

地域単位の健康関連ソーシャルキャピタル指標 ver 4.0

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1. 指 標

【問6】 参加している会やグループについておうかがいします。

1) あなたは下記のような会・グループにどのくらいの頻度で参加していますか

(1) ボランティアのグループ

1. 週4回以上 2. 週2～3回 3. 週1回 4. 月1～3回 5. 年に数回 6. 参加していない

(2) スポーツ関係のグループやクラブ

1. 週4回以上 2. 週2～3回 3. 週1回 4. 月1～3回 5. 年に数回 6. 参加していない

(3) 趣味関係のグループ

1. 週4回以上 2. 週2～3回 3. 週1回 4. 月1～3回 5. 年に数回 6. 参加していない

(6) 学習・教養サークル

1. 週4回以上 2. 週2～3回 3. 週1回 4. 月1～3回 5. 年に数回 6. 参加していない

(8) 特技や経験を他者に伝える活動

1. 週4回以上 2. 週2～3回 3. 週1回 4. 月1～3回 5. 年に数回 6. 参加していない

【問9】 あなたの住んでいる地域についておうかがいします。

1) あなたの地域の人は、一般的に信用できると思いますか。

1. とても信用できる 2. まあ信用できる 3. どちらともいえない
4. あまり信用できない 5. 全く信用できない

2) あなたの地域の人は、多くの場合、他の人の役に立とうとしますか。

1. とてもそう思う 2. まあそう思う 3. どちらともいえない
4. あまりそう思わない 5. 全くそう思わない

3) あなたは現在住んでいる地域にどの程度愛着がありますか。

1. とても愛着がある 2. まあ愛着がある 3. どちらともいえない
4. あまり愛着がない 5. 全く愛着がない

【問8】 あなたとまわりの人の「たすけあい」についておうかがいします。

1) あなたの心配事や愚痴(ぐち)を聞いてくれる人。あてはまるすべてに○をしてください。

1. 配偶者 2. 同居の子ども 3. 別居の子ども 4. 兄弟姉妹・親戚・親・孫
5. 近 隣 6. 友 人 7. その他() 8. そのような人はいない

2) 反対に、あなたが心配事や愚痴(ぐち)を聞いてあげる人。あてはまるすべてに○をしてください。

1. 配偶者 2. 同居の子ども 3. 別居の子ども 4. 兄弟姉妹・親戚・親・孫
5. 近 隣 6. 友 人 7. その他() 8. そのような人はいない

3) あなたが病気で数日間寝込んだときに看病や世話をしてくれる人。あてはまるすべてに○をしてください

1. 配偶者 2. 同居の子ども 3. 別居の子ども 4. 兄弟姉妹・親戚・親・孫
5. 近 隣 6. 友 人 7. その他() 8. そのような人はいない

2. 算出方法

- (1) 11 指標それぞれについて、赤枠の回答者割合を小地域（学区）単位で集計する。なお、問8の3項目については、いずれかがいる割合にするために1で引いた値を使用する。
- (2) 11 指標の因子得点、問6の5項目・問9の3項目・問8の3項目について単純加算した値、もしくは、以下の式で重み付けして加算した値をそれぞれ市民参加(Civic participation)得点、社会的凝集性(Social cohesion)得点、互酬性(Reciprocity)得点とする。

(重み付け式：因子負荷量に基づいた重みづけ)

$$\text{Civic participation} = \text{ボランティア割合} \times 0.6 + \text{スポーツ割合} \times 0.8 + \text{趣味割合} \times 0.9 \\ + \text{学習割合} \times 0.7 + \text{経験伝達割合} \times 0.5$$

$$\text{Social cohesion} = \text{信頼割合} \times 0.9 + \text{互酬性割合} \times 0.8 + \text{愛着割合} \times 0.7$$

$$\text{Reciprocity} = \text{情緒サポ受領} \times 0.8 + \text{情緒サポ提供} \times 0.7 + \text{手段サポ受領} \times 0.6$$

Saito Masashige, Kondo Naoki, Aida Jun, Kawachi Ichiro, Koyama Shiho, Ojima Toshiyuki, Kondo Katsunori.
(2017) Development of an Instrument for Community-Level Health Related Social Capital among Japanese Older People: The JAGES project. *Journal of Epidemiology*. 27(5): 221–227

Table 1. Correlation between social capital candidate indicators and subjective health at the community level (n=702)

