Student-Mentored Research

Does actual overweight or perception of overweight elevate suicide risk in bullied vs. non-bullied students?

Ashley Kalle, BS[1], Yunmi Chung, MPH[2,3], and Wonsuk Yoo, PhD[2,4]

[1]Department of Psychological Sciences, Augusta University, Augusta, GA; [2]Institute of Public & Preventive Health, Augusta University, Augusta, GA; [3]Department of Medicine, Emory School of Medicine, Atlanta, GA; [4]Dental College of Georgia, Augusta University, Augusta, GA

Corresponding Author: Wonsuk Yoo • 1120 15th St., CJ 2300 Augusta, GA 30912 • wyoo@augusta.edu

ABSTRACT

Background: For individuals in Georgia aged 10-14 and 15-24, suicide is the third leading cause of death. Those who are overweight are often bullied by their peers, and being bullying can lead to higher risks of suicidality. There is, however, mixed evidence about the relationship between high weight and suicide. Weight perception may be a stronger predictor of suicide than actual weight. The aim of the present study was to examine, in a national sample of high school students, the interaction between weight and bullying on suicide outcomes.

Methods: A secondary data analysis was performed with data from the 2015 Youth Behavior Risk Surveillance Survey (YRBSS), a cross-sectional survey of high school students nationwide conducted by the Centers for Disease Control and Prevention. The predictor variables analyzed were actual overweight, overweight perception, and bullying. The outcome variables were suicide ideation, suicide planning, and suicide attempts.

Results: For non-bullied students, perception of overweight was a predictor of suicide risk. Whether actual overweight or perception of overweight increases suicide risk in bullied students depended on the type of bullying. For being bullied at school only and being bullied at school and online, overweight perception increased suicide risks. For being bullied online, actual overweight increased suicide risks.

Conclusions: Interventions that target bullied students and decrease body dissatisfaction may lower suicide attempts.

Key words suicide, bullying, cyberbullying, weight, perception of weight, overweight, obesity

Statement of Student-Mentor Relationship: The lead author for this report, Ashley Kalle, a Master of Science in Psychology student, participated in the Summer Public Health Scholars Program in the Institute of Public & Preventive Health at Augusta University. Dr. Wonsuk Yoo, the senior author, served as her mentor.

https://doi.org/10.21633/jgpha.6.2s11

INTRODUCTION

In 2014, 17% of deaths among those of ages 10–24 years resulted from suicide (Centers for Disease Control and Prevention, 2015). Similar rates are seen in Georgia, with suicide being the third leading cause of death for individuals ages 10-14 and 15-24 (Centers for Disease Control and Prevention, 2015). According to the CDC's 2013 Youth Risk Surveillance System Survey, Georgia youth have slightly more suicide attempts than the national average (CDC, 2013). The percentages of students who reported seriously considering suicide and making a suicide plan increased from 2009 to 2015 (David-Ferdon et al., 2016). According to CDC Web-based Injury Statistics Query and Reporting System (WISQARS) data for Georgia in 2010, injuries related to nonfatal self-harm resulted in approximately $10.4 billion for medical and work loss costs (Centers for Disease Control and Prevention, 2015). These data support the concept that suicide is a severe and expensive

public health problem for Georgia and the United States.

Bullying is associated with increased suicidality. For instance, a review of 37 studies of adolescents found a consistent association between being bullied and suicidal ideation (Kim & Leventhal, 2008). In a nationally representative data set for 2013, bullied high school students were three times more likely to report suicidal ideation and suicide attempts (Sibold, Edwards, Murray-Close, & Hudziak, 2015). Those bullied both at school and online had the highest suicide risk, followed by students bullied online, and those bullied at school (Messias, Kindrick, & Castro, 2014). Differing outcomes for those bullied online versus at school indicate that researchers should analyze these cases separately. Overall, these studies support the concept that bullying both at school and online can lead to increased risk of suicidality.

