



Relations of participation in organized activities to smoking and drinking among Japanese youth: contextual effects of structural social capital in high school

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Abstract

Objectives This cross-sectional study examined the effect of school-level structural social capital on smoking and drinking among Japanese youth.

Methods Self-administered anonymous questionnaires were distributed to 3248 students at 29 high schools across Okinawa, Japan in 2008. Structural social capital was measured by students' participation in organized activities: student council, extracurricular activities, volunteer activities, community sports clubs, and youth associations. Contextual-level social capital was measured by aggregated school-level individual responses.

Results At the individual level, extracurricular activity participation was negatively associated with smoking and drinking, whereas participation in youth associations was positively associated with smoking and drinking. School-level extracurricular activity participation was negatively associated with smoking among boys, whereas school-level participation in youth associations was positively associated with smoking among boys and girls and drinking among boys.

Conclusions This study suggests that structural social capital measured by participation in organized activities, especially extracurricular activities, might be an important way for youths to attain good health. This study also supports the idea that particular type of activities, such as youth associations, can lead to the so-called “dark side of social capital”.

Keywords Social capital · Social participation · Multilevel modelling · High school · Japan

Introduction

Cigarette smoking and alcohol use among young people have been a global public health concern given its harmful influence on youths' health in the short and long term (Gore et al. 2011). In Japan, smoking and drinking behaviours among Japanese youth have also been common, although underage smoking and drinking are prohibited. Yet, in recent years, the prevalence of cigarette and alcohol use among Japanese youth has been declining (Osaki et al. 2008, 2009; Takakura and Miyagi 2014). Surveys of high school students in the study region showed that current smoking prevalence among boys was 25 % in 2002 and 7 % in 2012, whereas that among girls was 11 % and 3 %, respectively. The current drinking prevalence among boys and girls was 40 % and 14 % and 42 % and 13 %, respectively (Takakura and Miyagi 2014). It has been pointed out that the causes of the current decreases might be due to minors' restricted access to tobacco, school policies against smoking, and limited sources of alcohol beverages, either by revised or recently enacted laws (Osaki et al. 2008, 2009; Takakura and Miyagi 2014). Understanding the potential determinants of health-risk behaviours such as smoking and drinking in young people is important for developing an effective prevention effort. In the field of public health, it is widely considered that social determinants play a significant role in health and health-related behaviours (McPherson et al. 2013). Against this background, the present study focuses on social capital as an important social determinant of youth health-risk behaviours.

Social capital is an important concept recognized as helping to elucidate social relationships of individuals and collectives, and studies have been conducted on its potential effects on health and health-related behaviours

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(De Silva et al. 2005; Kawachi et al. 2008). Although different definitions and metrics have been proposed, social capital often refers to features of social organization such as trust, norms, and networks, which can improve social efficiency by facilitating coordinated actions (Putnam 1993). In most public health research, social capital is assessed on the basis of social cohesion, an approach that conceptualizes social capital in terms of resources available to members of social groups, and it is commonly measured according to attributes of groups, such as organizations, communities, neighbourhoods, and workplaces (Kawachi et al. 2008; Engström et al. 2008). Many studies have also examined the effects of social capital at both individual and collective levels on health outcomes (Kawachi et al. 2008; Murayama et al. 2012).

The concept of social capital includes both structural and cognitive components. The structural component refers to the extent and intensity of associational links or social participation, whereas the cognitive component refers to perceptions of trust and reciprocity (Harpham 2008; Engström et al. 2008). Several systematic literature reviews on social capital and physical health (Kim et al. 2008), mental health (De Silva et al. 2005), and health-related behaviours (Lindström 2008) have suggested that higher individual-level social capital with both cognitive and structural components has mostly positive associations with good health outcomes. Furthermore, generally stronger associations with health outcomes were observed for cognitive social capital than for structural social capital (Kawachi et al. 2008; Lindström 2008). However, certain types of social participation were also found to have a negative impact on health outcomes, the so-called “dark side of social capital” (Portes 1998; Kawachi et al. 2008; Zambon et al. 2010; Chen et al. 2014).

On the other hand, associations between contextual-level social capital and health outcomes were inconclusive. After adjustment for individual-level variables, Kim et al. (2008) reported that contextual effects of social trust on health outcomes were mostly weak and the association between contextual-level social participation and health outcomes was no longer statistically significant. Some studies also showed that higher contextual-level social trust was positively associated with self-rated health, whereas contextual-level social participation was not (Snelgrove et al. 2009; Murayama et al. 2012).