	Partial correlation ^{a)}	
	SRH (fair/poor)	GDS (≥5)
Volunteer group (≥ once a month)	-.093**	-.193***
Sports group (≥ once a month)	-.233***	-.355***
Hobby activity (≥ once a month)	-.256***	-.332***
Study or cultural group (≥ once a month)	-.144***	-.205***
Skills teaching (≥ once a month)	-.106**	-.200***
Frequency of contact with friends (rarely)	.272***	.372***
Number of friends (≥ 10)	-.140**	-.255***
Receive emotional support (any one or more)	-.049	-.189***
Provide emotional support (any one or more)	-.154**	-.265***
Receive instrumental support (any one or more)	-.186***	-.292***
Community trust (very & moderately trusted)	-.204***	-.373***
Community contribution (agree strongly & agree)	-.144***	-.331***
Community attachment (very & moderately attached)	-.136***	-.315***
Facilities you feel free to drop in	-.102**	-.206**

SRH: Self-rated health GDS: Geriatric depression scale

*** $p < .001$ ** $p < .01$ * $p < .05$

a) Population density and elderly proportion at municipality level were controlled.

Table 2. Extraction of social capital candidate indicators based on reliability

	number of items	Communalities (Factor analysis)	
		14	11
Volunteer group		.325	.315
Sports group		.638	.640
Hobby activity		.743	.752
Study or cultural group		.500	.495
Skills teaching		.295	.288
Less frequency of contact with friends		.273	
Number of friends		.229	
Receive emotional support		.679	.687
Provide emotional support		.538	.533
Receive instrumental support		.392	.394
Community trust		.795	.883
Community contribution		.720	.650
Community attachment		.534	.529
Facilities you feel free to drop in		.273	
	Cronbach's alphas	.728	.752

Table 3. Factor loadings of community-level social capital scale

	Exploratory factor analysis ^{a)}			Confirmatory factor analysis ^{b)}		
	Civic participation (F1)	Social cohesion (F2)	Reciprocity (F3)	Civic participation (F1)	Social cohesion (F2)	Reciprocity (F3)
Volunteer group	.536	.119	-.029	.557	-	-
Sports group	.791	-.015	.100	.796	-	-
Hobby activity	.868	-.020	.021	.867	-	-
Study or cultural group	.706	-.023	-.051	.693	-	-
Skills teaching	.536	.003	-.060	.532	-	-
Community trust	.055	.934	-.009	-	.947	-
Community contribution	-.058	.817	-.015	-	.790	-
Community attachment	.055	.716	.007	-	.727	-
Received emotional support	-.092	-.005	.831	-	-	.828
Provided emotional support	.104	-.097	.750	-	-	.682
Received instrumental support	-.061	.257	.486	-	-	.603
Correlation coefficient						
F1 & F2	.154 (p=.000)			.178 (p=.000)		
F1 & F3	.065 (p=.087)			.031 (p=.495)		
F2 & F3	.436 (p=.000)			.392 (p=.000)		

a) EFA was applied promax rotation and maximum likelihood method.

b) Model fit indicators of CFA were as follows:

Chi-square (df)=271.2(41), p<.001 RMSEA=.089 CFI=.925 TLI=.899 SRMR=.058

Table 4. Descriptive statistics for the final sample

Outcome		
Fair/poor health	*No (n=97324, 78.6%)	Yes (n=22134, 17.9%)
	† Unknown (n=4302, 3.5%)	
Depressive symptoms	*No (n=74648, 60.3%)	Yes (n=26700, 21.6%)
	† Unknown (n=22414, 18.1%)	
Level 1 (individuals, n=123,760)		
Age (in years)	Mean=74.0 Range=65-106	
Gender	*Male (46.3%)	Female (53.7%)
Marital status	*Married (70.0%)	Divorced (20.9%)
	Separated (3.3%)	Never married (2.2%)
	Unknown (3.6%)	
Education	* ≥ 10 years (n=56.0%)	< 10 years (41.7%)
	Unknown (2.3%)	
Annual household income (Equivalent income)	* ≥ ¥4,000,000 (8.4%)	¥2,000,000 - ¥3,999.999 (30.0%)
	< ¥2,000,000 (41.4%)	Unknown (20.2%)
Civic participation (number of groups which participated one or more times a month in five indicators)	None (45.1%)	One (15.5%)
	Two (10.3%)	Over three (6.9%)
	† Unknown (22.1%)	
Social cohesion (number of "very/moderately agree" in three indicators)	None (12.9%)	One (17.1%)
	Two (20.6%)	Three (44.6%)
	† Unknown (4.7%)	
Reciprocity (number of "any one or more" in three indicators)	None (1.3%)	One (3.0%)
	Two (6.7%)	Three (82.8%)
	† Unknown (6.2%)	
Level 2 (communities, n=702)		
Civic participation (factor score)	Mean = 0	Range = -2.60 - 3.41
Social cohesion (factor score)	Mean = 0	Range = -3.66 - 2.73
Reciprocity (factor score)	Mean = 0	Range = -4.07 - 2.02

* Reference categories used for subsequent regression analyses

† Unknown cases in these major variables were eliminated in subsequent regression analyses.