In a review of the past 40 years of research related to bullying, prevalence rates for bully victimization ranged from as low as 10% to as high as 33% of students (Hymel & Swearer, 2015). These statistics demonstrate that bullying occurred commonly among adolescents, but overweight individuals were more susceptible than their average-weight peers. According to recent national estimates of weight, 16.0% of high school students are overweight, and an additional 13.9% are obese (Kann et al., 2016). Overweight adolescents are at risk of bullying because their peers often view them as different and undesirable. Researchers have documented that children as early as 3 years old have negative explicit attitudes, implicit attitudes, and stereotypes against their overweight peers (Cramer & Steinwert, 1998; Kraig & Keel, 2001; Solbes & Enesco, 2010). Overweight children aged 10-14 years report more prevalent, frequent, and upsetting weight-based teasing than their average-weight peers (Hayden-Wade et al., 2005). In high school, weight-based bullying is pervasive. These students indicate that being overweight is the primary reason that other students are bullied at school (Puhl, Luedicke, & Heuer, 2011). The pervasiveness of bullying for overweight high school students was also demonstrated in a recent study, in which 92% of students in weight loss camps reported victimization from their peers based on their weight (Puhl, Peterson, & Luedicke, 2013).

Although adolescents are often bullied due to their weight, which potentially leads to increased suicidality, there is mixed evidence that being overweight or obese elevates suicide risk. For example, of 15 studies evaluating obesity and suicidality, 8 reported that obese individuals are less likely to commit suicide, one reported no association, and one reported that obese individuals are more likely to commit suicide (Klinitzke, Steinig, Bluher, Kersting, & Wagner, 2013). Furthermore, a review of epidemiological studies related to body mass index (BMI) and suicide risk found an inverse relationship between BMI and the risk of completed suicide. However, among females, a high BMI was associated with an elevated risk of attempted suicide but a low risk of completed suicide (Zhang, Yan, Li, & McKeown, 2013). In a review of 23 studies, there were more positive associations between obesity and suicide than negative or absent associations (Heneghan, Heinberg, Windover, Rogula, & Schauer, 2012). These reports highlight the mixed evidence regarding whether actual weight is a predictor of suicide risks. Further, most studies focus on adult suicide rather than adolescent suicide, indicating that more research must be completed to determine, for adolescents, whether elevated BMI is a risk factor for suicide.

Although it is questionable whether elevated BMI is positively or negatively associated with adolescent suicide risk, there is support for the influence of perception of weight on adolescent suicide risk. Adolescents often have an inaccurate perception of their weight (Dave & Rashad, 2009; Swahn et al., 2009). Overestimating weight can have severe consequences, such as increasing suicide ideation, plans, and attempts (Dave & Rashad, 2009; Lee & Seo, 2013). One study discovered that, for students, actual overweight had a smaller effect on increasing suicidality than perception of overweight (Dave & Rashad, 2009). These results indicate that perception of weight predicts adolescent suicide risks more accurately than actual weight.

Due to the inconsistent evidence regarding the effect of actual weight on suicide, the current study examined, for students, whether perception of overweight versus actual overweight increases suicide risks. Typically, actual weight is associated with being bullied, but the perception of overweight is associated with suicide more consistently than actual overweight. It is hypothesized that (1) bullied students have

higher suicide risks than non-bullied students; (2) non-bullied students with an overweight perception have higher suicide risks than non-bullied students who are actually overweight; and (3) bullied students with an overweight perception have higher suicide risks than bullied students who are actually overweight.

METHODS

Study Population

The data were obtained from the Youth Risk Behavior Surveillance Survey (YRBSS), a publically available dataset provided by the Centers for Disease Control and Prevention (CDC) (Kann et al., 2016). The YRBSS is a nationally representative survey of public and private high schools. The 2015 edition of the YRBSS contained 89 questions assessing student health risk behaviors (Kann et al., 2016). The school response rate was 69%, the student response rate was 86%, and the overall response rate was 60% (Kann et al., 2016). The current study analyzed data for 15,402 participants in 36 states. Items assessing BMI, weight perception, bullying, sadness, suicidality, and demographics were analyzed. Demographic information for the sample is in Table 1 and in the CDC's report on the 2015 YRBSS (Kann et al., 2016).

