

**Original Article**

**Youth sport participation and underage drinking behavior: the mediating effect of self-esteem**

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**Abstract:**

Underage drinking has been recognized as a public health issue in the United States. Even though participation in sport activities have been recommended as an important tool for youth development and reducing risky behavior, previous research has indicated that sport participation directly increased alcohol consumption among youth. Furthermore, youth with low self-esteem are more likely to engage in delinquent behaviors (including alcohol consumption). There is a lack of empirical research on how self-esteem mediates the relationship between sport participation and underage drinking behavior. Using a Structural Equation Modeling approach, the current study examined the theoretical relationships between sports participation, underage drinking behavior and the mediating effect of self-esteem among a sample of youth (specifically 8th and 10th grades). To have a larger sample size, this study used the data from the annual national surveys, “Monitoring the Future: A Continuing Study of American Youth”. The results indicated that sport participation significantly increases both drinking behavior and self-esteem. In contrast, a greater level of self-esteem significantly decreases drinking behavior. The findings suggest that although youth who are frequently involved in sport and physical activities have increased drinking behavior, a greater level of self-esteem offset this effect. Since this study provides insight into the under-studied potential mediating factor of self-esteem, people (e.g., parents, teachers, coaches, and administrators) who work closely with youth and adolescents will benefit from these findings and gain a better understanding of underage drinking behavior and the importance of self-esteem among youth. The current study contributes to the literature on positive youth development and public health.

**KeyWords:** youth sport, youth alcohol consumption, self-esteem, positive youth development, structural equation modeling

**Introduction**

Underage drinking has been recognized as a public health issue leading to serious injuries and causing deaths among youths, but only 1 in 100 parents recognize their child’s drinking behavior in the United States (Edgar Snyder & Associates, 2018). The 2018 National Survey of Drug Use and Health reported that nearly 19% of youth aged 12-20 had consumed alcohol in the past 30 days and the rates had been consistent the past four years (e.g., 20% in 2015) (SAMHSA, 2019). Researchers indicate that alcohol use is one of the major causal factors for intentional and unintentional injuries and harm to people other than the drinker, and it causes family deprivation, interpersonal violence, suicide, homicide, and crime (Anderson, Chisholm, & Fuhr, 2009). Furthermore, negative physical health disorders (e.g., liver and kidney and various cancers) and behavioral consequences (e.g., risky sexual activity, physical injuries, poor school performance, and addiction) have been associated with alcohol consumption (Cooper, 2002; Hingson, Heeren, Winter, & Weschler 2005; Rehm, Taylor, Mohapatra, Irving, Baliunas, Patra, & Roerecke, 2010; Townshend & Duka, 2005; Yamagata, Ishida, Sairenchi, Takahashi, Ohba, Shiigai, & Koyama, 2007). The report indicated that a significant number of young people under age 21 visited emergency rooms for injuries related to alcohol in 2013 (about 119,000) (Naeger, 2017). Such deleterious consequences and high rates of alcohol use indicate the necessity for further study into the correlates and predictors of youth alcohol behaviors.

Sport and physical activity has been recognized as an important tool for youth development. Globally, sport participation plays significant role in improving physical and mental health (e.g., childhood obesity), improving academic performance, fostering social skills (e.g., teamwork) among youth and adolescents (UNICEF, 2014). Scholars suggest that sport participation can have a protective effect on juvenile delinquency including drinking behaviors (Elder, Leaver-Dunn, Wang, Nagy, & Green, 2000; Thorlindsson & Bemburg, 2006). Advocates for sport participation’s positive effect on youth behavior and development reference further studies showing a link to discipline, academic success, prosocial conformity, and higher self-esteem (Bowker,

2006; Fredrick & Eccles, 2006). While the positive impacts of sport participation on youth development are well documented, on the other hand, mixed results exist in that sport participation has been related to higher rates of delinquency as well, including alcohol consumption (Lisha & Sussman, 2010). For instance, several critical scholars have shown sport participation to foster a culture of inequality, aggression, poor mental health, negative self-image, and contradictory findings to raising a youth's level of self-esteem (Gatz, Messner, & Ball-Rokeach 2002; Heyman, 1986). As the effect of sport participation on delinquency and self-esteem has been mixed (either increased or decreased), so is the effect of self-esteem on delinquency. As related to alcohol, previous research showed that youth levels of self-esteem have been significantly related to the likelihood of participating in drinking in mixed and ambiguous results (either increase or decrease) (Fisher, Miles, Austin, Camargo, & Colditz, 2007; Zimmerman, Copeland, Shope, & Dielman, 1997).