Table 5. Estimated prevalence ratios from multilevel Poisson regression analysis

	Self-rated health (fair/poor)			Depressive symptoms (GDS ≥ 5)		
	model 1	model 2	model 3	model 1	model 2	model 3
	<i>PR</i> (95%CI)	<i>PR</i> (95%CI)	<i>PR</i> (95%CI)	<i>PR</i> (95%CI)	<i>PR</i> (95%CI)	<i>PR</i> (95%CI)
<i>Fixed parameters</i>						
Community level variables						
Civic participation (factor score)	0.94*** (0.92-0.95)	0.96*** (0.93-0.98)	0.97** (0.96-1.00)	0.93*** (0.92-0.95)	0.95*** (0.93-0.97)	0.94*** (0.92-0.97)
Social cohesion (factor score)	0.99 (0.97-1.01)	1.03* (1.01-1.06)	1.03 (0.99-1.06)	0.97*** (0.95-0.98)	1.02* (1.00-1.04)	1.03 (1.00-1.06)
Reciprocity (factor score)	0.98 (0.96-1.01)	1.00 (0.98-1.03)	1.04 (0.98-1.10)	0.96*** (0.94-0.98)	0.98* (0.96-1.00)	1.04 (0.98-1.10)
Individual-level variables						
Civic participation (0-3)		0.74*** (0.72-0.76)	0.74*** (0.72-0.76)		0.76*** (0.75-0.78)	0.76*** (0.75-0.78)
Social cohesion (0-3)		0.84*** (0.83-0.85)	0.84*** (0.83-0.85)		0.77*** (0.76-0.77)	0.77*** (0.76-0.77)
Reciprocity (0-3)		0.86*** (0.84-0.88)	0.86*** (0.84-0.88)		0.82*** (0.80-0.83)	0.82*** (0.80-0.83)
Cross-level interactions						
Community level civic participation × Individual level civic participation			0.98 (0.95-1.00)			1.01 (0.98-1.03)
Community level social cohesion × Individual level social cohesion			1.00 (0.98-1.02)			0.99 (0.98-1.01)
Community level reciprocity × Individual level reciprocity			0.99 (0.97-1.02)			0.98* (0.96-1.00)
<i>Random parameters</i>						
Community level intercept variance (standard error)	.004 (.002)	.004 (.002)	.003 (.001)	.001 (.001)	.000 (.000)	.000 (.000)
Community level structural SC slope variance	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)

(standard error)						
Community level cognitive SC slope variance	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)
(standard error)						

*** $p < .001$ ** $p < .01$ * $p < .05$

All models are also adjusted for individual-level age, gender, marital status, education, and annual house income. Unknown cases in social capital variables and dependent variables were eliminated in this analyses. Sample size of model 1 was as follows: SRH; individual=119,458, community=702, GDS; individual=101,348, community=702. Sample size of model 2 and model 3 were as follows: SRH; individual=88,436, community=702, GDS; individual=79,081, community=702.

Appendix 1. Candidate indicators of community-level social capital in the JAGES 2013 cross-sectional study (53 indicators, n=702)