Table 1. Sample characteristics

Variable	N	%
Gender		
Female	7,751	48.7
Male	7,955	50.9
Grade		
9th	4,221	27.0
10th	3,982	25.5
11th	3,712	23.8
12th	3,580	22.9
Race		
White	8,336	53.4
Black/African American	2,078	13.3
Hispanic/Latino	1,520	9.7
Other	3,336	21.1
Overweight		
Yes	4,318	27.6
No	10,103	70.1
Overweight Perception		
Yes	4,844	31.0
No	10,518	67.3
Bullying		
None	11,451	73.3
At school	1,574	10.1
Online	854	5.5
Both (school and online)	1,537	9.8
Sad or hopeless		
Yes	4,609	29.5
No	10,821	69.3
Considered Suicide		
Yes	2,738	17.5
No	12,694	81.2
Made a Suicide Plan		
Yes	2,209	14.1
No	12,920	82.7
Attempted Suicide		
Yes	1,183	7.6
No	12,633	80.9

Variables

Perceived Weight

Perceived weight was assessed by the question "How do you perceive your weight?" This question provided five options including "very underweight," "slightly underweight," "about the right weight," "slightly overweight," and "very overweight." Both "slightly overweight" and "very overweight" responses were recoded and combined to make one overweight category. The "very underweight," "slightly underweight," and "about the right weight responses" were combined to make one non-overweight category. The perceived weight of participants was analyzed using the two levels of overweight and non-overweight.

Actual Weight

The CDC used questions about weight and height to determine BMI (kg/m^2) (Kann et al., 2016). To determine actual weight, BMI was compared with age and gender reference data from CDC growth charts (Kuczmarski et al., 2000). A BMI of ≥85th percentile was considered overweight. Those with a BMI of ≤84 percentile were considered not overweight.

Bullying

Bullying was analyzing by two questions. These included "During the past 12 months, have you ever been bullied on school property?" and "During the past 12 months, have you ever been electronically bullied? (Include being bullied through e-mail, chat rooms, instant messaging, Websites, or texting)." Both questions provided a yes/no response option. From these questions, a new variable was created and called "bully location" to compare students who were bullied at school only, online only, in both locations, or not at all.

Sadness and Suicidality

One question, used to account for sadness, was "During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?" Three questions were analyzed to assess suicidality. These included "During the past 12 months, did you ever seriously consider attempting suicide?" "During the past 12 months, did you make a plan about how you would attempt suicide?" and "During the past 12 months, how many times did you actually attempt suicide?" These questions were answered as yes/no, except for the suicide attempt question, which provided options ranging from "0 times" to "6 or more times." Responses indicating one or more suicide attempts were recoded into one category indicating a suicide attempt. The YRBSS suicidality questions have good convergent and discriminant validity (May & Klonsky, 2011).

Statistical Analyses

Descriptive statistics were conducted to have frequencies and proportions for categorical variables and means and standard deviations for continuous variables. A logistic regression model was utilized to assess the impact of bullying on the likelihood that high school students would report suicide attempts. The model contained four independent variables (bullying location, gender, race, and sadness). Stratified analyses were performed with three binary logistic regressions stratified by bullying (at school, online, both, none) to assess whether perception of overweight or actual overweight elevated suicide risks (suicide ideation, suicide plans, and suicide attempts) after adjusting for gender, race, and sadness. The reference variables included female for gender, white for race, and no for all other variables. Odds ratios (ORs) and corresponding 95% confidence intervals (CIs) were reported. All models were statistically significant, indicating that they were distinguished between respondents who reported and did not report suicide ideation, suicide plans, and suicide attempts. Among predictor variables, multicollinearities were examined using correlation matrices and condition indices (Yoo et al., 2014). All analyses were accomplished using version 21.0 of the International Business Machines (IBM) Statistical Package for the Social Sciences (SPSS). All were two-sided at the 5% significance level.

RESULTS

Among respondents, 26.7% indicated that they were bullied in the last year (Table 1). Students were most likely to be bullied at school only (10.1%), followed by both at school and online (9.8%) and online only (5.5%). Of the students, 31.0% perceived themselves as being overweight, but only 27.6% were actually overweight. A high percentage of students reported having felt sad or hopeless (29.5%), considered suicide (17.5%), made a suicide plan (14.1%), or attempted suicide (7.6%).

