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Online Social Identity Mapping (oSIM) in Japan

AYAHITO ITO* *Tohoku University*

TOSHIYUKI HIMICHI *Kochi University of Technology*

HIROTAKA IMADA *Royal Holloway, University of London*

RISA TAKASHIMA *Hokkaido University*

S. ALEXANDER HASLAM and BLAKE MCMILLAN *University of Queensland*

TASUKU IGARASHI *Nagoya University*

Abstract: The social identity approach to health in social psychology (the so-called "social cure") explores the capacity for group memberships that furnish people with a positive sense of social identity to enhance their health and well-being. Online social identity mapping (oSIM) is a tool that allows individuals to represent their social identities graphically, providing insights into the quantity and quality of these group-based connections. However, to date only an English version of oSIM has been available, and the tool has only been validated in Western cultural contexts. To address this gap, the present study aimed to validate oSIM in Japan. To this end, a sample of Japanese participants ($N = 309$) created a visual map of their social group memberships using oSIM and also completed measures of health, well-being, loneliness and social connection. The study confirmed that oSIM measures are valid in the Japanese context and identified significant correlations with social support, mental health, and subjective well-being. Findings also indicated that the quality of group memberships was a better predictor of loneliness and mental health than the number of groups to which a person belongs. This suggests that interventions targeting loneliness should focus on enhancing the quality of social group memberships and associated social identities rather than just increasing the number of a person's social ties. Findings also highlight the importance of oSIM being available in non-English-speaking countries to support the assessment and improvement of public health in the community.

Key words: social identity mapping, social identity, group memberships, social cure.

Loneliness is associated with negative feelings, such as general dissatisfaction, unhappiness, depression, anxiety, and emptiness (Peplau & Perlman, 1979). This increases the risk of death (Wang et al., 2023) and poses a health risk that is similar to that associated with smoking

*Correspondence concerning this article should be sent to: Ayahito Ito, Graduate School of Education, Tohoku University, Kawauchi, Aoba-ku, Sendai, Miyagi 980-8576, Japan. (E-mail: ayahito.ito@gmail.com)

(Holt-Lunstad et al., 2010, 2017). The goal of reducing loneliness is therefore a pressing global health challenge (World Health Organization, 2021). Consequently, countries have begun to implement national strategies to address these issues. For example, in the United Kingdom, practitioners engage in social prescribing—a process in which healthcare workers connect patients to a range of non-clinical groups in the community (World Health Organization, 2021). This approach aims to address health issues stemming from loneliness and isolation by encouraging people to engage in community activities and other forms of meaningful social interaction. Recent reviews of social prescribing also suggest that building, restoring, and sustaining social identities through meaningful group-based connections is an effective strategy to combat loneliness (S. A. Haslam et al., 2022; S. A. Haslam, Haslam et al., 2024). Yet, past interventions have not been successful in reducing loneliness. For instance, research indicates that in the United States approximately one in three or four people still feel lonely (Bradburn, 1969, p. 318; Weissbourd et al., 2021). There is therefore a need to develop effective interventions to alleviate this situation. There is also a need for psychological tools that can help us explore the root causes and mechanisms of loneliness and social isolation, and help us assess and appreciate its form and prevalence.

Speaking to these issues, the social identity approach to health (often referred to as "social cure" research; C. Haslam et al., 2018; S. A. Haslam, Fong et al., 2024) explores how group memberships can enhance individual health and well-being. Drawing on a large body of theorizing and supportive empirical evidence, this approach suggests that in a wide range of contexts people's social group memberships shape their cognition, emotions, and behavior (Tajfel & Turner, 1979). More specifically, the approach posits that seeing oneself as part of a social group is a basis for psychological connection to others and, through this, functions as a source of self-esteem and social support as well as providing a sense of meaning and purpose (C. Haslam et al., 2018). Consistent with this claim, McNamara et al. (2021) showed that community identification downregulates loneliness directly and indirectly through social support in ways that enhance well-being. Similarly, Fong et al. (2021) showed that identification with a neighborhood-based community increases social cohesion, reduces loneliness, and promotes general well-being both directly and indirectly. Importantly too, social group membership itself is directly related to reduced risk of premature death. This conclusion emerges from research by Steffens et al. (2016), which investigated the effects of retirees either gaining or losing group memberships after ending work and found that the latter was associated with substantially higher risk of premature death. More generally, such findings highlight the point that being socially integrated through having multiple group memberships has a critical role to play in reducing loneliness and promoting health and well-being.