Taken together, previous findings on the effects of structural social capital on health outcomes, especially at the contextual level, were inconsistent and supported the idea that effects of structural social capital depend upon setting and the type of predictors and outcomes studied

(Pavlova et al. 2013). More empirical research is needed to further elucidate the association between health and structural social capital at both individual and contextual levels.

Although most previous studies used adult populations, recently, investigations of social capital and health among youth have been increasing. Nevertheless, multilevel studies of youth health have been limited to social capital in neighbourhoods and communities (De Clercq et al. 2012; Thorlindsson et al. 2012; Åslund and Nilsson 2013), with possibly little attention paid to school-related issues (Morrow 1999). Students spend most of their daytime hours at school, which can be a particularly important context for setting norms for students’ behavioural patterns and attitudes (Johansen et al. 2006), and thus might have shared influences on student health and health-related behaviours (West et al. 2004). Therefore, school is plausibly an important place to generate social capital for students. However, few studies have used school as a reference area unit to examine contextual social capital for students (Takakura 2011).

This study focused on high school students’ social participation, which has been considered a key indicator of structural social capital (Nyqvist et al. 2013). Students’ social participation has often been measured by participation in organized activities (Winstanley et al. 2008; Zambon et al. 2010). Our measure of structural social capital is in line with this approach. In general, it has been proposed that high levels of social capital might influence health-related behaviours by promoting rapid diffusion of health information, increasing adoption of healthy behavioural norms, and exerting informal social control over deviant behaviours (Kawachi and Berkman 2000). Social participation in young people might exert an especially high influence over health-risk behaviours through expectations about the behavioural norms of the group they participate in (McPherson et al. 2013); more specifically, participation in extracurricular activities is the most influential activity for enhancing students’ school connectedness and might serve as a social control function deterring them from delinquency (Moilanen et al. 2014). This study simultaneously examined the effects of social participation at both individual and school levels on youth health-risk behaviours, such as cigarette smoking and alcohol drinking, by measuring aggregate student responses to participation in each school’s organized activities. It was hypothesized that not only individuals with high levels of social participation, but also those in schools characterized by high aggregate levels of social participation, would be less likely to engage in health-risk behaviours.

Methods

Data

The present study was conducted in public high schools across Okinawa Prefecture, Japan, between October and December 2008. Using written instructions provided by researchers, classroom teachers distributed in class a self-administered anonymous questionnaire designed to obtain a wide range of health, sociodemographic, and psychosocial information and to explore those trends among students in Okinawa (Takakura and Miyagi 2014). After being informed about the nature and intent of the study, both in writing and verbally, all students attending the class were requested to complete and return a questionnaire sealed in an unmarked envelope to assure confidentiality of the responses. Students were free to decline to participate. No follow-up was conducted on students absent from school when the survey was conducted. The study protocol was approved by the Institutional Review Board of the University of the Ryukyus.

The study sample consisted of 3248 students in grades 10 through 12 (aged 15–18 years) enrolled in 29 public high schools across Okinawa. Okinawa Prefecture has 64 public high schools (40 general high schools and 24 vocational high schools) and is divided into six districts (Okinawa Prefectural Educational Board 2008). Nineteen general high schools and 10 vocational high schools were randomly chosen, one or more from each school type according to the proportion of schools located in the six districts. In each selected school, one class was chosen from each grade. Among 3248 students, 150 declined to participate and 248 were absent from school when the survey was conducted, leaving a total of 2850 students who participated in this study (response rate: 88 %). From among those, data on parental education level, cigarette smoking, and alcohol drinking were missing from 286, 61, and 96 participants, respectively. Other variables of interest had no missing cases. Then, questionnaire responses from the 2479 students (1207 boys and 1272 girls) who provided complete data on all variables of interest were used for analyses (76 % of the original study sample).

Health-risk behaviours

Cigarette smoking and alcohol drinking were assessed using questions adapted from the Youth Risk Behavior Surveillance conducted by the US (Centers for Disease Control and Prevention 2011). We evaluated smoking and drinking behaviours from students responses to the following questions: “During the past 30 days, on how many days did you smoke cigarettes?” and “During the past 30 days, on how many days did you have at least one drink

of alcohol?” A current smoker or drinker was defined as one who smoked cigarettes or consumed alcohol on at least one day in the past month (Centers for Disease Control and Prevention 2011). Test–retest reliability of these questions demonstrated adequate stability for Japanese adolescents, with the kappa statistic ranging from 0.51 to 0.65 (Takakura and Miyagi 2003).