In model 1, all bullying locations made a statistically significant contribution to the model (Table 2). Of these locations, the strongest predictor of suicide attempts was being bullied at

school and online (OR = 4.68, 95% CI: 3.74-5.86), followed by being bullied at school (OR = 2.48, 95% CI: 1.93-3.20) and being bullied online (OR = 2.23, 95% CI: 1.93-3.20). This indicates that students who were bullied were two to four times more likely to report a suicide attempt than those who were not bullied. The first hypothesis was supported.

Table 2. Predictors of suicide ideation, plans, and attempts

Outcome	Ideation	Plans	Attempts
Predictor	**OR (95% CI)**	**OR (95% CI)**	**OR (95% CI)**
Not bullied	*Ref*	*Ref*	*ref*
Bullied at school	2.50 (2.06-3.04)*	2.16 (1.75-2.66)*	2.48 (1.93-3.20)*
Bullied online	2.06 (1.60-2.65)*	1.57 (1.20-2.06)*	2.23 (1.61-3.08)*
Both	4.01 (3.34-4.83)*	4.27 (3.53-5.16)*	4.68 (3.74-5.86)*
Sadness *(ref: no)*	11.49 (9.94-13.27)*	10.84 (9.26-12.70)*	9.18 (7.47-11.29)*
Male *(ref: Female)*	1.02 (0.89-1.17)	1.04 (0.90-1.20)	0.98 (0.82-1.17)
Race			
White	*Ref*	*Ref*	*ref*
Black	1.10 (0.88-1.38)	1.62 (1.30-2.03)*	2.32 (1.75-3.07)*
Hispanic	0.97 (0.77-1.23)	1.17 (0.91-1.49)	2.32 (1.74-3.10)*
Other	1.49 (1.26-1.75)*	1.38 (1.16-1.65)*	2.31 (1.87-2.86)*

*p-value < .05

To assess whether perception of overweight or actual overweight elevated suicide risks (suicide ideation, suicide plans, and suicide attempts), three binary logistic regressions stratified by bullying (at school, online, both, none) were conducted. For non-bullied students, overweight perception, and not actual overweight, was a predictor of suicide ideation, suicide plans, and suicide attempts (Table 3). The ORs indicate that overweight perception by non-bullied students leads to suicide attempts 1.71 times more than non-bullied students without an overweight perception. The second hypothesis was supported.

Table 3. Overweight vs. overweight perception on suicide risk stratified by bullying type

Outcome	Ideation	Plans	Attempts
Predictor	**OR (95% CI)**	**OR (95% CI)**	**OR (95% CI)**
Not bullied			
Overweight	0.94 (0.74-1.19)	0.96 (0.74-1.24)	0.75 (0.53-1.06)
Overweight Perception	1.76 (1.40-2.22)*	1.56 (1.22-2.01)*	1.71 (1.23-2.36)*
Sadness *(ref: no)*	13.83 (11.28-16.96)*	14.59 (11.61-18.34)*	10.66 (7.84-14.50)*
Male *(ref: Female)*	0.97 (0.80-1.18)	1.00 (0.80-1.23)	0.99 (0.74-1.31)
Race			
White	*ref*	*Ref*	*ref*
Black	1.19 (0.88-1.61)	1.66 (1.22-2.64)*	2.61 (1.70-3.99)*
Hispanic	0.98 (0.71-1.34)	0.97 (0.69-1.36)	2.68 (1.76-4.08)*
Other	1.43 (1.13-1.80)	1.23 (0.94-1.59)	2.54 (1.79-3.62)*
Bullied at school			
Overweight	1.27 (0.79-2.04)	0.89 (0.53-1.50)	0.92 (0.47-1.78)
Overweight Perception	1.33 (.84-2.12)	1.87 (1.12-3.12)*	1.56 (.82-2.99)
Sadness *(ref: no)*	10.29 (7.17-14.75)*	12.02 (7.88-18.33)*	5.41 (3.35-8.75)*
Male *(ref: Female)*	1.14 (.81-1.62)	1.17 (.80-1.72)	1.96 (1.25-3.08)*
Race			
White	*ref*	*Ref*	*ref*
Black	1.22 (0.69-2.16)	1.90 (1.04-3.45)*	4.03 (2.13-7.63)*
Hispanic	0.84 (0.46-1.55)	1.19 (0.64-2.23)	3.09 (1.60-5.95)*
Other	1.11 (0.72-1.73)	0.78 (0.47-1.29)	0.81 (0.43-1.52)
Bullied online			
Overweight	2.05 (1.04-4.04)*	3.37 (1.61-7.05)*	0.75 (0.31-1.87)
Overweight Perception	0.82 (0.45-1.50)	1.60 (0.88-2.93)	1.25 (0.60-2.61)