Nevertheless, the persistence of this global challenge underscores the need for innovative tools that provide insights into people's social connections and identities so that these might not only be assessed but also targeted as a site for intervention (e.g., as they are in GROUPS 4 HEALTH; Cruwys et al., 2022; C. Haslam et al., 2016, 2019). Seeking to address this need, Cruwys et al. (2016) developed a social identity mapping tool (SIM) to help visualize the quantity and quality of a person's group memberships, and, more recently, an online version of the tool (oSIM) has also been developed (Bentley et al., 2020). oSIM provides a visual representation of a person's subjectively meaningful social group memberships and their inter-relationships. More specifically, oSIM involves people (a) representing the various groups that they see themselves to be a member of, (b) reflecting on how important each one is to them, (c) rating key features of each group (how positive it is, how representative they are of it, how supportive it is, and how much contact they have with it), and finally (d) assessing the quality of relationships between their groups (specifically, their compatibility). In this way, oSIM allows researchers and practitioners to map key features of a person's group-based

social worlds but also to track changes in these over time (for a detailed discussion of the method, see Bentley et al., 2023). In addition, oSIM also offers several advantages. First, it provides a visual representation that allows participants to see and reflect on their social connections holistically (Cruwys et al., 2016). Second, it captures both quantitative and qualitative aspects of group memberships simultaneously (Bentley et al., 2020). Third, it enables assessment of inter-relationships between different social groups, which is not easily achieved by conventional self-report measures. These advantages highlight the importance of oSIM in social psychology and health science research.

Although oSIM has already been validated using a variety of samples (Bentley et al., 2020), to date only an English-language version has been available. Yet, given the global need for research to better understand and prevent social isolation, it is clearly important to develop versions of oSIM in additional languages. Doing so is important not only for efforts to tackle loneliness around the world but also for cross-cultural research that would afford a deeper understanding of the contours and implications of people's social identity networks across different societies (see Chang et al., 2016, 2017). Accordingly, as a first step toward facilitating the development of oSIM in multiple languages, we sought to translate the oSIM tool into Japanese and to test the validity of this Japanese version.

Japan is a relevant context for this development because it is a country in which 40% of people indicate that they experience loneliness occasionally or often (The Office for Policy on Loneliness and Isolation, Cabinet Secretariat, 2023). It is also a country in which there has been a marked increase in recent years in the number of deaths attributed to loneliness in people aged 60 and older (The Small Amount & Short Term Insurance Association of Japan, 2022). In light of this, the importance of tools and strategies for measuring and then responding to loneliness and isolation is increasingly recognized. Indeed, to address this issue, the Japanese government enacted the "Act on Promotion of Policy for Loneliness and Isolation" in June 2023, and this came into effect in April 2024. Among other things, this and the 2023 Basic Policies for Economic and Fiscal Management and Reform recognized the need to employ social cure-like strategies to tackle loneliness—for example, by creating a range of spaces and groups that can facilitate social connection (e.g., Men's Sheds and other community groups).

In the present study, we therefore aimed to examine the validity of oSIM in a Japanese context. Specifically, the study was designed to test whether oSIM can be used to assess the same features of group life as the English-language version of the tool (i.e., those pertaining to the number and quality of group memberships and their inter-relationships). To assess the tool's predictive validity, we also sought to examine whether, within this population, the quantity and quality of group memberships indexed by oSIM would be negatively correlated with loneliness and mental health—specifically anxiety, depression, and stress.

In Bentley et al.'s (2020) original study, depression was significantly negatively correlated with oSIM variables that reflect quality of social group membership (i.e., the number of positive/representative/supportive oSIM groups) but not with just the number of oSIM groups. Similar patterns were evident for life satisfaction. These results highlight the importance of quality of group membership for maintaining mental health and well-being. In light of previously observed links between socioeconomic status (SES) and social identity capital (C. Haslam et al., 2018; see also Marmot, 2015; Marmot & Wilkinson, 2005), we also expected that even outside English-speaking countries, the number of positive/representative/supportive oSIM groups would be positively correlated with SES as well as with mental health, life satisfaction, and subjective health.

Method

Power Analysis and Participants

Previous research suggests that around 238 participants would be sufficient in a typical study

that utilizes a correlation analysis (power = .80, alpha = .05, half-width of confidence interval (w) = .10; Schönbrodt & Perugini, 2013). However, for an anticipated attrition rate of 20% (Miura & Kobayashi, 2018), we established a target sample size of 298.

