heroin one or more times during their life'.	Significant	Significant	Significant	Significant	Significant	Significant	Not Significant
Other Drug Use	Used heroin one or more times during the past 30 days'.	Significant	Significant	Not Significant	Significant	Significant	Significant	Not Significant

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Table A5. Potential Reduction in Prevalence of Substance Use and Misuse Problem Behaviors When Significant (p<=0.007) Odds Ratios Exist for Protective Factors -
Alaska YRBS Local High School Respondents, 2019*
Alaska 2019 Local High School YRBS Survey (N=7,456) (Unweighted)**

Protective Factors with Significant Reductions Shown in Green Cells

TOPIC AREA	PROBLEM BEHAVIORS	Strongly agree or agree that matter to people in community	Always or frequently able to control emotions	Able to remain quite or extremely calm when things go wrong	Parents discuss school about every day	Strongly agree or agree that teachers care	Have 3+ adults comfortable seeking help from	2+ Days in organized activities
Body Weight	Were overweight'.	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Body Weight	Were obese'.	Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Body Weight	Were overweight or obese'.	Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Significant
Nutrition and Physical Activity	Drank a soda 1+ times per day during the past 7 days'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Nutrition and Physical Activity	Drank soda or another sugar-sweetened drink (including sports drinks and energy drinks) one or more times per day during the past 7 days'.	Significant	Significant	Significant	Significant	Significant	Significant	Significant
Nutrition and Physical Activity	Watch 3+ hours of TV on average school day'.	Significant	Significant	Significant	Not Significant	Significant	Not Significant	Significant
Nutrition and Physical Activity	3+ hours of computer screen time not for school work on average school day'.	Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Significant
Nutrition and Physical Activity	Watched TV, played videos, or used the computer for reasons other than school work for 3+ hours per day on an average school day'.	Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Significant
Nutrition and Physical Activity	Were not physically active for at least 60 minutes on 5 of the past 7 days'.	Significant	Significant	Significant	Significant	Not Significant	Significant	Significant
Nutrition and Physical Activity	Were not physically active for at least 60 minutes on each of the past 7 days'.	Significant	Significant	Significant	Significant	Not Significant	Significant	Significant

Notes:

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Table B1. Prevalence of Miscellaneous Problem Behaviors by Protective Factors Index (6)*
Alaska 2019 Statewide Local High School YRBS Survey (N=7,456)**
Version 20210120

Topic Areas	PROBLEM BEHAVIORS	Prevalence of Problem Behavior Among Local HS Respondents (Unweighted)	Prevalence of Problem Behavior by Number of Protective Factors Present							Wald F Sig.
			0 1	2	3	4	5	6 7		Linear Regression
Academic Achievement	[V109R2] 'Academic achievement - Ds/Fs'.	6.9%	14.1%	11.0%	8.0%	5.9%	3.8%	1.6%		0.000
Sleep	[V237R] ' Got 8 less than hours of sleep on an average school night'.	74.0%	79.7%	83.5%	77.5%	72.7%	70.6%	62.3%		0.000
Housing	[V255R] ' Who ever slept away from their parents or guardians home because they were kicked out, ran away, were abandoned, or felt unsafe in their home during the past 12 months'.	12.4%	23.8%	22.1%	12.4%	9.4%	7.8%	4.0%		0.000

Notes:
The 2019 Alaska Local High School sample of 7,456 respondents represents 7,456 students.
Problem behavior indicators (column A) in italics indicate prevalence rate is based upon a subset of respondents.
Variable names of problem behaviors and protective factors are indicated in brackets.
Index: Absent or missing = 0, present = 1 for each of the seven protective factors.
Prevelance in RED indicates deviaton from descending trends as the number of protective factors increases.
If the significance level of the Wald statistic is small (less than 0.05) then the regression coefficient is useful to the model. Wald F statistics in red are not significant and the null hypothesis of 0 cannot be rejected.   Only, 3 of 67 (4.4%) problem behaviors did not have linear regressions significant at the p<0.05 suggesting the cumulative influence of additional protective factors. Although the regression on access to loaded firearms is signficant, it is an increasing trend. Forty-one of 67 (61.2%) problem behaviors show a consistent decreasing trend in prevalence with increases in the protective factor index.
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Table B2. Prevalence of Injury and Violence Problem Behaviors by Protective Factors Index (6)*
Alaska 2019 Statewide Local High School YRBS Survey (N=7,456)**
Version 20210120

