

Does Participation in the Setouchi Triennale Foster Social Capital? A Cross-Sectional Study

Chikara Miyaji^{a,b*}, Soshi Takao^c, Hiroshi Habu^{a,d}, Naomi Matsumoto^c,
Ken Aoo^e, Yosuke Nishita^e, Masao Tsuru^f, and Takashi Yorifuji^c

^aDepartment of Epidemiology, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences,

^cFaculty of Medicine, Dentistry and Pharmaceutical Sciences, Okayama University, Okayama 700-8558, Japan,

^bOkayama University Health Service Center, ^eGraduate School of Humanities and Social Sciences, Okayama University, Okayama 700-8530, Japan, ^dDepartment of Social and Behavioral Sciences, Harvard T. H. Chan School of Public Health, Boston, MA, United States of America, ^fFaculty of Economics, Musashi University, Tokyo 176-8534, Japan

This study examined whether participation in an art project was associated with higher social capital (SC). We conducted a questionnaire survey from November 2021 to March 2022 among residents aged 20 years or older of Naoshima, an island in Kagawa Prefecture, Japan. Before the survey, the Setouchi Triennale had been held on Naoshima four times, starting in 2010. We calculated propensity scores for Triennale participation and performed propensity score matching. We then compared cognitive and structural SC by Triennale participation and found significant differences, respectively. We adopted a conditional ordered logistic regression analysis with propensity score matching for cognitive or structural SC, and found adjusted odd ratios of 2.913 (95%CI, 1.846-4.596) for cognitive SC and 4.535 (95%CI, 2.839-7.244) for structural SC. Our findings suggest that Triennale participation enhanced the cognitive aspect of SC while also building structural SC.

Key words: social capital, art project, propensity score matching

In recent years, efforts to revitalize local communities by hosting art projects have spread throughout Japan. Art projects are activities that exhibit works of contemporary art and also create new social contexts by engagement with local communities and individual social events; they create new connections that differ from existing relationships [1]. Conventional policies and solutions aimed at local economic growth through labor-intensive industrialization are losing their effectiveness in both developed and developing countries. There are expectations for social innovation to revitalize local communities through alternative methods, and the role of art in such innovation has been discussed. In this context, art can be a tool to encourage social par-

ticipation and connect stakeholders with diverse backgrounds [2].

In July 2010, the Setouchi Triennale was first held on islands of the Seto Inland Sea, which straddles Japan's Okayama and Kagawa prefectures: it presented 75 artworks and 16 events from 18 countries and regions (see the Setouchi Triennale Executive Committee website: <<https://setouchi-artfest.jp/files/about/archive/general-report2010.pdf>>, accessed March, 2023) [3]. The foundation for this art project was laid with the Naoshima Cultural Village Concept, which was announced in 1988; that concept materialized in 1992 with the completion of a facility on Naoshima Island (Kagawa Prefecture) where visitors could dine while surrounded

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*Corresponding author. Phone: +81-86-235-7173; Fax: +81-86-235-7178
E-mail: miyaji-c@okayama-u.ac.jp (C. Miyaji)

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by nature, sculpture and art installations [4]. The purpose of the Setouchi Triennale, which is held every 3 years, is to revitalize the local community by bringing visitors from all over the world to the Setouchi islands, which are losing their vitality due to aging and depopulation; at the same time, the event seeks to convey the charm of the region through contemporary art that features the traditional culture and beautiful natural environments of the islands [4]. Finally, the Setouchi Triennale draws attention to global environmental issues. Perhaps as a result of its multi-pronged appeal, the Triennale has developed into a major art project, drawing a huge number of visitors to Japan [5]: approximately 1.18 million people attended the fourth event in 2019 (see the Setouchi Triennale Executive Committee website: <<https://setouchi-artfest.jp/files/about/archive/report2019.pdf>>, accessed March, 2023).

Art has the potential to trigger communication [3]; it has also been suggested to augment empowerment among people with mental health needs, and to promote mental health and social inclusion [6]. In Finland and other Nordic countries, art and cultural activities have been incorporated into government policies to enhance health and well-being [7]. It has also been shown that art production — including both bottom-up and top-down initiatives — can be used as a tool to augment social capital. Accordingly, bottom-up art-production initiatives have been a focus in the UK (*e.g.*, The Other Side Gallery), while top-down art-production initiatives have been pursued by local governments in Denmark (*e.g.*, the GAIA Academy) [8].