Despite alcohol use being a major problem and significant relationships with sport participation remaining inconclusive, researchers have seldom tested the mediation effect of self-esteem on sport participation's ability to predict drinking behaviors. Moreover, many studies have focused on drinking behaviors among college students or athletes (e.g., Green, Nelson, & Hartmann, 2014; Tewksbury, Higgins, & Mustaine, 2008; Wilson, Pritchard, & Schaffer, 2004) instead of students under the age of 21. In response to these issues, the current study will further explore the relationship between sport participation, underage drinking, and the potential mediating factor of self-esteem. Eventually, this study will provide helpful resources for improvement of youth sport participation and prevention of underage drinking behavior.

### **Theoretical background**

*Sport participation.* Sport participation is salient to the adolescent culture of the United States resulting in much debate about the social components related to youth development including delinquency (Holland & Andre, 1994). Some studies have contended that sport participation and physical activity promote positive social development and reduce delinquency (Eccles & Barber, 1999; Fejgin, 1994; Mahoney & Cairns, 1997; Marsh, 1998; McNeal, 1995; Otto & Alwin, 1977). For example, youth athletic participation has been associated with better grades, higher rates of college attendance, prosocial peer networks, and lower levels of delinquency (Elder et al., 2000; Hoffmann & Xu, 2002; Mahoney, 2000; Mahoney & Cairns, 1997; Mahoney, Cairns, & Farmer, 2003; Marsh & Klietman, 2003; Thorlindsson & Bemburg, 2006). However, other studies showed sport participation to be associated with contradictions to prosocial development and increased delinquency through numerous factors such as psychological and developmental disorders, risk taking, negative peer influences, group social norms, and media portrayals of professional athletes (Dams-O'Connor, Martin & Martens, 2007; Heyman, 1986; Thombs & Hamilton, 2002). These inconclusive findings regarding sport's effect on delinquency and youth development have been well-reflected in the youth alcohol use literature (Lisha & Sussman, 2010).

*Alcohol consumption.* Previous studies have found sports participation to have a protective effect on youth alcohol use (Elder et al., 2000; Kelly, 2013; Thorlindsson & Bemburg, 2006). Thorlindsson and Bemburg (2006) found that sport participation and leisure activities were associated with reduced alcohol use and association with alcohol using peers. Elder et al. (2000) also found that participation in group-based physical activity was associated with a reduced likelihood to drink alcohol. However, other studies have shown sport participation to raise the likelihood of alcohol use in youth samples (Denham, 2011; Eitle, Turner, & McNulty-Eitle, 2003; Lisha & Sussman, 2010). Denham (2011) found participants of various sports, such as football, baseball, and weightlifting, to have higher rates of alcohol use than non-participation peers. Eitle and colleagues (2003) contended that playing sports did not prevent alcohol or drug use even when controlling for other known predictors of alcohol use, such as stress exposure, socioeconomic status, family structure, and peer substance use. Lisha and Sussman (2010) systematically reviewed literature on high school and college sport participation with results indicating that the majority of studies reviewed suggested higher levels of alcohol consumption among sport participants. A similar result was shown in another system review (Kwan, Bobko, Faulkner, Donnelly, & Cairney, 2014), sport participation was clearly associated with increases in alcohol consumption among youth.

*Self-esteem.* Similar to the inconclusive findings regarding sport participation's effect on drinking alcohol, previous research has shown sport participation's effect on levels of self-esteem among youth to be inconclusive across samples (Fredricks & Eccles, 2006; Richman & Shaffer, 2000). Fredricks and Eccles (2006) found sport participation to directly predict increased self-esteem over time. Slutzky and Simpkins (2009) found that youth who spent more time in team sport participation had greater levels of self-esteem than their peers. Bowker (2006) found that this relationship between sports and higher self-esteem to be due to greater satisfaction with physical appearances and physical competencies. However, other studies have found a weak link or a negative relationship between sport participation and self-esteem among youth (Gibbons, Lynn, & Stiles, 1997; Richman & Shaffer, 2000). Even when controlling for success and winning at sports, some studies concluded limited and conflicting evidence regarding participations' ability to raise a youth's self-esteem (Gibbons et al., 1997; Richman & Shaffer, 2000). Such inconclusive findings establish the need for further research on sport participation's effect on self-esteem.