			Prevalence of Problem Behavior by Number of Protective Factors Present							Wald F Sig.
Topic Areas	PROBLEM BEHAVIORS	Prevalence of Problem Behavior Among Local HS Respondents (Unweighted)	0 1	2	3	4	5	6 7	Linear Regression
Unintentional Injuries	[QN008R2] 'Rarely or never wore a helmet when riding a bicycle'.	66.3%	78.3%	78.5%	71.1%	63.6%	61.6%	49.9%	0.000
Unintentional Injuries	[V009R2] 'Rarely or never wore a seatbelt in a car driven by someone else'.	8.1%	15.0%	11.8%	8.5%	5.7%	5.5%	3.6%	0.000
Unintentional Injuries	[V010R] 'Rode with driver who had been drinking past 30 days'.	15.1%	21.0%	20.3%	17.3%	14.4%	10.5%	8.1%	0.000
Unintentional Injuries	[QN250R] 'Drove one or more times when they had been drinking alcohol past 30 days'.	4.3%	9.0%	7.1%	5.1%	2.8%	2.5%	1.8%	0.000
Violence	[V015R] 'Did not go to school because felt unsafe'.	10.9%	17.9%	15.8%	12.0%	9.0%	7.5%	4.9%	0.000
Violence	[V020R] 'Were in a physical fight one or more times on school property during the past year'.	11.3%	16.5%	15.4%	13.0%	10.1%	8.8%	5.1%	0.000
Violence	[V259R] 'Could get and be ready to fire a loaded gun'.	55.4%	53.2%	52.6%	55.7%	54.2%	55.6%	60.6%	0.001
Violence	[V121R] 'Bullied on school property in past year'.	23.8%	34.9%	29.8%	25.8%	22.6%	18.0%	14.1%	0.000
Violence	[V251R] 'Bullied off school property in past year'.	16.9%	25.7%	22.4%	18.8%	15.7%	11.9%	8.8%	0.000
Violence	[QNEBULR] 'Electronically bullied during the past year'.	19.4%	28.4%	24.4%	22.1%	16.6%	16.7%	10.4%	0.000
Violence	[QNBUL2R] 'Bullied on or off school property, or electronically bullied during the past year'.	33.5%	46.6%	41.5%	37.1%	31.9%	26.2%	20.3%	0.000
Sexual Violence	[V022R] 'Ever been physically forced to have sexual intercourse when they did not want to'.	10.7%	18.4%	15.2%	11.7%	9.0%	6.7%	4.8%	0.000
Sexual Violence	[V222R] 'Experienced sexual violence during the past year'.	14.2%	22.6%	19.6%	16.9%	11.6%	8.6%	7.9%	0.000
Sexual Violence	[QN191R] 'Experienced dating violence among those dating during the past year'.	9.1%	15.4%	13.0%	12.3%	5.4%	5.5%	3.5%	0.000
Sexual Violence	[QN192R] 'Experienced sexual violence among those dating during the past year'.	8.9%	13.8%	13.0%	11.4%	7.3%	4.8%	3.9%	0.000

Notes:
The 2019 Alaska Local High School sample of 7,456 respondents represents 7,456 students.
Problem behavior indicators (column A) in italics indicate prevalence rate is based upon a subset of respondents.
Variable names of problem behaviors and protective factors are indicated in brackets.
Index: Absent or missing = 0, present = 1 for each of the seven protective factors.
Prevalence in RED indicates deviation from descending trends as the number of protective factors increases.
If the significance level of the Wald statistic is small (less than 0.05) then the regression coefficient is useful to the model. Wald F statistics in red are not significant and the null hypothesis of 0 cannot be rejected.   Only, 3 of 67 (4.4%) problem behaviors did not have linear regressions significant at the p<0.05 suggesting the cumulative influence of additional protective factors. Although the regression on access to loaded firearms is significant, it is an increasing trend. Forty-one of 67 (61.2%) problem behaviors show a consistent decreasing trend in prevalence with increases in the protective factor index.
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Table B3. Prevalence of Sexual Behavior and Mental Health Problem Behaviors by Protective Factors Index (6)*
Alaska 2019 Statewide Local High School YRBS Survey (N=7,456)**
Version 20210120