Social capital (SC) is broadly defined as the characteristics of social groups that facilitate cooperation to achieve common goals, and is considered an important factor in understanding social determinants of health [9]. SC has a cognitive aspect based on subjective elements such as perceptions and values (*e.g.*, trust and reciprocity), as well as a structural aspect involving interpersonal connections and social networks; the structural dimension of SC can be objectively verified through actual behavioral observations and records (*e.g.*, participating in community activities) [10]. In the structural dimension, a distinction is made between bonding SC, which refers to trust and cooperation among members of networks with similar social identities (*e.g.*, in terms of race or ethnicity), and bridging SC, which signifies connections among individuals whose social identities are dissimilar [11]. Bonding SC

is exclusive, strengthening ties within homogeneous, socially similar groups and enhancing access to internal resources; by contrast, bridging SC is inclusive, strengthening ties among heterogeneous, socially diverse groups and enhancing access to external resources [12].

There is a dearth of quantitative investigations into the relationship between art projects and SC, and only a few such studies have been performed in Japan. One showed the influence of art events on residents' network and community building [13]; another demonstrated the possibility of art events increasing SC in mountainous areas [14, 15]. Most of the studies have been limited to univariate analyses, as far as we know, only one study was conducted on the relationship between art projects and SC in Japan using an ordinal probit model [14]. Clearly, additional research using more advanced methodologies will be needed in this area.

The present study examined the relationship between participation in the Setouchi Triennale as an exposure factor and SC as an outcome factor with adjustment for potential confounders. We also adopted propensity score matching because it can appropriately compare groups (*i.e.*, participants and nonparticipants) with inherently low comparability. We hypothesized that participation in the Setouchi Triennale would be associated with higher SC.

Materials and Methods

Study design and participants. In this cross-sectional study, we conducted a questionnaire survey among all Naoshima residents aged 20 years and older from November 2021 to March 2022. We distributed questionnaires to 2,588 individuals by mail; the completed questionnaires were also collected by mail. The analysis subjects are individuals who completed the questionnaire and were provided with written informed consent, and who were matched through propensity score between participation and non-participation in the art project. We conducted this observational study following the recommendations in the Strengthening the Reporting of Observation Studies in Epidemiology (STROBE) statement. The study was approved by the Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences and the Okayama University Hospital Ethics Committee (approval number 2110-023).

Measures.

Participation in art projects. Respondents were asked whether or not they had participated in activities related to the Setouchi Triennale.

Social capital. We assessed cognitive SC using two items: “Would you say that people in your neighborhood can be trusted?” (as a measure of trust) and “Would you say that people in your neighborhood mutually aid others?” (as a measure of reciprocity) [16,17]. These items were assessed using questions originally adapted by Kawachi *et al.* from the U.S. General Social Survey [18]. We assessed both items on a five-point Likert scale: trust was rated from “can be trusted” to “cannot be trusted” and reciprocity was rated from “try to be helpful” to “just look out for themselves” [16,17]. We summed the trust and reciprocity scores to obtain the cognitive SC score (range, 0-8). For our analysis, we categorized the cognitive SC score into three levels: 0-4, 5-6, and 7-8.

We referred to previous studies [19] and derived our measure of structural SC from the survey item responses regarding participation in six groups: community salons, sports clubs, culture clubs, or senior citizens’ groups; alumni associations; supporters’ associations or political campaign groups; citizens’ groups, environmental and nature conservation groups; community-based activities (*e.g.*, neighborhood associations, women’s associations, welfare committees); and long-term care insurance and government services (day-care and day services). We categorized the number of groups in which participants were active into four levels: 0, 1, 2, and over 2.

With reference to a previous study [20], we assessed whether each group was related to bonding or bridging SC by asking participants to rate whether the social composition of the group was homogeneous or heterogeneous. Specifically, we asked respondents, “Would you say that the composition of your group was diverse or similar with respect to sex, age, and occupational background?” Those who indicated that the members of their group had similar backgrounds were classified as being involved in bonding SC; and those who indicated that the members of their group were diverse were categorized as being involved in bridging SC. To confirm the dose–response relationship between art project participation and bonding or bridging SC, we divided the number of groups in which participants were active into four levels: 0, 1, 2, and over 2.

Covariates. We employed the following covariates as dichotomous or continuous variables: sex (male or female); age; body mass index (BMI); smoking status (non-smoker or smoker); alcohol consumption (non-drinker or drinker); length of residence on Naoshima; education (primary, junior high school, high school or vocational school, university, graduate school, other); regular hospital visits (yes or no); marital status (unmarried or married); number of cohabitants, including self (1 or 2 and more); and source of income (own income or social security benefits, family income, other).