Outcome	Ideation	Plans	Attempts
Sadness *(ref: no)*	5.75 (3.43-9.63)*	4.88 (2.72-8.78)*	5.95 (2.80-12.65)*
Male *(ref: Female)*	1.37 (0.86-2.17)	1.22 (0.74-2.03)	1.68 (0.91-3.09)
Race			
White	*ref*	*Ref*	*ref*
Black	0.90 (0.34-2.40)	4.18 (1.70-10.28)*	0.75 (0.16-3.40)
Hispanic	1.70 (0.63-4.60)	2.62 (0.95-7.23)	2.05 (0.61-6.90)
Other	1.93 (1.13-3.31)*	1.60 (0.88-2.93)	2.46 (1.28-4.72)*
Both			
Overweight	0.90 (0.60-1.37)	0.75 (0.50-1.41)	0.99 (0.61-1.60)
Overweight Perception	1.63 (1.10-2.42)*	1.70 (1.15-2.52)*	1.39 (0.87-2.21)
Sadness *(ref: no)*	7.00 (4.94-9.90)*	5.59 (3.93-7.97)*	11.03 (6.49-18.75)*
Male *(ref: Female)*	0.92 (0.67-1.25)	0.97 (0.71-1.32)	0.53 (0.37-0.77)
Race			
White	*ref*	*Ref*	*ref*
Black	0.72 (0.38-1.34)	0.81 (0.43-1.52)	0.84 (0.38-1.84)
Hispanic	0.95 (0.42-2.12)	1.47 (0.67-3.23)	1.77 (0.76-4.12)
Other	1.69 (1.14-2.50)*	2.20 (1.48-3.25)	4.17 (2.69-6.47)*

*p-value < 0.05

With the same models as for non-bullied students, hypothesis three examined whether actual overweight or perception of overweight increased suicidality in bullied students. There were mixed results for this hypothesis (Table 3). For students bullied at school, neither actual overweight nor perception of overweight was a significant factor for suicide ideation or suicide attempts, but perception of overweight was a predictor of suicide plans. For students bullied online, actual overweight was a predictor of increased suicide ideation and suicide plans. For students bullied online, being overweight doubled the risk for suicide ideation and planning, but overweight was not a predictor of suicide attempts. For those bullied at school and online, overweight perception was a predictor of suicide ideation and suicide plans. Students bullied in both locations and having an overweight perception were 1.63 times more likely to have suicidal thoughts and 1.70 times more likely to have a suicide plan compared to non-bullied students. For those bullied in both locations with or without an overweight perception, there was no difference in suicide attempts.

DISCUSSION

The first hypothesis confirms previous research by demonstrating that bullied students have two to three times the risk of suicide (Kim & Leventhal, 2008; Messias et al., 2014; Sibold et al., 2015). The second hypothesis also supports past research that having an overweight perception can increase suicide risk (Dave & Rashad, 2009; Lee & Seo, 2013). The third hypothesis extends upon previous research by investigating the interaction between bullying location, actual overweight, and perception of overweight. It illustrates that, for students bullied online and at school and having an overweight perception raises suicide ideation and planning. Students with only an overweight perception and bullied at school were more likely to form a suicide plan. Finally, there was support for actual overweight, and not overweight perception, increasing suicide ideation and plans in students bullied online. However, actual overweight was not a significant risk factor for suicide attempts for students bullied online, which supports the concept that increased BMI has a negative association with suicide.