Structural social capital

This study assessed structural social capital by measuring participation in five types of organized activities: student council, extracurricular activities, volunteer activities, community sports clubs, and youth associations. Respondents were asked to circle each activity that they participated in during the past 12 months, and each circled activity was coded as “participated” and no mark as “other.” Then, the total number of activities in which the respondents participated was counted and coded as “no participation”, “one activity”, and “two or more activities”.

Contextual-level social capital was measured by aggregated school-level individual responses. The proportion of students in each school who participated in each activity was calculated. The mean total number of activities participated in at each school was also calculated. Both these school-level variables were then treated as continuous variables in the analyses.

Covariates

This study included several sociodemographic factors shown to be potential confounders as control variables (Sellström and Bremberg 2006). These variables included gender, grade, school type (general or vocational), school location (urban or rural), family structure, and level of parental education. Family structure was categorized by who the student lived with and coded as “living with both parents” or “other”. Level of parental education was coded by each parent’s level of educational attainment, with the highest level used in the analysis. Categories were “high school or lower”, “specialized training college or junior college”, and “university or higher”. These categories corresponded to the International Standard Classification of Education Level, at levels 1/2/3, 5B, and 5A/6, respectively (OECD 2008).

Data analyses

Due to the hierarchical nature of the data with students nested within schools, a multilevel logistic regression model was performed using the GLIMMIX procedure in SAS version 9.2 (SAS Institute Inc. 2008). In the analysis,

a random intercept model was fitted based on a logit-link function and schools were treated as random effects. For each behaviour, modelling was adapted in stages as follows, separately for boys and girls.

This study separately tested each organized activity and number of activities participated in for each regression model. Model 1 included individual-level social capital and covariates, whereas Model 2 contained contextual-level social capital and covariates. Finally, Model 3 included both individual- and contextual-level social capital and covariates to examine whether a contextual effect of school-level social capital for each behaviour existed after taking into account individual-level social capital (Diez Roux 2002). Odds ratios (OR) with 95 % confidence intervals were estimated as fixed effects. For contextual-level social capital, ORs were computed for the increase of one standard deviation in the corresponding social capital characteristics. As a measure of variability in each behaviour between and within schools, the intraclass correlation coefficient (ICC) was estimated, which was the proportion of total variance in school level-related behaviour (Diez Roux 2002).

Results

Table 1 shows study sample characteristics and prevalence of smoking and drinking organized by independent variable. Overall, current smoking prevalence among boys and girls was 11.6 % and 6.3 %, respectively, and current drinking prevalence among boys and girls was 20.3 % and 20.5 %. Regarding participation in organized activities, more than half of the students (69 % of boys and 59 % of girls) participated in extracurricular activities. A few students (from 4 % to 16 %) were involved in other organized activities. A large proportion of students were involved in at least one activity (81 % of boys and 72 % of girls). The mean total number of activities across the schools studied was 1.0.

Table 1 also shows results of bivariate analysis. On average, students with lower grades, students at general high schools, students living with both parents, and students with higher parental education had lower ORs for smoking and drinking. At the individual level, participation in extracurricular activities was negatively associated with smoking and with drinking. However, participation in youth associations was positively associated with smoking and with drinking, and participation in volunteer activities and community sports clubs was positively associated with drinking among boys. In general, the more organized activities a student participated in, the less likely he or she was to smoke and drink, except for boys' drinking. Contextual-level participation in extracurricular activities,

student council among girls, or participation in at least one activity was negatively associated with smoking and with drinking, whereas contextual-level participation in youth associations was positively associated with smoking and with drinking (Table 1).

Table 2 shows results of multilevel modelling. Each finding of Models 1 and 2 after covariate adjustment was almost in the same direction as those of bivariate analysis. After taking into account individual- and contextual-level variables simultaneously in Model 3, both individual- and contextual-level extracurricular-activity participations were negatively associated with smoking, although the contextual-level OR for girls was not statistically significant, whereas both individual- and contextual-level youth-association participations were positively associated with smoking. On the other hand, only individual-level participation in extracurricular activities was negatively associated with drinking, and participation in volunteer activities or community sports clubs at the individual level was also positively associated with drinking among boys. Meanwhile, both individual- and contextual-level youth-association participations were positively associated with drinking, although the contextual-level OR for girls was not statistically significant. As for the number of activities participated in, girls who participated in at least one activity were less likely to smoke (ORs of 0.5 and 0.4, for participation in one activity and two or more activities, respectively), and boys who participated in one or more activities were less likely to smoke but the ORs were insignificant (each OR of 0.7). The associations between number of activities at the individual level and drinking among boys and girls were not statistically significant and showed mixed directions. The number of activities at the contextual level was negatively associated with smoking and drinking among boys and girls, but the ORs were insignificant (ORs from 0.7 to 0.9).