Statistical analysis. Propensity score matching seeks to balance covariates across comparison groups (here, participation versus nonparticipation in the Setouchi Triennale) by matching individuals with respect to their probability (propensity) to participate in the art project. To calculate the propensity scores, we applied the above 11 covariates. We applied logistic regression analysis to calculate the propensity score. We matched each Setouchi Triennale participant in a 1 : 3 ratio to a nonparticipant with a caliper width (maximum allowable difference in propensity scores between pairs) of 0.2 or less; we discarded unmatched samples. We then compared SC between participants and non-participants in the Setouchi Triennale using Mann-Whitney *U*-tests. In addition, we conducted a conditional ordered logistic regression analysis to examine the relationships between participating in the Setouchi Triennale and cognitive or structural SC; we used subjects in the lowest cognitive or structural SC category as the reference group. We calculated adjusted odds ratios (aORs) and 95% confidence intervals (CIs). STATA/SE17.0 (StataCorp, College Station, TX, USA) was used for all statistical analyses, and statistical significance was set at $p < 0.05$.

Results

Participants. We distributed the questionnaires to 2,588 individuals and received responses from 739 (response proportion, 28.6%). In all, 708 respondents provided written informed consent to participate. We excluded 2 respondents who were under 20 years of age, leaving 706 respondents for the propensity score matching. When calculating the propensity score, 106 patients were excluded when cognitive SC was the outcome, and 114 patients were excluded when structural

SC was the outcome due to missing variables. Figure 1 presents the distribution of the propensity scores according to exposure status (nonparticipation versus participation in the Setouchi Triennale). The histogram indicates that there was an acceptable overlap between the two sets of propensity scores. Table 1 shows the individual characteristics before and after matching, confirming that the covariates were appropriately balanced before and after propensity score matching.

Cognitive and structural SC. Results for cognitive and structural SC after matching are shown in Table 2 and Table 3 by Setouchi Triennale participation. For cognitive SC by art project participation, 39.0% of non-participants were in the low, 42.0% in the intermediate, and 19.1% in the high group. Among participants, 14.6% were in the low, 48.3% in the intermediate, and 37.1% in the high group. For structural SC by art project participation, 48.8% of non-participants reported no involvement, and 28.3% were in the low, 13.2% in the intermediate, and 9.7% in the high group. Among participants, 20.9% reported no involvement, and 19.8% were in the low, 23.3% in the intermediate, and 36.1% in the high group. The results of the Mann-Whitney *U*-test by art project participation showed significant differences in SC.

Relationship between art project participation and SC. Table 4 shows the adjusted ORs and 95% CIs for cognitive and structural SC in the participation group

compared with the nonparticipation group. In conditional ordered logistic regression analysis with propensity score matching, the corresponding ORs were 2.913 (95%CI, 1.846-4.596) and 4.535 (95%CI, 2.839-7.244), respectively.

To investigate the mechanism underlying the relationship between art project participation and SC, we conducted a subanalysis similar to the main analysis that used the cognitive SC sub-domain of general trust and reciprocity, and bonding and bridging SC as outcomes (Table 4). For that analysis, we divided the SCs into three or four groups: trust (0-1, 2, and over 2); reciprocity (0-1, 2, and over 2); bonding SCs (0, 1, 2, and over 2); and bridging SCs (0, 1, 2, and over 2). The OR was 2.547 (95%CI, 1.341-4.838) for trust and 2.373 (95%CI, 1.488-3.783) for reciprocity. On the other hand, the ORs for bonding and bridging SC were 3.013 (95%CI, 1.758-5.164) and 3.430 (95%CI, 2.172-5.415), respectively.

Discussion

This study examined the hypothesis that participation in the Setouchi Triennale was associated with higher levels of cognitive and structural SC. The results of the Mann-Whitney *U*-test revealed that there were significant differences in cognitive and structural SC between those who participated in the art project and