Studying sport participation's effect on self-esteem is further warranted as previous research has established a youth's level of self-esteem to be significantly associated with delinquency including alcohol use in mixed and ambiguous results (either increase or decrease)

(Hammé Peretson, Buster & Westburg, 2010; Scheier, Botvin, Griffin, & Diaz, 2000; Zimmerman et al., 1997). Previous research has found low self-esteem to be a significant predictor and high self-esteem to have protective effects on alcohol use among youth (Hammé Peretson et al., 2010; Swaim & Wayman, 2004). Zimmerman and colleagues (1997) found this relationship between high levels of self-esteem and reduced substance use to be due to lesser youth susceptibility to peer pressure and level of tolerance for deviance demonstrated by their peers, including the drinking of alcohol. Scheier and colleagues (2000) found levels of self-esteem to be part of a complex set of etiological forces that contribute to early age alcohol use.

However, results are inconclusive in that those with high self-esteem have been found to be involved with alcohol as well (Dolcini & Adler, 1994; Fisher et al., 2007). Fisher and colleagues (2007) found youth with high levels of self-esteem were more likely to initiate alcohol use than those with lower self-esteem. Dolcini and Adler (1994) found positive relationships between high self-esteem and risk behaviors among youth including alcohol use. Therefore, such inconclusive findings establish the need for further research. Moreover, one potential mediating factor significantly related to sport participation and alcohol consumption which may aid in further understanding the complex relationship is a youth's level of self-esteem (Fisher et al., 2007; Fredricks & Eccles, 2006; Hammé Peretson et al., 2010; Richman & Shaffer, 2000).

*Mediating effect of self-esteem.* Earlier, Faulkner and colleagues (2007) examined the mediating role of self-esteem between vigorous physical activity and juvenile delinquency among Canadian adolescents, but the results of a series of negative binomial regression analyses indicated that there was no mediation effect of self-esteem between vigorous physical activity and delinquency behavior.

Furthermore, underage alcohol drinking was excluded from the study for the risky behavior as the delinquency outcome variables. On the other hand, some scholars suggested the mediation effect of self-esteem between sport participation and underage drinking behavior based on the reviewed qualitatively approached literature (e.g., Clark, Camire, Wade, & Cairney, 2015; Kwan et al., 2014). According to the review of Kwan and colleagues (2014), "none of the studies in our review analyzed psychosocial and/or behavioral pathways (mediating and moderating effects) that might explain how sport might be protective of alcohol and illicit drug use among youth" (p. 504). In their conclusion, they emphasized the inclusion of self-esteem as a capable mediator, which is necessary to explain the relationship between sport participation and alcohol consumption among adolescents (Kwan et al., 2014). In support of the Kwan et al.'s (2014) suggestion, Clark and her colleagues (2015) comprehensively reviewed literature on the relationship between youth sport participation and psychological and social factors that connect sport participation and alcohol and drug use.

They indicated that psychological variables (e.g., self-esteem, self-regulation) increased by sport involvement would intervene with deviant behaviors, such as alcohol and substance use and abuse, among youth (Clark et al., 2015). That is, this review showed a protective pathway where sport participation enhances psychological and social outcomes and this association in turn impacts positive psychological well-being and decreases alcohol and drug use. However, to our knowledge, there is a lack of empirical research on how self-esteem mediates the relationship between sport participation and underage drinking behavior. Therefore, more empirical studies are needed to determine whether the mechanisms underlying the association of sport participation with underage drinking behavior are additionally explained by enhanced self-esteem among youth and adolescents. Important to the current study are the understudied lifestyle factors of sport participation and self-esteem to which previous research has indicated mixed results in predicting drinking behaviors (Fisher et al., 2007; Hammé Peretson et al., 2010; Lisha & Sussman, 2010).

The purpose of the current study is to understand the relationship between sport participation, underage drinking behavior, and the mediating effect of self-esteem. As the effect of sport participation on drinking behavior is inconclusive across samples, the current study may provide insight into the under-studied potential mediating factor of self-esteem. Therefore, four hypotheses were examined as follows:

Hypothesis 1: Sports participation increases students' drinking behavior.

Hypothesis 2: Sports participation increases students' self-esteem.

Hypothesis 3: Self-esteem decreases students' drinking behavior.

Hypothesis 4: Sports participation decrease students' drinking behavior through self-esteem.