According to prior analyses, extracurricular activities appear to be by far the most frequently engaged activity and might contribute largely to the negative associations of the number of activities with smoking and drinking. Thus, the distribution and association of the number of activities re-categorized by the presence or absence of extracurricular activities are shown in Table 3. Participation in extracurricular activities only and in more than one activity including extracurricular activities was negatively associated with smoking and drinking, except for boys' drinking. Other participation combinations without extracurricular activities were positively associated with smoking and drinking. Regarding school variation in smoking and drinking, ICCs for smoking among boys and girls were 0.14 and 0.10, and ICCs for drinking among boys and girls were 0.08 and 0.05, respectively, which indicate that 14 % and 10 %, and 8 % and 5 % of the total variance in

Table 1 Sample characteristics and prevalence of cigarette smoking and alcohol drinking by independent variables (Japan, 2008)

	Boys		Girls		Cigarette smoking				Alcohol drinking			
	n	(%)	n	(%)	Boys		Girls		Boys		Girls	
					(%)	(95 % CI)	(%)	(95 % CI)	(%)	(95 % CI)	(%)	(95 % CI)
Total	1207	(100)	1272	(100)	(11.6)	(6.3)	(20.3)	(20.5)				
Individual-level variables												
Grade												
1st	405	(33.6)	452	(35.5)	(10.1)	(4.6)	(18.3)	(16.2)	1.0	1.0	1.0	1.0
2nd	402	(33.3)	438	(34.4)	(12.7)	(8.2)	(16.2)	(22.1)	1.8	0.9	1.5	1.5
3rd	400	(33.1)	382	(30.1)	(12.0)	(6.0)	(26.5)	(23.8)	1.3	1.6	1.6	1.6
School type												
General H.S.	793	(65.7)	876	(68.9)	(10.0)	(5.3)	(17.9)	(17.6)	1.0	1.0	1.0	1.0
Vocational H.S.	414	(34.3)	396	(31.1)	(14.7)	(8.6)	(24.9)	(27.0)	1.7	1.5	1.5	1.7
School location												
Rural	281	(23.3)	307	(24.1)	(11.4)	(6.5)	(24.2)	(21.5)	1.0	1.0	1.0	1.0
Urban	926	(76.7)	965	(75.9)	(11.7)	(6.2)	(19.1)	(20.2)	0.7	0.54-1.02	0.9	0.68-1.27
Family structure												
Both parents	892	(73.9)	912	(71.7)	(9.9)	(4.6)	(17.9)	(19.0)	1.0	1.0	1.0	1.0
Other	315	(26.1)	360	(28.3)	(16.5)	(10.6)	(27.0)	(24.4)	1.7	1.25-2.29	1.4	1.03-1.85
Parental education level												
High school or less	561	(46.5)	561	(44.1)	(15.0)	(8.7)	(23.7)	(24.2)	1.0	1.0	1.0	1.0
Specialized training or Jr. college	257	(21.3)	342	(26.9)	(12.1)	(4.1)	(19.8)	(19.6)	0.8	0.55-1.15	0.8	0.55-1.06
University or more	389	(32.2)	369	(29.0)	(6.4)	(4.6)	(15.7)	(15.7)	0.6	0.43-0.84	0.6	0.41-0.82
Student council												
Other	1109	(91.9)	1131	(88.9)	(12.1)	(6.5)	(19.8)	(20.7)	1.0	1.0	1.0	1.0
Participated	98	(8.1)	141	(11.1)	(6.1)	(5.0)	(25.5)	(19.1)	1.4	0.86-2.23	0.9	0.58-1.41
Extracurricular activity												
Other	374	(31.0)	523	(41.1)	(19.3)	(11.3)	(27.5)	(26.4)				
Participated	833	(69.0)	749	(58.9)	(8.2)	(2.8)	(17.0)	(16.4)	0.5	0.41-0.72	0.5	0.42-0.72
Volunteer activity												
Other	1062	(88.0)	1072	(84.3)	(11.3)	(6.5)	(19.3)	(20.3)	1.0	1.0	1.0	1.0
Participated	145	(12.0)	200	(15.7)	(13.8)	(5.0)	(27.6)	(21.5)	1.6	1.07-2.36	1.1	0.74-1.55
Community sports club												
Other	1098	(91.0)	1224	(96.2)	(11.8)	(6.2)	(19.2)	(20.7)	1.0	1.0	1.0	1.0
Participated	109	(9.0)	48	(3.8)	(9.2)	(8.3)	(31.2)	(16.7)	1.9	1.24-2.94	0.8	0.36-1.66