The results are subject to at least four limitations. First, the findings are based on self-reported data, which are prone to recall bias. The survey questions were also limited because they asked only about the last 12 months. This can eliminate from the analysis risky behaviors that may still be affecting other behaviors of the students. Both actual weight and perception of weight are also limited, because overweight was compared to everyone not overweight instead of only to average-weight students. This is limiting, because underweight students are also oftentimes bullied along with overweight students (Wang, Iannotti, & Luk, 2010). Therefore, including underweight students in the non-overweight group may skew the results. Lastly, the results do not determine causality between variables. For example, it is unclear whether those who were

bullied became overweight or if those who were overweight became bullied. Similarly, those who were overweight may have become suicidal and those who were suicidal may have become overweight.

To address these limitations, future research could examine the effects of actual and perceived weight for underweight students and should include a clear definition of bullying. Because the results indicated that the risk of having an overweight perception or being actually overweight depended on the type of bullying, future investigations should examine bullying at school and online as separate problems instead of combining them. Since both perceived and actual weight can increase suicide risk, other avenues of research should examine the role of social influences (e.g., constructs, norms, and stigma) contributing to perceived and actual overweight. Lastly, most of the literature analyzing the association between elevated BMI and suicide has related to adults, and most research on adolescent suicide has examined suicide attempts and has not focused on suicide completions. Therefore, more research must be conducted to determine the risk of suicide completions for overweight and obese adolescents.

Current public health suicide interventions for high school students focus largely on sadness, depression, and attitudes toward seeking mental health treatment (Baek et al., 2015; Ciffone, 2007; Schilling, Aseltine, & James, 2016). However, the results indicate that perception of being overweight increases suicide behavior even when sadness is accounted for in the model. Therefore, public health interventions in Georgia and in the entire United States should incorporate body dissatisfaction in suicide prevention programs. The results also indicate that any type of bullying increases suicide behavior. Nearly 40% of those bullied reported being bullied both at school and online. Students bullied online and at school also engaged in the most suicide behaviors. Despite the elevated risks for students experiencing both types of bullying, many current bullying prevention programs focus on either being bullied at school or cyberbullying (Garaigordobil & Martinez-Valderrey, 2016; Gradinger, Yanagida, Strohmeier, & Spiel, 2016; Schroeder et al., 2012; Trip et al., 2015). Therefore, to reach the population of students most at risk, bullying prevention programs should address both types, which will also meet the needs of students being bullied in one location only. In the present research, we performed a cross-sectional study to evaluate the predictor variables of actual and perception of overweight associated with suicide ideation, suicide planning, and suicide attempts. Based on our findings, we plan to develop a prediction model to evaluate factors associated with suicide risk in bullied and non-bullied students using a traditional model-building approach as well as non-parametric data-mining techniques to find appropriate risk predictors (Harrell, 1996; Hastie, 2009; W. Yoo, Ference, B. A., Cote, M. L., Schwartz, A., 2012).

CONCLUSIONS

Efforts to reduce suicides in high school students should examine bullying at school and online as separate problems with different associated risks. Interventions must also focus on creating an accurate perception of weight. These efforts should not be limited to students who are overweight, but should also target those who are of an average weight and underweight. Interventions that target bullied students and decrease body dissatisfaction may lower suicide attempts.

Acknowledgements

Authors thank Dr. Madison Gates for valuable discussion on data and methods and Public Health Scholars Program supported by Institute of Public and Preventive Health at Augusta University.

References

Baek, J. H., Park, J. I., Ahn, J., Roh, S. W., Heo, J. Y., Fava, M., . . . Jeon, H. J. (2015). Review of Suicide Prevention Programs: Massachusetts, United States, in Comparison with Seoul. *Psychiatry Investig, 12*(3), 281-287. doi:10.4306/pi.2015.12.3.281

CDC. (2013). Youth Risk Behavior Survey Data

Centers for Disease Control and Prevention. (2015). Web-Based Injury Statistics Query and Reporting System (WISQARS). Retrieved from https://www.cdc.gov/injury/wisqars/

Ciffone, J. (2007). Suicide prevention: an analysis and replication of a curriculum-based high school program. *Soc Work, 52*(1), 41-49.