## Material & methods

Three research models were developed to address above-mentioned hypotheses: the first model (Model 1) represented the direct effect of sport participation on students' drinking behavior, the second model (Model 2) presented the indirect effect of sport participation on students' drinking behavior through self-esteem, and the last model (Model 3) presented the combination model of first and second models to examine direct and indirect effects of sport participation on drinking behavior. Fig. 1 provides a graphical representation of three models along with the hypotheses.

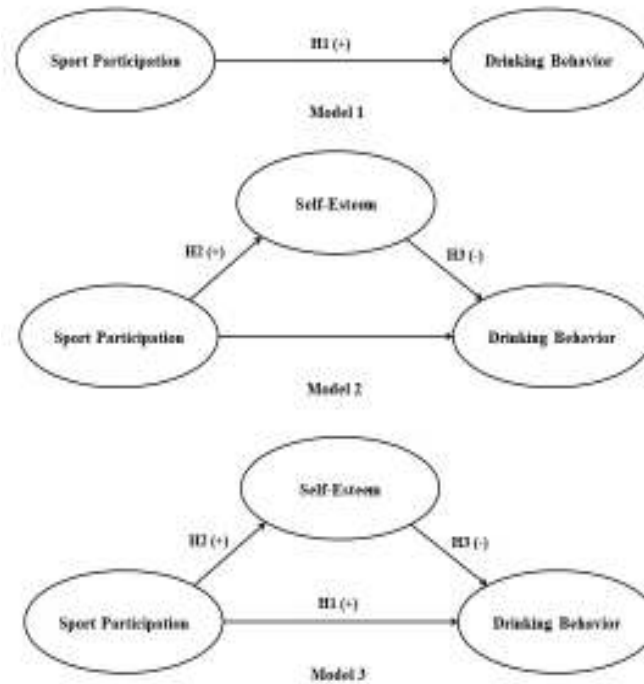


Fig.1 Three Proposed Research Models

*Participations and data collection*

To raise the importance of the relationships among youth sport participation, self-esteem, and youth alcohol consumption, a large number of youth participants are required. The current study used an existing data set from the annual surveys, “Monitoring the Future: A Continuing Study of American Youth” (Johnston, Bachman, O’Malley, Schulenberg, & Miech, 2014). The survey was part of a series that investigated various characteristics of American youth, such as attitudes, lifestyles, and deviant behaviors. Respondents of this survey were 8th and 10th grade students, who were selected through a stratified multi-stage cluster sample of schools in 2014 (Johnston et al., 2014). The total sample size in the original data was 28,536. Specifically, for gender, 50.2% were female students and for race, 17.0% were African American /Black, 60.4% were White, and 22.6% were Hispanic in original data. The original data set was retrieved from the Inter-university Consortium for Political and Social Research (ICPSR).

*Sample.* In order to examine above three proposed research models, the current study generated a data set of 8,120 students who responded to the questionnaire regarding the measures of sport participation, self-esteem, and drinking behavior through a filtering process. In comparison with the original data, the selected sample of this study had similar characteristics: 49.2% were male students. For race, 15.9% were African American/Black students, 62.7% were White students, and 21.4% were Hispanic students.

*Measure*

As an endogenous variable, drinking behavior was measured by three items: “On how many occasions (if any) have you had alcoholic beverages to drink - more than just a few sips during the last 12 months?”, “On how many occasions (if any) have you had beer to drink - more than just a few sips during the last 12 months?”, and “On how many occasions (if any) have you had flavored alcoholic beverages like Mike’s Hard Lemonade, Smirnoff Ice, Baccardi Silver, wine coolers, etc. to drink - more than just a few sips during the last 12 months?” Answers were coded using a 7-point Likert-scale, responses ranged from 1 = 0 occasions to 7 = above 40 occasions. Thus, higher scores on the scales indicated that students engaged in each type of drinking behaviors more frequently. To measure the level of sport participation, as an exogenous variable, two items were used: “How often do you exercise vigorously (jogging, swimming, calisthenics, or any other active sports)?” and “How often do you actively participate in sports, athletics or exercising?” Each student responses were coded from 0 = never to 2 = almost daily. Higher scores indicated that students were involved in sport and physical activities more frequently. It is important to note that although researchers have commonly recommended that 3 or more items per factor be used in confirmatory factor analysis (CFA), many studies showed evidences that two items can be used (e.g., Raubenheimer, 2004; Worthington & Whittaker, 2006; Yong & Pearce, 2013).