Table 1 continued

	Boys		Girls		Cigarette smoking				Alcohol drinking				
	n	(%)	n	(%)	Boys		Girls		Boys		Girls		
					OR	(95 % CI)	(%)	OR	(95 % CI)	(%)	OR	(95 % CI)	
Youth association													
Other	1122	(93.0)	1200	(94.3)	1.0	1.0	1.0	1.0	(18.9)	1.0	(19.3)	1.0	
Participated	85	(7.0)	72	(5.7)	3.2	(1.90–5.34)	3.3	(1.71–6.48)	(38.8)	2.7	(1.72–4.32)	3.0	(1.84–4.89)
Number of participations in organized activities ^a													
0	233	(19.3)	361	(28.4)	1.0	1.0	1.0	1.0	(23.6)	1.0	(22.7)	1.0	
1	738	(61.1)	671	(52.8)	0.6	(0.39–0.89)	0.4	(0.25–0.67)	(17.2)	0.7	(0.47–0.96)	0.9	(0.66–1.23)
2 or more	236	(19.6)	240	(18.9)	0.5	(0.31–0.93)	0.3	(0.15–0.68)	(26.7)	1.2	(0.78–1.79)	0.6	(0.42–0.98)
Contextual-level variables	Mean	SD	Mean	SD	OR ^c	(95 % CI)	OR ^c	(95 % CI)	OR ^c	(95 % CI)	OR ^c	(95 % CI)	
Student council (%) ^b	9.3	4.1	10.0	3.8	0.8	(0.70–1.00)	0.8	(0.61–0.97)	0.9	(0.80–1.06)	0.8	(0.73–0.97)	
Extracurricular activity (%) ^b	64.9	15.2	62.8	12.8	0.6	(0.51–0.75)	0.6	(0.47–0.78)	0.8	(0.65–0.88)	0.7	(0.64–0.86)	
Volunteer activity (%) ^b	13.5	9.8	14.3	11.0	0.9	(0.78–1.13)	1.0	(0.76–1.21)	1.0	(0.91–1.19)	1.0	(0.87–1.15)	
Community sports club (%) ^b	6.6	3.3	6.1	3.0	1.0	(0.79–1.15)	0.9	(0.68–1.08)	1.1	(0.99–1.32)	1.0	(0.83–1.09)	
Youth association (%) ^b	6.4	5.5	6.3	5.5	1.4	(1.17–1.57)	1.4	(1.18–1.69)	1.3	(1.17–1.50)	1.2	(1.04–1.34)	
Number of participations in organized activities ^a	1.0	0.2	1.0	0.2	0.7	(0.56–0.82)	0.7	(0.57–0.93)	0.9	(0.78–1.03)	0.8	(0.71–0.94)	

Bold print denotes statistical significance

OR, Crude odds ratio; 95 % CI, 95 % confidence interval

^a 5 organized activities

^b Proportion of students who participated in the activity within the school

^c ORs are computed for the increase of 1 standard deviation from the mean

Table 2 Associations of each social capital at individual and contextual level with cigarette smoking and alcohol drinking by multilevel models (Japan, 2008)