Cramer, P., & Steinwert, T. (1998). Thin is good, fat is bad: How early does it begin? *Journal of Applied Developmental Psychology, 19*(3), 429-451. doi:10.1016/S0193-3973(99)80049-5

Dave, D., & Rashad, I. (2009). Overweight status, self-perception, and suicidal behaviors among adolescents. *Soc Sci Med, 68*(9), 1685-1691. doi:10.1016/j.socscimed.2009.02.015

David-Ferdon, C., Crosby, A. E., Caine, E. D., Hindman, J., Reed, J., & Iskander, J. (2016). CDC Grand Rounds: Preventing Suicide Through a Comprehensive Public Health Approach. *MMWR:*

Morbidity & Mortality Weekly Report, 65(34), 894-897.

Garaigordobil, M., & Martinez-Valderrey, V. (2016). Impact of Cyberprogram 2.0 on Different Types of School Violence and Aggressiveness. *Front Psychol, 7*, 428. doi:10.3389/fpsyg.2016.00428

Gradinger, P., Yanagida, T., Strohmeier, D., & Spiel, C. (2016). Effectiveness and sustainability of the ViSC Social Competence Program to prevent cyberbullying and cyber-victimization: Class and individual level moderators. *Aggress Behav, 42*(2), 181-193. doi:10.1002/ab.21631

Harrell, F. E., Jr., Lee, K. L., Mark, D. B. (1996). Multivariable prognostic models: issues in developing models, evaluating assumptions and adequacy, and measuring and reducing errors. *Stat Med, 15*(4), 361-387. doi:10.1002/(SICI)1097-0258(19960229)15:4<361::AID-SIM168>3.0.CO;2-4

Hastie, T., Tibshirani, R., Friedman, J. (2009). *The Elements of Statistical Learning* (Second ed.): Springer.

Hayden-Wade, H. A., Stein, R. I., Ghaderi, A., Saelens, B. E., Zabinski, M. F., & Wilfley, D. E. (2005). Prevalence, characteristics, and correlates of teasing experiences among overweight children vs. non-overweight peers. *Obes Res, 13*(8), 1381-1392. doi:10.1038/oby.2005.167

Heneghan, H. M., Heinberg, L., Windover, A., Rogula, T., & Schauer, P. R. (2012). Weighing the evidence for an association between obesity and suicide risk. *Surg Obes Relat Dis, 8*(1), 98-107. doi:10.1016/j.soard.2011.10.007

Hymel, S., & Swearer, S. M. (2015). Four decades of research on school bullying: An introduction. *Am Psychol, 70*(4), 293-299. doi:10.1037/a0038928

Kann, L., McManus, T., Harris, W. A., Shanklin, S. L., Flint, K. H., Hawkins, J., . . . Zaza, S. (2016). Youth Risk Behavior Surveillance - United States, 2015. *MMWR Surveill Summ, 65*(6), 1-174. doi:10.15585/mmwr.ss6506a1

Kim, Y. S., & Leventhal, B. (2008). Bullying and suicide. A review. *Int J Adolesc Med Health, 20*(2), 133-154.

Klinitzke, G., Steinig, J., Bluher, M., Kersting, A., & Wagner, B. (2013). Obesity and suicide risk in adults--a systematic review. *J Affect Disord, 145*(3), 277-284. doi:10.1016/j.jad.2012.07.010

Kraig, K. A., & Keel, P. K. (2001). Weight-based stigmatization in children. *International Journal Of Obesity And Related Metabolic Disorders: Journal Of The International Association For The Study Of Obesity, 25*(11), 1661-1666.

Kuczmarski, R. J., Ogden, C. L., Grummer-Strawn, L. M., Flegal, K. M., Guo, S. S., Wei, R., . . . Johnson, C. L. (2000). CDC growth charts: United States. *Adv Data*(314), 1-27.