For the mediation variable, self-esteem was measured by six(6) items of Rosenberg’s (1965) self-esteem scale: (1) On the whole, I am satisfied with myself, (2) I am able to do things as well as most other people, (3) I feel that I’m a person of worth, at least on an equal plane with others, (4) I take a positive attitude toward myself, (5) At times I think I am no good at all (reverse coding), and (6) I feel I do not have much to be proud of (reverse coding). The respondents used an answer choice (1 = disagree to 5 = agree). Higher scores on the scale indicated more of the respective item. That is, students with higher scores had higher self-esteem.

*Statistical analysis*

Statistical analysis was conducted in a series of steps in order to examine three proposed research models with four hypotheses using IBM SPSS for windows and AMOS 22.0 for analyses of Structural Equation Modeling (SEM). The first step of the analysis involved the use of descriptive statistics in order to provide information about the distribution of the data, including the mean, standard deviation, skewness, and kurtosis. When skewness is below 3 and kurtosis is below 10, normality of the data would be determined (Kline, 2016). In the second step, a correlation analysis between the measures that indicated sport participation, self-esteem, and drinking behavior was conducted to show that observed measures shared suitable levels of variation. Collinearity problems occurred when sharing too much variation (the correlation coefficients greater .90) (Kline, 2016). It is important to note that Structural Equation Modeling (SEM) analysis included two processes: (1) measurement model, confirmatory factor analysis (CFA), and (2) structural model (SM), path analysis. The third step was the presentation of CFA. The purpose of the CFA was to determine if the measures showed discriminant and convergent validity, composite reliability, and proper fit between the model and the data. Kline (2016) suggests that factor loadings above .50 were large. Further, Kline (2016) suggests that multiple goodness-of-fit indexes (chi-square [ $\chi^2$ ] statistics, comparative fit indexes [CFI], root mean squared error of approximation [RMSEA], and standardized root mean of the residual [SRMR]) were necessary to properly determine model fit. In addition, the composite reliability was included in order to address the consistency of the observed measures in respective latent variables (Raykov, 1997; higher than .70). Next, to test hypotheses, the present study analyzed three research models, with the goodness-of-fit of the model also considered. This fourth step of this study was done to consider the hypothesized links between the latent measures and the model fit. While we examined the hypotheses, broadly, we were examining the mediation effect of self-esteem, and sport participation and drinking behavior.

To determine if the model fits the data for CFA and SM, this study used several criteria such as  $\chi^2$ , CFI, RMSEA, and SRMR. Schumacker and Lomax (1996) and Kline (2016) explains that the  $\chi^2$  should not be significant to indicate a properly fitting model. However, the  $\chi^2$  test was not the only test of the goodness-of-fit of research models because it was, potentially, sensitive to sample size (Kline, 2016). In particular, the sample size in this study was very large. Thus, other fit statistics (CFI, RMSEA, and SRMR) were necessary to determine if the CFA did fit the data. If CFI is higher than .90, the goodness-of-fit is deemed good, but CFI above .95 is excellent (Kline, 2016). The goodness-of-fit is very good if the RMSEA is lower than .05, good if it is .05-.08, and poor if it is higher than .10 (Hu & Bentler, 1999). The SRMR should be .05 or below, but .08 or below was an acceptable range (Hu & Bentler, 1999). Furthermore, with a large sample size of the present study, the Sobel test was appropriate to examine the significance of a mediation effect of self-esteem (Preacher & Leonardelli, 2018).

**Results**

For the first step, descriptive statistics provided the distribution of the data using the mean, standard deviation, and scale of observed measures. In addition, skewness and kurtosis determined the normality of the observed measures (see Table 1). Although skewness and kurtosis of observed measures in drinking behavior were relatively high, all of the observed measures met Kline's (2016) thresholds for normality (skewness < 3, kurtosis < 10). It is important to note that previous research indicated that distribution of deviant and criminal behaviors could be non-normal depending on sample population based on the previous research (Glaeser, Sacerdote, & Scheinkman, 1996).