	Cigarette smoking						Alcohol drinking					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
	OR	(95 % CI)	OR	(95 % CI)	OR	(95 % CI)	OR	(95 % CI)	OR	(95 % CI)	OR	(95 % CI)
Boys												
Individual-level student council	0.4	(0.18–1.04)			0.5	(0.19–1.08)	1.4	(0.84–2.30)			1.4	(0.85–2.34)
Contextual-level student council ^a			0.8	(0.54–1.11)	0.8	(0.56–1.13)			0.9	(0.73–1.17)	0.9	(0.72–1.16)
Individual-level extracurricular activity	0.5	(0.31–0.66)			0.5	(0.33–0.71)	0.6	(0.45–0.84)			0.6	(0.47–0.88)
Contextual-level extracurricular activity ^a			0.6	(0.47–0.87)	0.7	(0.51–0.97)			0.8	(0.63–1.00)	0.8	(0.67–1.06)
Individual-level volunteer activity	1.3	(0.75–2.18)			1.3	(0.75–2.20)	1.5	(1.01–2.32)			1.5	(1.01–2.33)
Contextual-level volunteer activity ^a			0.9	(0.67–1.34)	0.9	(0.66–1.32)			1.0	(0.80–1.31)	1.0	(0.79–1.28)
Individual-level community sports club	0.8	(0.40–1.62)			0.8	(0.40–1.63)	1.8	(1.17–2.89)			1.8	(1.15–2.88)
Contextual-level community sports club ^a			1.0	(0.70–1.36)	1.0	(0.71–1.37)			1.1	(0.85–1.35)	1.0	(0.82–1.31)
Individual-level youth association	2.8	(1.60–4.82)			2.6	(1.49–4.51)	2.4	(1.45–3.81)			2.2	(1.33–3.54)
Contextual-level youth association ^a			1.4	(1.07–1.91)	1.3	(1.01–1.80)			1.3	(1.10–1.62)	1.3	(1.05–1.55)
Individual-level participation in organized activities												
1	0.7	(0.44–1.07)			0.7	(0.45–1.09)	0.8	(0.52–1.10)			0.8	(0.53–1.11)
2 or more	0.7	(0.38–1.20)			0.7	(0.39–1.26)	1.3	(0.83–2.01)			1.3	(0.85–2.05)
Contextual-level participation in organized activities ^a												
Girls			0.7	(0.46–0.95)	0.7	(0.49–1.01)			0.9	(0.69–1.18)	0.9	(0.71–1.21)
Individual-level student council	0.8	(0.36–1.87)			0.9	(0.39–2.01)	1.0	(0.61–1.53)			1.0	(0.64–1.60)
Contextual-level student council ^a			0.7	(0.50–1.02)	0.7	(0.51–1.02)			0.8	(0.67–1.01)	0.8	(0.67–1.01)
Individual-level extracurricular activity	0.2	(0.15–0.42)			0.3	(0.16–0.47)	0.6	(0.47–0.84)			0.7	(0.49–0.89)
Contextual-level extracurricular activity ^a			0.6	(0.42–0.90)	0.8	(0.50–1.14)			0.8	(0.65–0.98)	0.9	(0.69–1.06)
Individual-level volunteer activity	0.7	(0.33–1.42)			0.7	(0.32–1.49)	1.0	(0.68–1.51)			1.0	(0.66–1.54)
Contextual-level volunteer activity ^a			0.9	(0.68–1.30)	1.0	(0.71–1.39)			1.0	(0.83–1.21)	1.0	(0.82–1.22)
Individual-level community sports club	1.6	(0.55–4.81)			1.7	(0.57–5.03)	0.8	(0.35–1.69)			0.8	(0.35–1.72)
Contextual-level community sports club ^a			0.8	(0.60–1.21)	0.8	(0.59–1.20)			0.9	(0.73–1.14)	0.9	(0.74–1.14)
Individual-level youth association	3.1	(1.52–6.29)			2.7	(1.29–5.48)	2.9	(1.72–4.80)			2.8	(1.65–4.68)
Contextual-level youth association ^a			1.5	(1.12–1.92)	1.4	(1.04–1.83)			1.1	(0.95–1.39)	1.1	(0.88–1.32)
Individual-level participation in organized activities												
1	0.5	(0.28–0.78)			0.5	(0.30–0.84)	1.1	(0.78–1.49)			1.1	(0.81–1.56)
2 or more	0.4	(0.17–0.77)			0.4	(0.18–0.85)	0.7	(0.46–1.11)			0.8	(0.48–1.19)
Contextual-level participation in organized activities ^a												
			0.7	(0.47–0.98)	0.8	(0.52–1.13)			0.8	(0.65–1.01)	0.8	(0.66–1.03)

Model 1 includes grade, school type, school location, family structure, parental education level, and each social capital at the individual level. Model 2 includes grade, school type, school location, family structure, parental education level, and each social capital at the contextual level. Model 3 includes grade, school type, school location, family structure, parental education level, and each social capital at individual and contextual levels

Bold print denotes statistical significance

OR, Adjusted odds ratio; 95 % CI, 95 % confidence interval

^a ORs are computed for the increase of 1 standard deviation from the mean

Table 3 Distribution and association of the number of participations in organized activities with cigarette smoking and alcohol drinking (Japan, 2008)