| Topic Areas | PROBLEM BEHAVIORS | Prevalence of Problem Behavior Among Local HS Respondents (Unweighted) | Prevalence of Problem Behavior by Number of Protective Factors Present | | | | | | Wald F Sig. |
			0 1	2	3	4	5	6 7	Linear Regression
Sexual Behavior	[V058R] 'Ever had sexual intercourse'.	38.8%	47.4%	45.3%	43.0%	38.0%	33.8%	29.1%	0.000
Sexual Behavior	[V059R] 'Had sexual intercourse for the first time before age 13 years'.	4.7%	8.6%	7.8%	4.4%	4.1%	3.2%	2.1%	0.000
Sexual Behavior	[V060R] 'Had sexual intercourse with 4 or more individuals'.	10.7%	16.5%	13.0%	11.5%	9.5%	8.6%	6.9%	0.000
Sexual Behavior	[QNOTHHPR] 'Did not use birth control pills, an IUD or implant, or a birth control shot, patch, or ring to prevent pregnancy among sexually active'.	56.8%	58.1%	54.3%	55.9%	61.7%	58.5%	51.3%	0.574
Sexual Behavior	[V198R3] 'Among students who had sexual intercourse during the past 3 months, did not use effective birth control during last sexual intercourse.'	25.7%	32.0%	26.9%	26.5%	28.2%	22.9%	14.7%	0.000
Sexual Behavior	[QN062R] 'Drugs or alcohol before sexual intercourse among sexual active'.	20.9%	28.6%	27.2%	22.0%	15.9%	18.5%	11.4%	0.000
Sexual Behavior	[QN063R] 'Among students who had sexual intercourse during the past 3 months, the percentage who did not use a condom during last sexual intercourse'.	50.7%	56.4%	56.6%	51.8%	46.6%	49.6%	41.7%	0.000
Sad Feelings and Attempted Suicide	[V097R2] 'Strongly agree or agree that feel alone'.	27.8%	54.2%	47.4%	32.6%	22.4%	14.3%	6.0%	0.000
Sad Feelings and Attempted Suicide	[V023R] 'Felt so sad or hopeless for two weeks in a row to stop usual activities'.	41.8%	62.2%	56.7%	50.4%	37.7%	29.5%	18.3%	0.000
Sad Feelings and Attempted Suicide	[V024R] 'Seriously considered suicide during past year'.	25.0%	42.3%	36.3%	29.1%	21.9%	17.0%	7.1%	0.000
Sad Feelings and Attempted Suicide	[V025R] 'Made a suicide plan during the past year'.	21.8%	36.4%	32.3%	25.8%	18.7%	14.9%	6.2%	0.000
Sad Feelings and Attempted Suicide	[V026R] 'Attempted suicide one or more times during the past year'.	17.8%	27.5%	22.9%	21.0%	15.0%	13.3%	8.7%	0.000

Notes:
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Problem behavior indicators (column A) in italics indicate prevalence rate is based upon a subset of respondents.
Variable names of problem behaviors and protective factors are indicated in brackets.
Index: Absent or missing = 0, present = 1 for each of the seven protective factors.
Prevalence in RED indicates deviation from descending trends as the number of protective factors increases.
If the significance level of the Wald statistic is small (less than 0.05) then the regression coefficient is useful to the model. Wald F statistics in red are not significant and the null hypothesis of 0 cannot be rejected.   Only, 3 of 67 (4.4%) problem behaviors did not have linear regressions significant at the p<0.05 suggesting the cumulative influence of additional protective factors. Although the regression on access to loaded firearms is significant, it is an increasing trend. Forty-one of 67 (61.2%) problem behaviors show a consistent decreasing trend in prevalence with increases in the protective factor index.
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Table B4. Prevalence of Substance Use and Misuse Problem Behaviors by Protective Factors Index (6)*
Alaska 2019 Statewide Local High School YRBS Survey (N=7,456)**
Version 20210120