Table 1. Sample Descriptive Statistics of Observed Measures

Variables		Mean	SD	Scale	Skewness	Kurtosis
Sport participation	x1 How often do you exercise vigorously (jogging, swimming, calisthenics, or any other active sports)?	1.62	.58	0-2	-1.26	.59
	x2 How often do you actively participate in sports, athletics or exercising?	1.45	.66	0-2	-.79	-.47
Self-Esteem	x3 On the whole, I am satisfied with myself	3.82	1.33	1-5	-.90	-.40
	x4 I am able to do things as well as most other people	3.91	1.20	1-5	-1.02	.90
	x5 I feel that I'm a person of worth, at least on an equal plane with others	3.85	1.29	1-5	-.94	-.25
	x6 I take a positive attitude toward myself	4.01	1.24	1-5	-1.22	.44
	x7 At times I think I am no good at all (reverse)	3.52	1.46	1-5	-.46	-1.24
	x8 I feel I do not have much to be proud of (reverse)	3.70	1.40	1-5	-.67	-.95
Drinking Behavior	y1 Alcoholic beverage w/t the last 12 months	1.72	1.32	1-7	2.09	3.95
	y2 Beer w/t the last 12 months	1.55	1.20	1-7	2.67	7.08
	y3 Flavored alcoholic beverage w/t the last 12 months	1.48	1.09	1-7	2.85	8.47

Note. N=8,120

As the second step, correlation analysis was performed to identify the relationships between observed measures and to indicate how much variance was shared between them. All correlations between the two observed measures of sport participation and six observed measures of self-esteem were positively significant ( $r = .16$  to  $.55$ ,  $p < .01$ ). On the other hand, all measures of self-esteem and drinking behavior were negatively and significantly correlated to each other ( $r = -.13$  to  $-.03$ ,  $p < .01$ ). Regarding the measures of sport participation and drinking behavior, only two associations were significant ( $r = .03$ ,  $p < .01$ ). The correlation matrix (see Table 2) indicated no collinearity among observed measures (interrelations were less than .90) (Kline, 2016).

Table 2. Correlation Matrix between Observed Measures

	1	2	3	4	5	6	7	8	9	10	11
1. x1	-										
2. x2	.55**	-									
3. x3	.21**	.18**	-								
4. x4	.22**	.20**	.56**	-							
5. x5	.18**	.16**	.61**	.52**	-						
6. x6	.24**	.20**	.66**	.51**	.61**	-					
7. x7	.16**	.17**	.43**	.25**	.34**	.40**	-				
8. x8	.19**	.20**	.44**	.29**	.35**	.39**	.63**	-			
9. y1	.01	.03**	-.11**	-.05**	-.10**	-.10**	-.12**	-.13**	-		
10. y2	.02	.03**	-.08**	-.04**	-.08**	-.08**	-.11**	-.12**	.80**	-	
11. y3	.01	.02	-.08**	-.03**	-.08**	-.09**	-.11**	-.12**	.75**	.74**	-

Note. \* $p < .05$ , \*\* $p < .01$

For the third step, the measurement model was examined by CFA using goodness-of-fit indexes, factor loadings, and composite reliability (see Table 3). The results of CFA indicated that the measurement model was good fit (CFI = .94, RMSEA = .08, and SRMR = .05), and the factor loadings were all statistically significant and large ( $\lambda > .50$ ). In addition, all of the latent variables' composite reliability were greater than .70 respectively (sport participation = .73, self-esteem = .85, and drinking behavior = .91). These results indicated the consistency of the observed measures in respective latent variables.

Table 3. Results of Measurement Model

Latent Variable	Observed Variable	Factor Loading	Composite Reliability
Sports Participation	How often do you exercise vigorously (jogging, swimming, calisthenics, or any other active sports)?	.80**	.73
	How often do you actively participate in sports, athletics or exercising?	.71**	
Self-esteem	On the whole, I am satisfied with myself	.83**	.85
	I am able to do things as well as most other people	.65**	
	I feel that I'm a person of worth, at least on an equal plane with others	.74**	
	I take a positive attitude toward myself	.80**	
	At times I think I am no good at all (reverse)	.57**	
	I feel I do not have much to be proud of (reverse)	.58**	
Drinking Behavior	Alcoholic beverage w/t the last 12 months	.90**	.91
	Beer w/t the last 12 months	.89**	
	Flavored alcoholic beverage w/t the last 12 months	.83**	
Chi-Square Test of Model Fit ( $\chi^2$ ) $df = 41$		1990.69**	
Confirmatory Fit Index (CFI)		.94	
Root Mean Squared Error of Approximation (RMSEA)		.08	
Standardized Root Mean of the Residual (SRMR)		.05	