Indicators	Mean (SD)	Partial correlation ^{a)}	
		SRH (fair/poor)	GDS (≥5)
How often do you attend activities for the following groups.			
Volunteer groups (% ≥ once a week)	6.1 (3.2)	-.069	-.146***
Volunteer groups (% ≥ once a month) (†)	12.6 (4.7)	-.093*	-.194***
Sports groups/clubs (% ≥ once a week)	20.1 (7.1)	-.210***	-.314***
Sports groups/clubs (% ≥ once a month) (†)	25.9 (8.3)	-.233***	-.355***
Hobby activity group (% ≥ once a week)	19.4 (5.7)	-.175***	-.217***
Hobby activity group (% ≥ once a month) (†)	34.3 (8.4)	-.256***	-.332***
Senior citizen club (% ≥ once a week)	3.3 (2.8)	.040	-.058
Senior citizen club (% ≥ once a month)	8.5 (5.6)	.083*	-.095*
Community association (% ≥ once a week)	2.9 (2.5)	-.054	.029
Community association (% ≥ once a month)	10.8 (5.8)	-.027	.024
Study or cultural group (% ≥ once a week)	4.4 (2.8)	-.143***	-.133***
Study or cultural group (% ≥ once a month) (†)	9.9 (4.6)	-.144***	-.205***
Nursing care prevention activities (% ≥ once a week)	5.1 (2.7)	-.007	-.063
Nursing care prevention activities (% ≥ once a month)	8.0 (4.0)	.010	-.115**
Activities to teach skills or pass on experiences to others (% ≥ once a week)	3.6 (2.3)	-.098**	-.120**
Activities to teach skills or pass on experiences to others (% ≥ once a month) (†)	6.2 (3.0)	-.106**	-.200***
Local events; e.g. festivals, Bon festival dance (% ≥ once a week)	0.6 (0.9)	-.033	-.059
Local events; e.g. festivals, Bon festival dance (% ≥ once a month)	2.0 (1.8)	.001	-.038
Activities to support older people requiring protection (% ≥ once a week)	2.3 (1.8)	.021	.001
Activities to support older people requiring protection (% ≥ once a month)	4.2 (2.7)	-.018	-.024
Activities to support older people requiring nursing care (% ≥ once a week)	2.1 (1.6)	.006	.018
Activities to support older people requiring nursing care (% ≥ once a month)	3.5 (2.3)	-.006	.009
Activities to support parents raising children (% ≥ once a week)	2.2 (1.6)	-.045	-.131***

Activities to support parents raising children (% ≥ once a month)	3.5 (2.1)	.013	.057
Local living arrangement improvement (beautification) activities (% ≥ once a week)	2.0 (1.8)	.054	.002
Local living arrangement improvement (beautification) activities (% ≥ once a month)	5.5 (3.6)	-.072	.002
Another group or organization (% ≥ once a week)	3.7 (2.5)	-.072	.006
Another group or organization (% ≥ once a month)	8.5 (3.7)	-.098*	-.069
How often do you see your friends?			
(% ≥ once a week)	48.7 (7.2)	-.023	-.050
(% ≥ one to three times a month)	71.3 (6.3)	-.096*	-.148**
(% rarely) (†)	9.1 (3.8)	.272***	.372***
How many friends/acquaintances have you seen over the past month?			
(% zero)	9.4 (4.1)	.102**	.149***
(% ≥ 10 persons) (†)	34.3 (5.7)	-.140***	-.255***
Do you have someone who listens to your concerns and complaints?			
(% none) (†)	94.3 (2.7)	-.049	-.189***
(% neighbor or friend)	49.5 (5.8)	-.089*	-.098**
Do you listen to someone's concerns and complaints?			
(% none) (†)	92.5 (2.9)	-.154***	-.265***
(% neighbor or friend)	49.8 (5.5)	-.093*	-.143***
Do you have someone who looks after you when you are sick for a few days?			
(% none) (†)	94.7 (3.1)	-.186***	-.292***
(% neighbor or friend)	7.4 (3.1)	-.028	.005
Do you look after someone when he/she is sick for a few days?			
(% none)	80.2 (5.0)	-.053	-.081*
(% neighbor or friend)	8.5 (3.7)	-.002	-.027
What kind of close partnerships in daily life do you have with people in your neighborhood?			
(% mutual consultation)	15.4 (9.4)	.066	.019
(% mutual consultation & standing and chatting frequently)	70.5 (10.2)	-.045	-.108**
(% none, not even greetings)	2.3 (2.0)	.097*	.148***

Do you think most people in your community is assistance to others?			
(% agree strongly)	5.9 (3.3)	.006	-.130**
(% agree strongly & agree) (†)	52.1 (8.5)	-.144***	-.331***
Houses or facilities you feel free to drop in within walking distance of your home (% many & some) (†)	35.7 (9.1)	-.102**	-.206***
Generally speaking, would you say that most people can be trusted? (% yes)	29.4 (11.6)	-.133***	-.189***
I can trust people I meet for the first time. (% very & moderately trust)	12.4 (7.8)	-.082*	-.104**
Do you think people living in your area can be trusted in general?			
(% very trusted)	11.6 (4.4)	-.029	-.189***
(% very & moderately trusted) (†)	68.6 (7.6)	-.204***	-.373***
How degree is your residential place attachment?			
(% very attached)	25 (7.5)	-.004	-.177***
(% very & moderately attached) (†)	79.1 (6.0)	-.136***	-.315***

a) Population density and elderly proportion at municipality level were controlled. *** p<.001, ** p<.01, * p<.05

† Indicators adopted in first model (14 indicators)

Appendix 2. Estimated prevalence ratios from multilevel Poisson regression analysis (indicator method)