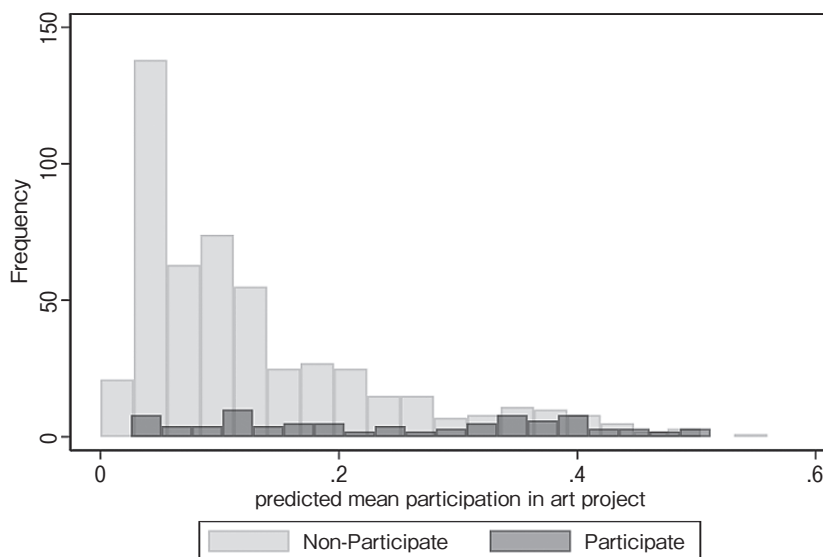


Fig. 1 Presents the distribution of the propensity scores according to exposure status (non-participation versus participation in the art project).

Table 1 Distribution of covariates by participating in art project after matching

	Cognitive social capital						Structural social capital					
	Before Matching			After Matching			Before Matching			After Matching		
	Non-participate (n=511)	Participate (n=89)	Non-participate (n=267)	Participate (n=89)	SDiff	Non-participate (n=506)	Participate (n=86)	Non-participate (n=258)	Participate (n=86)	SDiff		
Sex (n, %)					0.07					0.02		
Male	237 46.4	44 49.4	139 52.1	44 49.4		236 46.6	43 50.0	131 50.8	43 50.0			
Female	271 53.0	44 49.4	127 47.6	44 49.4		267 52.8	42 48.8	125 48.5	42 48.8			
Other	3 0.6	1 1.1	1 0.4	1 1.1		3 0.6	1 1.2	2 0.8	1 1.2			
Age (mean, SD)	61.4 17.56	56.0 18.31	57.1 16.81	56.0 18.31	-0.06	61.2 17.45	55.5 18.42	56.4 16.64	55.5 18.42	-0.05		
BMI (mean, SD)	23.4 5.61	22.6 2.96	22.8 3.34	22.6 2.96	-0.07	23.4 5.61	22.7 2.98	22.8 3.46	22.7 2.98	-0.04		
Smoking status (n, %)					-0.08					0.05		
Non-smoker	468 91.6	78 87.6	227 85.0	78 87.6		463 91.5	75 87.2	229 88.8	75 87.2			
Smoker	43 8.4	11 12.4	40 15.0	11 12.4		43 8.5	11 12.8	29 11.2	11 12.8			
Alcohol consumption (n, %)					0.04					0.01		
Non-drinker	276 54.0	25 28.1	80 30.0	25 28.1		271 53.6	24 27.9	73 28.3	24 27.9			
Drinker	235 46.0	64 71.9	187 70.0	64 71.9		235 46.4	62 72.1	185 71.7	62 72.1			
Length of Residence (mean, SD)	46.1 25.18	37.1 26.30	36.3 25.31	37.1 26.30	0.03	45.8 25.13	36.8 26.37	37.7 25.86	36.8 26.37	-0.03		
Education (n, %)					-0.02					0.01		
Primary/Junior high school/High school	343 67.1	29 32.6	84 31.5	29 32.6		337 66.6	29 33.7	88 34.1	29 33.7			
Vocational school/University/Graduate school/Other	168 32.9	60 67.4	183 68.5	60 67.4		169 33.4	57 66.3	170 65.9	57 66.3			
Hospital visit (n, %)					0.08					-0.01		
Yes	318 62.2	41 46.1	134 50.2	41 46.1		314 62.1	39 45.4	116 45.0	39 45.4			
No	193 37.8	48 53.9	133 49.8	48 53.9		192 37.9	47 54.7	142 55.0	47 54.7			
Marital status (n, %)					-0.03					0.02		
Unmarried	70 13.7	19 21.4	54 20.2	19 21.4		70 13.8	18 20.9	56 21.7	18 20.9			
Married	441 86.3	70 78.7	213 79.8	70 78.7		436 86.2	68 79.1	202 78.3	68 79.1			
Number of people living together (n, %)					0.10					0.07		
1	99 19.4	23 25.8	81 30.3	23 25.8		98 19.4	23 26.7	77 29.8	23 26.7			
2 ≤	412 80.6	66 74.2	186 69.7	66 74.2		408 80.6	63 73.3	181 70.2	63 73.3			
Source of income (n, %)					-0.01					0.00		
Own income	189 37.0	53 59.6	158 59.2	53 59.6		190 37.6	52 60.5	156 60.5	52 60.5			
Social security benefits/Family income/Other	322 63.0	36 40.5	109 40.8	36 40.5		316 62.5	34 39.5	102 39.5	34 39.5			

SDiff, standardized difference.