	Boys		Girls		Cigarette smoking				Alcohol drinking				
					Boys		Girls		Boys		Girls		
	n	(%)	n	(%)	(%)	OR	(95 % CI)	(%)	OR	(95 % CI)	(%)	OR	(95 % CI)
Number of participations in organized activities ^a													
0	233	(19.3)	361	(28.4)	(16.7)	1.0	(10.8)	1.0	(23.6)	1.0	(22.7)	1.0	
1 without extracurricular activities	125	(10.4)	142	(11.1)	(23.2)	1.5	(0.88–2.58)	1.1	(32.8)	1.6	(0.98–2.55)	1.8	(1.21–2.82)
1 with extracurricular activities	613	(50.8)	529	(41.6)	(8.0)	0.4	(0.28–0.68)	0.2	(14.0)	0.5	(0.36–0.77)	0.7	(0.51–0.99)
2 or more without extracurricular activities	16	(1.3)	20	(1.6)	(25.0)	1.7	(0.51–5.41)	1.5	(43.8)	2.5	(0.90–7.07)	1.5	(0.54–3.91)
2 or more with extracurricular activities	220	(18.2)	220	(17.3)	(8.6)	0.5	(0.26–0.84)	0.2	(25.5)	1.1	(0.72–1.70)	0.6	(0.37–0.91)

Bold print denotes statistical significance

OR, Crude odds ratio; 95 % CI, 95 % confidence interval

^a 5 organized activities

smoking and drinking among boys and girls were attributable to school-level differences.

Discussion

This study showed that the association between structural social capital at school and adolescents' smoking and drinking varied by activity type and outcome behaviour.

When examining each type of organized activity, individual-level participation in extracurricular activities was negatively associated with smoking and drinking, that is, students who participated in extracurricular activities had lower odds of current smoking and drinking. This finding is consistent with previous studies that have demonstrated extracurricular activities' protective effect against adolescent substance use (Bohnert and Garber 2007; Moilanen et al. 2014; Chen et al. 2014). This is not unexpected because extracurricular activities can involve spending many after-school hours with supervision and mentoring from supportive adults, thus limiting opportunities for involvement in deviant behaviours (Bohnert and Garber 2007; Denault and Poulin 2009). In addition, student participation in extracurricular activities might help strengthen school connectedness through relationships with peers, leaders, and advisory teachers (Chen et al. 2014), and thus buffer risk and lower subsequent deviance from the norms of health-related behaviours (Moilanen et al. 2014).

The findings regarding associations between school-level extracurricular participation and smoking and drinking were somewhat mixed. For boys' smoking, after adjustment for individual-level participation and covariates, the odds of smoking were 30 % lower for higher contextual-level extracurricular participation than for lower contextual-level participation. In other words, holding constant a student's own level of extracurricular participation, students in schools where a large proportion of students actively participated in extracurricular activities were less likely to smoke than students in other schools. To date, no study has investigated the contextual effect of school-level extracurricular activities on adolescent smoking. An Icelandic study showed that, after adjusting for individual-level participation, adolescents from neighbourhoods where many adolescents participated in organized sports were less likely to smoke, which suggests the contextual effect of community-level participation in organized sports on adolescent smoking (Thorlindsson et al. 2012). Thorlindsson et al. (2012) stated that "the contextual associations represent an important case of social emergence that can be explained by a particular type of social capital that resides in a voluntary social organization". The present result might be consistent with their findings. In addition, schools with higher levels of

extracurricular participation might function as an informal social control by discouraging deviant behaviours (e.g., smoking) among its students (Moilanen et al. 2014). For girls' smoking, when adjusting for individual-level participation and covariates, the contextual effect of extracurricular participation at school level was still protective but not statistically significant. As the prevalence of extracurricular participation among girls was smaller than that among boys, presumably the contextual effect of school-level extracurricular participation on girls' smoking might be attenuated.

For drinking behaviour, no statistically significant contextual effects of school-level participation in extracurricular activities were observed among boys and girls, even though ORs for drinking after introducing individual- and contextual-level variables were almost the same value as ORs that included only the contextual-level variable. The present study showed that ICCs for drinking were smaller than those for smoking among boys and girls, which suggests that between-school variance in drinking was smaller than that in smoking. One possible explanation for an insignificant contextual effect of extracurricular activities on drinking is that no variation in drinking remained in the contextual-level variable after accounting for the individual-level variable. The same could be an explanation for the absence of a contextual effect of youth associations on girls' drinking. Another explanation is that adolescent drinking is more tolerated in Japanese society than adolescent smoking, as previous studies indicated that many Japanese adolescents recognized alcohol drinking as acceptable depending on the situation (Wada et al. 1998). If adolescent drinking can be thought as being to some extent socially acceptable, the contextual effects of extracurricular participation at school level on drinking through social norms or social controls might be weakened (Takakura 2011).