We had 309 participants (126 females and 183 males, M_{age} = 42.46 years, SD = 9.46 years) who fully completed the study through a crowdsourcing service.[1] This study was approved by the Institutional Review Board, and all participants provided their informed consent. Participant recruitment and reimbursement were conducted on the Lancers, Inc, platform. The actual data collection was then done on a different platform: Qualtrics Japan LCC. The participant reimbursement rate was 500 JPY and Japanese adults aged 18 years or older who were fluent in Japanese were allowed to participate. As for quality control, two male participants were excluded for failing an attention check[2] (i.e., a directed questions scale; Maniaci & Rogge, 2014); and 16 participants who did not report group compatibility were also excluded. Analysis therefore focused on data from the remaining 291 participants (121 females and 170 males, M_{age} = 42.49 years, SD = 9.34 years).

Measures and Procedure

Online social identity mapping. Participants were given a URL link that took them to a landing screen that contained a summary of the mapping process together with short videos explaining key operations. Detailed information about oSIM is available at https://sign.centre.uq.edu.au/products-services/products/social-connection-tool.[3] As can be seen from the example in Figure 1, the mapping process involves participants (a) drawing circles to represent the social groups they belong to (e.g., family groups, hobby groups), (b) rating each group on several different dimensions (see below), and (c) drawing lines between the circles to depict the level of group compatibility.

As noted above, the key variables that can be collected by oSIM pertain to the quantity and quality of group memberships. Quantity of group membership was indexed by (a) the number of groups identified in a map and (b) participants' perception of the amount of time they spend with each of their groups in a typical month (where 0% = *no contact*, 100% = *every day of the month*). If participants spend 14% or more of their time with a group (equivalent to one day a week), then that group is defined as a "high-contact group."

Quality of group membership was indexed by (a) the number of positive groups (the number of groups rated above 6 on a scale from 1 [*not at all positive*] to 10 [*very positive*]), (b) the number of representative groups (the number of groups rated above 6 in a scale from 1 [*not at all representative*] to 10 [*very representative*] for the extent to which individuals feel that they are representative of the group), (c) the number of supportive groups (the number of groups rated above 6 in a scale from 1 [*not at all supportive*] to 10 [*very supportive*] for the extent to which individuals feel that they receive support from the group), (d) the number of important groups (the number of large or very large circles, where circles were small [*not important at all*], medium-sized [*moderately important*], large [*important*], or very large [*very important*]), and (e) the proportion of compatible groups (the proportion of groups linked by

[1]A laptop was required for the data collection in Qualtrics and participants were advised of this requirement at the time of recruitment. To confirm that all participants read the instructions, they were asked to type the four digits that were shown in the last part of the instructions in order to enter the oSIM page.

[2]One additional question, which asked the participants to choose a specific option, was inserted at the end of the Depression, Anxiety and Stress Scale questions.

[3]Japanese translation can be made using the following Chrome extension. https://chromewebstore.google.com/detail/osim-japanese-translation/cgcnglgaaaihbgmfkklkhcjnelbhnlpm?pli=1. Please note that the use of oSIM requires a licensing agreement with the Social Identity and Groups Network (SIGN) at The University of Queensland.

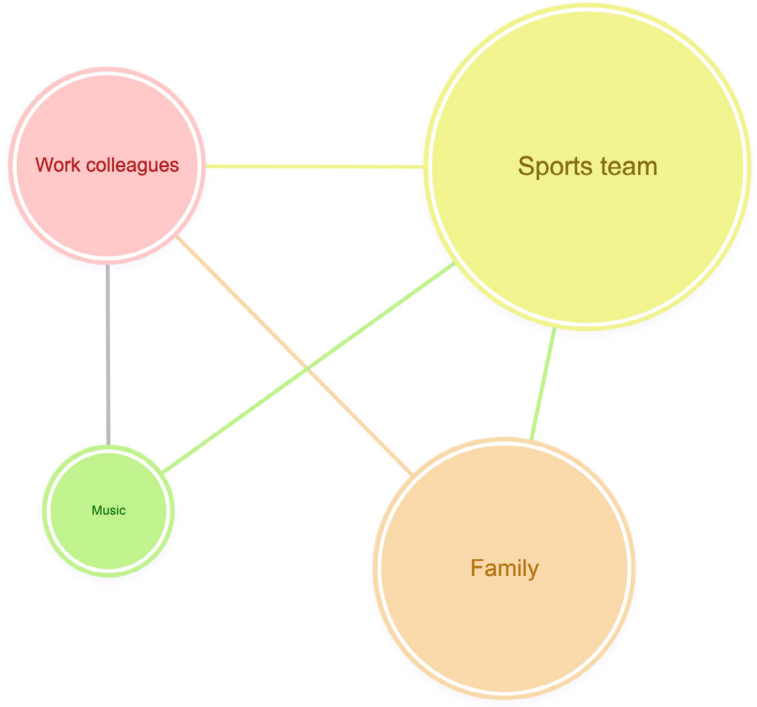
straight lines in the map where lines were red [*not compatible at all*], orange [*incompatible*], yellow [*compatible*], or green [*very compatible*]).