Topic Areas	PROBLEM BEHAVIORS	Prevalence of Problem Behavior Among Local HS Respondents (Unweighted)	Prevalence of Problem Behavior by Number of Protective Factors Present						Wald F Sig.
			0 1	2	3	4	5	6 7	Linear Regression
Cigarette Smoking and Other Tobacco Products	[V029R] 'Smoked a whole cigarettes for the first time before age 13 years'.	8.5%	15.5%	13.1%	9.5%	5.6%	5.8%	3.2%	0.000
Cigarette Smoking and Other Tobacco Products	[V030R] 'Smoked cigarettes on at least one of the past 30 days'.	8.6%	15.0%	13.0%	9.9%	6.1%	6.5%	2.8%	0.000
Cigarette Smoking and Other Tobacco Products	[QNAKSLTR] 'Used smokeless tobacco on at least one of the past 30 days'.	7.2%	11.7%	11.5%	8.6%	5.3%	4.6%	2.6%	0.000
Cigarette Smoking and Other Tobacco Products	[V122R1] 'Think smoking one or more packs of cigarettes per day has no risk of harm'.	8.8%	13.6%	15.6%	9.7%	7.0%	5.6%	3.9%	0.000
Cigarette Smoking and Other Tobacco Products	[V201R2] 'Parents consider it a little bit wrong or not wrong at all for them to smoke cigarettes'.	7.1%	12.6%	11.4%	8.2%	5.1%	5.7%	2.0%	0.000
Cigarette Smoking and Other Tobacco Products	[V239R2] 'Think their friends feel it would be a little bit wrong or not wrong at all for them to smoke cigarettes'.	26.3%	35.9%	32.0%	28.8%	24.2%	24.0%	16.8%	0.000
Cigarette Smoking and Other Tobacco Products	[V203R] 'Ever used electronic vapor products (e-cigarettes, e-cigars, e-pipes, vape pipes, vaping pens, e-hookahs, and hookah pens such as blue, NJOY, or Starbuzz).'	49.3%	58.8%	58.6%	54.1%	46.5%	44.8%	35.7%	0.000
Cigarette Smoking and Other Tobacco Products	[V204R] Used electronic vaping products (e-cigarettes, e-cigars, e-pipes, vape papes, vaping pens, e-hookahs, and hookah pens such as blue, NJOY, or Starbuzz) on at least one of the past 30 days (current vaping use)	28.3%	37.3%	34.9%	32.7%	26.0%	24.7%	16.5%	0.000
Cigarette Smoking and Other Tobacco Products	[V258R2] 'Think using electronic vapor products every day has slight risk or no risk of harm.'	45.6%	55.5%	57.0%	48.5%	44.6%	41.5%	31.6%	0.000
Alcohol Use	[V039R] 'Had at least one drink of alcohol during their life'.	60.7%	64.9%	66.2%	64.7%	58.9%	57.7%	53.5%	0.000
Alcohol Use	[V040R] 'Had their first drink of alcohol before age 13'.	17.9%	24.2%	24.4%	20.3%	16.0%	13.9%	10.9%	0.000
Alcohol Use	[V041R] 'Had at least one drink of alcohol in the past 30 days'.	23.6%	29.6%	28.8%	26.7%	20.9%	20.9%	17.2%	0.000
Alcohol Use	[V228R] 'Binge drinking (2017) on at least one of the past 30 days'.	14.0%	19.0%	17.4%	16.2%	12.0%	11.8%	9.0%	0.000
Alcohol Use	[QN261R2] 'Parents consider it a little bit wrong or not wrong at all for them to have one or two alcohol drinks per day'.	10.5%	14.7%	13.6%	13.2%	8.8%	8.2%	5.9%	0.000
Alcohol Use	[QN262R2] 'Think their friends feel it would be a little bit wrong or not wrong at all for them to have one or two of an alcoholic beverage nearly every day'.	29.4%	35.2%	33.3%	32.5%	27.9%	26.5%	23.3%	0.000
Alcohol Use	[QNGAVER] 'Among students who drank alcohol during the past 30 days, those who usually got the alcohol they drank by having someone give it to them'.	35.6%	34.6%	35.0%	33.3%	34.1%	40.0%	38.2%	0.182
Marijuana Use	[V045R] 'Used marijuana ever'.	41.4%	52.8%	51.1%	45.5%	39.7%	34.7%	28.4%	0.000
Marijuana Use	[V046R] 'Tried marijuana for the first time before age 13 years'.	12.0%	20.1%	18.9%	14.1%	9.4%	8.3%	4.2%	0.000
Marijuana Use	[V047R] 'Used marijuana one or more times during past 30 days'.	22.0%	30.6%	31.8%	27.0%	19.1%	16.0%	11.2%	0.000
Marijuana Use	[V047R3] 'Used marijuana three or more times during past 30 days'.	15.3%	22.4%	22.7%	19.0%	12.9%	10.9%	6.6%	0.000
Marijuana Use	[V242R2] 'Parents who consider it a little bit wrong or not wrong at all for them to smoke marijuana'.	20.2%	29.6%	25.4%	24.9%	17.3%	16.5%	11.2%	0.000
Marijuana Use	[V243R2] 'Think their friends feel it would be a little bit wrong or not wrong at all for them to use marijuana'.	50.4%	56.7%	54.5%	54.4%	48.8%	48.4%	42.3%	0.000
Other Drug Use	[V231R] 'Used prescription pain medication one or more times during their life'.	18.7%	28.0%	27.2%	19.6%	16.8%	14.2%	9.2%	0.000
Other Drug Use	[V232R] 'Used prescription pain medication one or more times during the past 30 days'.	8.0%	13.4%	13.0%	8.4%	6.1%	5.5%	3.2%	0.000
Other Drug Use	[V252R] 'Used benzodiazepine one or more times during their life'.	9.1%	15.7%	14.3%	10.7%	6.2%	5.9%	3.8%	0.000
Other Drug Use	[V052R] 'Used heroin one or more times during their life'.	2.9%	5.8%	5.7%	3.6%	2.0%	0.8%	0.5%	0.000
Other Drug Use	[V229R] 'Used heroin one or more times during the past 30 days'.	2.1%	4.8%	3.8%	2.7%	1.3%	0.5%	0.3%	0.000