Lee, C. G., & Seo, D. C. (2013). Trajectory of suicidal ideation in relation to perceived overweight from adolescence to young adulthood in a representative United States sample. *J Adolesc Health, 53*(6), 712-716. doi:10.1016/j.jadohealth.2013.06.013

May, A., & Klonsky, E. D. (2011). Validity of suicidality items from the Youth Risk Behavior Survey in a high school sample. *Assessment, 18*(3), 379-381. doi:10.1177/1073191110374285

Messias, E., Kindrick, K., & Castro, J. (2014). School bullying, cyberbullying, or both: correlates of teen suicidality in the 2011 CDC Youth Risk Behavior Survey. *Compr Psychiatry, 55*(5), 1063-1068. doi:10.1016/j.comppsych.2014.02.005

Puhl, R. M., Luedicke, J., & Heuer, C. (2011). Weight-based victimization toward overweight adolescents: observations and reactions of peers. *J Sch Health, 81*(11), 696-703. doi:10.1111/j.1746-1561.2011.00646.x

Puhl, R. M., Peterson, J. L., & Luedicke, J. (2013). Weight-based victimization: bullying experiences of weight loss treatment-seeking youth. *Pediatrics, 131*(1), e1-9. doi:10.1542/peds.2012-1106

Schilling, E. A., Aseltine, R. H., Jr., & James, A. (2016). The SOS Suicide Prevention Program: Further Evidence of Efficacy and Effectiveness. *Prev Sci, 17*(2), 157-166. doi:10.1007/s11121-015-0594-3

Schroeder, B. A., Messina, A., Schroeder, D., Good, K., Barto, S., Saylor, J., & Masiello, M. (2012). The implementation of a statewide bullying prevention program: preliminary findings from the field and the importance of coalitions. *Health Promot Pract, 13*(4), 489-495. doi:10.1177/1524839910386887

Sibold, J., Edwards, E., Murray-Close, D., & Hudziak, J. J. (2015). Physical activity, sadness, and suicidality in bullied US adolescents. *J Am Acad Child Adolesc Psychiatry, 54*(10), 808-815. doi:10.1016/j.jaac.2015.06.019

Solbes, I., & Enesco, I. (2010). Explicit and implicit anti-fat attitudes in children and their relationships with their body images. *Obes Facts, 3*(1), 23-32. doi:10.1159/000280417

Swahn, M. H., Reynolds, M. R., Tice, M., Miranda-Pierangeli, M. C., Jones, C. R., & Jones, I. R. (2009). Perceived overweight, BMI, and risk for suicide attempts: findings from the 2007 Youth Risk Behavior Survey. *J Adolesc Health, 45*(3), 292-295. doi:10.1016/j.jadohealth.2009.03.006

Trip, S., Bora, C., Sipos-Gug, S., Tocai, I., Gradinger, P., Yanagida, T., & Strohmeier, D. (2015). Bullying prevention in schools by targeting cognitions, emotions, and behavior: Evaluating the effectiveness of the REBE-ViSC program. *J Couns Psychol, 62*(4), 732-740. doi:10.1037/cou0000084

Wang, J., Iannotti, R. J., & Luk, J. W. (2010). Bullying victimization among underweight and overweight U.S. youth: differential associations for boys and girls. *J Adolesc Health, 47*(1), 99-101. doi:10.1016/j.jadohealth.2009.12.007

Yoo, W., Ference, B. A., Cote, M. L., Schwartz, A. (2012). A Comparison of Logistic Regression, Logic Regression, Classification Tree, and Random Forests to Identify Effective Gene-Gene and Gene-Environmental Interactions. *Int J Appl Sci Technol, 2*(7), 268.

Yoo, W., Mayberry, R., Bae, S., Singh, K., Peter He, Q., & Lillard, J. W., Jr. (2014). A Study of Effects of MultiCollinearity in the Multivariable Analysis.

Int J Appl Sci Technol, 4(5), 9-19.
Zhang, J., Yan, F., Li, Y., & McKeown, R. E. (2013). Body mass index and suicidal behaviors: a critical review of epidemiological evidence. *J Affect Disord, 148*(2-3), 147-160. doi:10.1016/j.jad.2012.05.048