Table 2 Distribution of Cognitive SC by participating in art project after matching

	Non-participate						Participate						p-value
	Low		Intermediate		High		Low		Intermediate		High		
	n	%	n	%	n	%	n	%	n	%	n	%	
Cognitive social capital	104	39.0	112	42.0	51	19.1	13	14.6	43	48.3	33	37.1	p<0.001
Trust	22	8.2	59	22.1	186	69.7	3	3.4	10	11.2	76	85.4	p<0.01
Reciprocity	58	21.7	113	42.3	96	36.0	8	9.0	31	34.8	50	56.2	p<0.001

Table 3 Distribution of Structural SC by participating in art project after matching

	Non-participate						Participate						p-value				
	No-involvement		Low		Intermediate		High		No-involvement		Low			Intermediate		High	
	n	%	n	%	n	%	n	%	n	%	n	%		n	%	n	%
Structural social capital	126	48.8	73	28.3	34	13.2	25	9.7	18	20.9	17	19.8	20	23.3	31	36.1	p<0.001
Bonding social capital	213	82.6	37	14.3	6	2.3	2	0.8	54	62.8	20	23.3	5	5.8	7	8.1	p<0.001
Bridging social capital	150	58.1	61	23.6	34	13.2	13	5.0	23	26.7	30	34.9	17	19.8	16	18.6	p<0.001

those who did not. Conditional ordered logistic analysis with propensity score matching consistently indicated that art project participation was significantly associated with both higher cognitive SC and higher structural SC than nonparticipation. These results support our a priori hypothesis. Art project participation was shown to have potential for fostering cognitive or structural SC in the community. Further, we observed that such participation in the art projects could enhance trust and reciprocity (sub-dimensions of cognitive SC) and promote both bonding and bridging SC.

Our results indicate that the Setouchi Triennale has the potential to promote social relationships among local residents in depopulated areas. The Triennale achieves this promotion through the exchange of diverse resources embedded in social networks—as symbolized by the interactions between overseas visitors and island residents. The islands in Okayama and Kagawa prefectures that are the main venue for the Setouchi Triennale were previously in decline; they had been abandoned due to industrial waste problems, air pollution from smelting plants, facilities for leprosy patients, and general collapse of communities [4,5]. Our findings based on quantitative data suggest the possibility of rebuilding communities by promoting the social participation of local residents via the initiation of art projects.

This investigation has several limitations. First, because this was a cross-sectional study, we cannot assume a causal relationship between Setouchi Triennale participation and social capital. In our investigation, however, exposure was an event that clearly occurred at an earlier time point, and thus there was a clear temporal order underlying the observed relationship (*i.e.*, the event was held in 2010, 2013, 2016, and 2019, whereas the outcome was measured in 2011-2022). Second, because the response rate for the survey was not high, the generalizability of the results is limited. Third, the possibility of common method bias cannot be ruled out. Because a questionnaire was used both for the subjective measurement of project participation as an exposure and that of social capital as an outcome, it is possible that the association was overestimated. In future research, the use of more objective exposure measurements (*e.g.*, a list of Triennale volunteers) might obviate this potential source of overestimation. Longitudinal surveys are also warranted to clarify the relationship between art project participation and the building of

Table 4 The odds ratios of SC by participating in art project

	n	OR	[95%CI]
Cognitive social capital	356	2.913	[1.846, 4.596]
Trust	356	2.547	[1.341, 4.838]
Reciprocity	356	2.373	[1.488, 3.783]
Structural social capital	344	4.535	[2.839, 7.244]
Bonding social capital	344	3.013	[1.758, 5.164]
Bridging social capital	344	3.430	[2.172, 5.415]

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

social capital.

In conclusion, we found that participation in the Setouchi Triennale was associated with higher cognitive and structural SC among residents. Our study suggests that participation in such art projects may have beneficial cognitive effects while simultaneously promoting the structural aspects of social capital (*i.e.*, social participation).

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