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Variable names of problem behaviors and protective factors are indicated in brackets.
Index: Absent or missing = 0, present = 1 for each of the seven protective factors.
Prevelance in RED indicates deviaton from descending trends as the number of protective factors increases.
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Table B5. Prevalence of Nutrition and Physical Activity Problem Behaviors by Protective Factors Index (6)*
Alaska 2019 Statewide Local High School YRBS Survey (N=7,456)**
Version 20210120

Topic Areas	PROBLEM BEHAVIORS	Prevalence of Problem Behavior Among Local HS Respondents (Unweighted)	Prevalence of Problem Behavior by Number of Protective Factors Present						Wald F Sig.
			0 1	2	3	4	5	6 7	Linear Regression
Body Weight	[QNOWTR] 'Were overweight'.	16.5%	16.9%	17.1%	17.1%	16.9%	16.6%	14.7%	0.162
Body Weight	[QNOBESER] 'Were obese'.	14.9%	16.5%	18.8%	14.8%	14.1%	15.0%	11.5%	0.000
Body Weight	[QNOVROBR] 'Were overweight or obese'.	31.4%	33.4%	35.9%	31.9%	30.9%	31.6%	26.2%	0.000
Nutrition and Physical Activity	[QNSODA1R] 'Drank a soda 1+ times per day during the past 7 days'.	12.2%	16.9%	15.1%	14.9%	12.8%	8.9%	6.0%	0.000
Nutrition and Physical Activity	[QNSSBS1R] 'Drank soda or another sugar-sweetened drink (including sports drinks and energy drinks) one or more times per day during the past 7 days'.	47.5%	54.4%	52.2%	51.6%	49.0%	44.3%	35.9%	0.000
Nutrition and Physical Activity	[V081R] 'Watch 3+ hours of TV on average school day'.	19.2%	24.8%	21.4%	22.2%	18.5%	17.6%	12.2%	0.000
Nutrition and Physical Activity	[QNVICOMR] '3+ hours of computer screen time not for school work on average school day'.	40.1%	41.6%	41.5%	42.7%	40.4%	41.5%	33.3%	0.000
Nutrition and Physical Activity	[QNSCRENR] 'Watched TV, played videos, or used the computer for reasons other than school work for 3+ hours per day on an average school day'.	57.6%	60.0%	58.8%	60.9%	58.5%	60.1%	47.9%	0.000
Nutrition and Physical Activity	[QNPA5DAR] 'Were not physically active for at least 60 minutes on 5 of the past 7 days'.	56.9%	74.2%	70.2%	59.7%	55.3%	48.6%	39.3%	0.000
Nutrition and Physical Activity	[QNPA7DAR] 'Were not physically active for at least 60 minutes on each of the past 7 days'.	80.8%	87.3%	87.4%	80.5%	79.9%	78.7%	73.6%	0.000
Sleep	[V237R] ' Got 8 less than hours of sleep on an average school night'.	74.0%	79.7%	83.5%	77.5%	72.7%	70.6%	62.3%	0.000
Housing	[V255R] ' Who ever slept away from their parents or guardians home because they were kicked out, ran away, were abandoned, or felt unsafe in their home during the past 12 months'.	12.4%	23.8%	22.1%	12.4%	9.4%	7.8%	4.0%	0.000

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Variable names of problem behaviors and protective factors are indicated in brackets.
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