Interestingly, individual-level participation in youth associations had a harmful effect, increasing smoking and drinking, and participation in volunteer activities or community sports clubs had the same effect with respect to boys' drinking. Moreover, contextual-level participation in youth associations was also positively associated with smoking and drinking. Specifically, not only students who participated in youth associations but also those in schools characterized by high aggregate levels of participation in youth associations were more likely to engage in smoking and drinking. This individual-level finding is consistent with previous studies that have shown that participation in social organizations outside school was associated with high levels of smoking and drinking (Zambon et al. 2010; Chen et al. 2014). One assumption is that social organizations outside of school, including youth associations and community sports clubs, might include peers and adults

who smoke and drink, and who then encourage adolescents to smoke and drink (Chen et al. 2014). Particularly, if the group's social context features a high proportion of deviant persons, a higher rate of smoking and drinking at the contextual level might occur (Mahoney and Stattin 2000). Students in schools characterized by active youth associations might be exposed more often to negative role models that put them at risk of smoking and drinking, which supports the finding that participation in particular types of organized activities can lead to behavioural contagion, the dark side of social capital (Portes 1998; Kawachi et al. 2008).

When examining the number of activities participated in, an individual-level protective effect of participation in one or more of any activity with respect to girls' smoking was observed. Zambon et al. (2010) examined the association between individual-level participation in different types of clubs and health outcomes among Western adolescents, and found that even though some clubs negatively affected health-related behaviours, participation in one or more clubs increased the likelihood of health-related behaviours, outweighing the observed negative effects. Similarly, this study found that participation in multiple types of activities can offset the harmful effects of particular types of activities at individual levels on smoking, but the parameters between one activity and two or more activities were not much different. When checking the modification effect of extracurricular activities, every combination with extracurricular activities had protective effects, whereas every combination without extracurricular activities had adverse effects on smoking among boys and girls. Therefore, the neutralization effect of the number of activities appears to mostly reflect the effect of extracurricular activities, and among organized activities, extracurricular activity participation might be the most effective way to prevent adolescent smoking. On the other hand, the effect of multiple participations on drinking might be diminished due to the adverse effects of several organized activities such as youth associations, community sports clubs, and volunteer activities. As mentioned above, the reason might be due to Japanese society's permissive attitude toward adolescent drinking. Contextual effects of the number of activities at school level on smoking and drinking showed a protective direction, but the associations were inconclusive because they did not reach statistical significance.

As mentioned in the introduction, previous studies have found generally weaker associations between health outcomes and structural social capital than for health outcomes and cognitive social capital (Kim et al. 2008; Lindström 2008). In many cases, structural social capital was measured by indicating the number of activities and organizations in which a respondent participated. Given the

dark side of social capital, the structural social capital indicator includes both positive and negative mixed impacts of activities. Thus, the association between structural social capital and health outcomes might be weakened.

The present study is among the first to explore associations between structural social capital at school and smoking and drinking behaviours in a sample of Japanese adolescents. The study's strengths include multilevel modelling of a large, regionally representative population of young people. Nonetheless, this study has several limitations. First, structural social capital was measured by the extent of social networks based on the presence of participation in organized activities without taking into account the networks' intensity and quality, which is advisable to include when measuring networks (Harpham 2008). Also, this study did not examine every type of organized activity. Second, each smoking and drinking behaviour was evaluated by a self-administered question. Although each question's reliability has been confirmed, it is unclear whether each question most successfully measured each behaviour. Third, this study did not consider the effect of class level. Types of organized activities might be influenced more by school class than school, and the possibility exists that they yield a biased parameter. However, most organized activities commonly include extracurricular activities that are systematically participated in at the school-wide rather than class level. Finally, the present data were obtained cross-sectionally; thus, this study cannot provide any information on causal relationships.

In conclusion, individual-level extracurricular activity participation was negatively associated with smoking and drinking, whereas individual-level participation in youth associations was positively associated with smoking and drinking. School-level extracurricular activity participation was negatively associated with smoking among boys, whereas school-level participation in youth associations was positively associated with smoking among boys and girls and drinking among boys. These findings suggest that structural social capital measured by participation in organized activities, especially extracurricular activities, might be an important way for young people to attain good health. This study also supports the idea that particular type of activities, such as youth associations, can lead to the dark side of social capital.

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Conflict of interest The author declares that he has no competing interests.

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