Note. \* $p < .05$ , \*\* $p < .01$

For the last step, three structural models (Model 1 to 3, see Fig. 1) were examined to test four hypotheses (Hypothesis 1 to 4). Regarding Model 1, the results of the chi-square statistic ( $\chi^2$ ) was 6.42 ( $p < .01$ ) and other model fit statistics were very excellent (CFI = 1.00, RMSEA = .01, and SRMR = .005). However, sport participation did not have a direct effect on drinking behavior ( $\beta = .05$ ,  $p > .05$ ). Therefore, Hypothesis 1 (Sport participation increases students' drinking behavior) was not supported. In Model 2, excluding the direct relation between sport participation and drinking behavior, the full mediation model that combined a relationship

between sport participation and drinking behavior through self-esteem were examined. The full mediation model indicated proper fit between the model and the data ( $\chi^2 = 2031.73$ ,  $p < .01$ , CFI = .94, RMSEA = .08, and SRMR = .05) and all of paths (effects) were statistically significant: (a) sport participation increased students' self-esteem ( $\beta = .34$ ,  $p < .01$ ), and (b) students' self-esteem decreased students' drinking behavior ( $\beta = -.14$ ,  $p < .01$ ). Therefore, Hypothesis 2 and 3 were supported in Model 2. To simultaneously examine four hypotheses (Hypothesis 1 to 4), Model 3 was included the first and second models to examined direct and indirect effects of sport participation on drinking behavior. The goodness-of-fit of the last structural model indicated that satisfactory model fit to the data ( $\chi^2 = 1990.69$ ,  $p < .01$ , CFI = .94, RMSEA = .08, and SRMR = .05). Like Model 2, the results indicated that sport participation increased students' self-esteem (Hypothesis 2:  $\beta = .35$ ,  $p < .01$ ) and self-esteem decreased students' drinking behavior (Hypothesis 3:  $\beta = -.18$ ,  $p < .01$ ). Particularly, Model 3 indicated that sport participation significantly increased students' drinking behavior (Hypothesis 1:  $\beta = .11$ ,  $p < .01$ ), unlike Model 1. Therefore, all of three hypotheses were supported in Model 3 (see Table 4).

Table 4. Results of Structural Models

Path	Model 1		Model 2		Model 3	
	Coef. (SE)	$\beta$	Coef. (SE)	$\beta$	Coef. (SE)	$\beta$
Sport participation → Drinking Behavior	.08 (.04)	.05			.27 (.04)	.11**
Sport participation → Self-Esteem			.61 (.03)	.34**	.61 (.03)	.35**
Self-Esteem → Drinking Behavior			-.21 (.02)	-.14**	-.27 (.02)	-.18**
$\chi^2$	6.42**		2031.73**		1990.69**	
CFI	1.00		.94		.94	
RMSEA	.01		.08		.08	
SRMR	.005		.05		.05	

Note. \* $p < .05$ , \*\* $p < .01$

Furthermore, the results of Model 3 indicated that students' self-esteem mediates the relationship between sport participation and students' drinking behavior (Total effects [TE] = .11, direct effects [DE] = .28, and indirect effects [IE] = -.16). The Sobel test revealed that the mediation effect of self-esteem was statistically significant ( $z = -11.24$ , standard error [S.E.] = .01,  $p < .001$ , see Table 5). Since the direct effect of sport participation on drinking behavior was extremely offset via the mediation effect of self-esteem, Hypothesis 4 (sports participation decreases students' drinking behavior through self-esteem) was supported.

Table 5. Direct/ Indirect and Total Effect and Sobel Test

	I.V	M.V	D.V	Direct	Indirect	Total Effect	Sobel Test	P-value
Model 3	Sport Participation	Self-Esteem	Drinking Behavior	.28 (.11)	-.16 (-.06)	.11 (.04)	-11.24	0.00

Note. Parentheses are standardized effects.

**Discussion**

Given the high rates of alcohol use and the plethora of negative consequences associated with youth alcohol consumption (Cooper, 2002; Johnston, O'Malley, Bachman, & Schulenberg, 2013), the current study, therefore, tested four hypotheses related to sport participation, self-esteem, and alcohol use among youth to have a better understanding of underage drinking behavior. Findings in the present study have theoretical and practical significances in addressing the problem of underage drinking behavior.

Although not significant in the direct relationship shown in model 1, sport participation was found to be related to drinking behaviors in further models (Model 2 and 3) that included testing the relationship through self-esteem. The results revealed that sport participation was found to generally increase drinking behaviors among youth and this is similar to much previous research that sport participation may cause negative impacts on youth and increasing risky behaviors including drinking problems (Kwan et al., 2014; Lisha & Sussman, 2010; Martens 2017). It is important note that previous studies have often led to conflicting findings; some researchers found that those youth who played sports were at an increased likelihood to drink alcohol (Lisha & Sussman, 2010). In contrast, other researchers found that youth sport participation was associated with more controlled drinking behaviors (Elder et al., 2000). Therefore, the current study supports that sport involvement may not be the solution to preventing drinking behavior by itself (Kwan et al., 2014). For instance, previous research indicated that adolescents who only participate in sports and specifically team sports are more likely to have an increased alcohol use compared to adolescents who participate in other academic activities (e.g., music clubs) (Martens 2017; Mays, DePadilla, Thompson, Kushner, & Windle, 2010).