	Self-rated health (fair/poor)			Depressive symptoms (GDS ≥ 5)		
	model 1	model 2	model 3	model 1	model 2	model 3
	<i>PR</i> (95%CI)	<i>PR</i> (95%CI)	<i>PR</i> (95%CI)	<i>PR</i> (95%CI)	<i>PR</i> (95%CI)	<i>PR</i> (95%CI)
<i>Fixed parameters</i>						
Community level variables						
Civic participation (factor score)	0.94*** (0.92-0.95)	0.96*** (0.94-0.98)	0.97* (0.95-1.00)	0.93*** (0.92-0.95)	0.95*** (0.93-0.96)	0.95*** (0.93-0.97)
Social cohesion (factor score)	0.99 (0.97-1.01)	1.03* (1.01-1.05)	1.03 (0.99-1.07)	0.97*** (0.95-0.98)	1.02* (1.01-1.04)	1.02 (0.98-1.05)
Reciprocity (factor score)	0.98 (0.96-1.01)	1.00 (0.97-1.02)	0.98 (0.90-1.07)	0.96*** (0.94-0.98)	0.98* (0.96-1.00)	0.97 (0.90-1.04)
Individual-level variables						
Civic participation (ref.=None)						
One		0.69*** (0.66-0.72)	0.68*** (0.65-0.71)		0.73*** (0.70-0.75)	0.73*** (0.70-0.75)
Two		0.54*** (0.51-0.58)	0.54*** (0.51-0.57)		0.60*** (0.57-0.63)	0.60*** (0.57-0.63)
\geq Three		0.44*** (0.41-0.48)	0.44*** (0.41-0.48)		0.46*** (0.43-0.49)	0.46*** (0.43-0.49)
Social cohesion (ref.=None)						
One		0.82*** (0.79-0.86)	0.82*** (0.79-0.86)		0.78*** (0.75-0.81)	0.78*** (0.76-0.81)
Two		0.72*** (0.69-0.76)	0.72*** (0.69-0.75)		0.64*** (0.62-0.67)	0.64*** (0.62-0.67)
Three		0.57*** (0.55-0.59)	0.57*** (0.55-0.60)		0.44*** (0.42-0.46)	0.44*** (0.43-0.46)
Reciprocity (ref.=None)						
One		0.82*** (0.74-0.91)	0.83** (0.75-0.93)		0.91* (0.84-0.99)	0.92 (0.84-1.00)
Two		0.84*** (0.77-0.93)	0.85** (0.77-0.94)		0.93* (0.86-1.00)	0.93 (0.86-1.01)
Three		0.65*** (0.59-0.71)	0.65*** (0.59-0.71)		0.61*** (0.57-0.66)	0.62*** (0.57-0.66)

Cross-level interactions

Community level civic participation						0.98		1.01
× Individual level civic participation (one)						(0.92-1.03)		(0.96-1.06)
Community level civic participation						0.93		1.03
× Individual level civic participation (two)						(0.86-1.01)		(0.96-1.10)
Community level civic participation						0.91		0.98
× Individual level civic participation (≥ three)						(0.82-1.01)		(0.89-1.07)
Community level social cohesion						1.00		1.02
× Individual level social cohesion (one)						(0.94-1.05)		(0.98-1.07)
Community level social cohesion						1.04		1.02
× Individual level social cohesion (two)						(0.99-1.10)		(0.97-1.06)
Community level social cohesion						1.00		1.00
× Individual level social cohesion (three)						(0.95-1.05)		(0.96-1.04)
Community level reciprocity						1.03		1.07
× Individual level reciprocity (one)						(0.92-1.17)		(0.96-1.18)
Community level reciprocity						1.02		1.03
× Individual level reciprocity (two)						(0.92-1.14)		(0.94-1.12)
Community level reciprocity						1.01		1.00
× Individual level reciprocity (three)						(0.92-1.11)		(0.93-1.08)

Random parameters

Community level intercept variance (standard error)	.004 (.002)	.005 (.002)	.005 (.002)	.001 (.001)	.001 (.001)	.001 (.001)
Community level civic participation slope variance (standard error)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)
Community level social cohesion slope variance (standard error)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)
Community level reciprocity slope variance (standard error)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)

*** $p < .001$ ** $p < .01$ * $p < .05$

All models are also adjusted for individual-level age, gender, marital status, education, and annual house income. Unknown cases in social capital variables were included in this analyses Coefficient of that were omitted in this table. Sample size of each models were as follows: SRH; individual=119,458, community=702, GDS; individual=101,348, community=702.