The results also support the full mediation model (Model 2) and its hypotheses that sport participation increases student's self-esteem and that self-esteem decreases student drinking. These perspectives have been found in some previous research, although the findings were not conclusive (Fredricks & Eccles, 2006; Swaim &

Wayman, 2004). Previous research suggests that self-esteem has been found to be related to both sport participation and drinking behaviors in mixed results (could either increase or decrease behaviors) among youth and adolescents. Furthermore, the current study found a mediation effect with self-esteem when including the direct relationship of sport participation and drinking behavior among youth (specifically both 8th and 10 grades) in Model 3. When the direct and inverse effect of sport participation on underage drinking behavior was statistically significant, these results were offset by the mediation effect of self-esteem. In other words, even though sport participation increased student drinking, sport participation could control drinking consumption through the development of higher self-esteem. These results support that psychological factors (e.g., self-esteem) are equally as important as social factors (e.g., peers) in contributing to prevent risky health behaviors among youth (Lo, Chang, Wong, Rochelle, & Kwok, 2011).

Previously many researchers have attempted to identify the predictors and correlates of deviant and risk health behaviors among youth and adolescents. However, findings of previous research were mixed and ambiguous results on relationships among sport participation, underage drinking behavior, and self-esteem. Therefore, the findings of the current study suggest there are theoretical relationships among sport participation, underage drinking behavior, and mediation effect of self-esteem, and these relationships provide a better understanding of underage drinking behavior among youth. It is important to note that there are still protective impacts of sport participation on reducing delinquency and risky health behaviors. The programs related to sport and physical activity could be a tool for youth development and the prevention of risky health behaviors but as a component of many and wider initiatives as part of the solution to underage drinking behaviors (Elder et al., 2000; Kwan et al., 2014). Moreover, the findings suggest that development of self-esteem is an important psychological factor to consider in youth sport programs because it significantly contributes to the causes and prevention of deviant and risky health behaviors for youth and adolescents (Lo et al., 2011).

Although results from the current study remain meaningful, some limitations to the findings should be noted. The cross-sectional nature of the data prevents temporal assessment. It is important to note that this study focused on frequency of participating in sport and physical activities, exercises, and athletics among youth to represent the sport participation. It didn't specifically indicate the levels and types of sports and exercises (e.g. club, individual or team settings). Additionally, control variables (e.g., academic performance, social factors) were not included in the current study's analysis so that the lack of control variables limits the strength of the results. Future studies should incorporate these limitations into data collection. Despite these limitations, since previous research about sport participation and the potential mediating effect of self-esteem has been an understudied topic in the alcohol use literature (Kwan et al., 2014), the results from the current study support the concept of self-esteem as a mediating factor in explaining the relationship between sport participation and alcohol use.

## Conclusions

The purpose of the current study is to understand the relationship between sport participation, underage drinking, and the mediating effect of self-esteem among youth and adolescents. Based on previous research, the effect of sport participation on drinking is inconclusive across samples. The results of the current study support the concept of self-esteem as a mediating factor in explaining the relationship between sport participation and alcohol use among youth and adolescents. Although frequency of sport participation was associated with higher rates of alcohol consumption among youth and adolescents, this study suggests that sport participation can develop higher levels of self-esteem in youth which work to control youth and adolescents' drinking behaviors. Since this study provides insight into the understudied potential mediating effect of self-esteem, people (e.g., parents, teachers, coaches, and administrators) who work closely with youth and adolescents will especially benefit from these findings and gain a better understanding of underage drinking behavior and importance of self-esteem among youth and adolescents. Moreover, these findings will be a helpful resource for youth sport and public health programs to provide the enhancement of self-esteem. This current study contributes to youth sport participation and risky behavior of youth and adolescent literature by addressing the demand of empirical studies of the relationship between youth sport participation and their alcohol consumption, based on the examination of the mediating effects of self-esteem.

**Conflicts of interest** - The authors declare no conflict of interest.

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