Because the primary purpose of the present study was to examine the validity of oSIM in the Japanese population, we did not report the data of (d) the number of important groups, which was not used in Bentley et al.'s (2020) original study. Appendix C summarizes the variables that were compared with oSIM variables.

User experience. User experience was assessed using a series of scales that assessed (a) ease of use (five items; e.g., "The mapping tool was user-friendly"), (b) enjoyment (two items; e.g., "I enjoyed using the mapping tool"), (c) learning (two items; e.g., "In using the mapping tool, I learnt something about myself"), (d) positive affect (two items; e.g., "Seeing my map made me feel good about myself"), (e) negative affect (two items; e.g., "Seeing my map made me feel sad"), and (f) overall experience ("Overall, using the mapping tool was a good experience"). In all cases, responses ranged from 1 (*strongly disagree*) to 5 (*agree strongly*; see Appendix A for details). One question related to learning ("Seeing my map gave me a lot to think about") that was used in Bentley et al.'s (2020) original study was not used in the present study due to experimenter error. However, all other scales proved to be reliable (ease of use, $\alpha = .89$; enjoyment, $r = .73$; learning, $r = .62$; positive affect, $r = .49$; negative affect, $r = .85$).

Group listing task. Participants listed the social groups they were members of (up to a

Figure 1
Example of online social identity mapping (oSIM).



Note. In this example, the size of circles depicts importance of the group, color of circles depicts group type (e.g., family, friends, and work), and the lines depict group compatibility between groups.

maximum of 10; Bentley et al., 2020; Cruwys et al., 2016; C. Haslam et al., 2008). They then rated each group's positivity ("How positive do you feel about being a member of this group?") on a 10-point scale (1 = *not positive at all*, 10 = *very positive*). As in previous studies (Bentley et al., 2020), the total number of groups was the sum of the number of groups listed and group positivity was calculated as the total number of groups that were rated above the midpoint (i.e., 6) for positivity. This self-report measure was also used to assess convergent validity.

Multiple group memberships. Membership of multiple groups was assessed by a 4-item scale (e.g., "I belong to lots of different groups"; Bentley et al., 2020; C. Haslam et al., 2008). Responses were made on scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), $\alpha = .93$; see Appendix A for details. This self-report measure was also used to assess convergent validity.

Social support. Perceived social support was assessed using an eight-item scale (e.g., "I get the emotional support I need from people"; House et al., 1988; where 1 = *strongly disagree*, 7 = *strongly agree*). The scale had good reliability ($\alpha = .87$).

Identity compatibility. Three questions were adapted from Brook et al.'s (2008) measure of identity harmony (e.g., "On the whole, it is easy for me to be a member of different groups"). Scales ranged from 1 = *strongly disagree* to 7 = *strongly agree* ($\alpha = .80$).

Social desirability. To assess social desirability, participants were asked to respond with either *True* or *False* to 10 items. This was designed to capture participants' concern to create a positive impression (e.g., "I have never deliberately said something that hurt someone's feelings"; Crowne & Marlowe, 1960; Reynolds, 1982; Strahan & Gerbasi, 1972). The number of *True* responses was used as an index of social desirability.

Life satisfaction. As in the original oSIM study, the 5-item Satisfaction With Life Scale (SWLS; Diener et al., 1985) was included as a measure of predictive validity (e.g., "All things considered, I am satisfied with my life"; where 1 = *strongly disagree*, 7 = *strongly agree*; $\alpha = .93$). This measure was also used to assess predictive validity.

Loneliness. Loneliness was assessed using the 10-item Japanese version of the UCLA Loneliness Scale (Arimoto & Tadaka, 2019; Russell, 1996; e.g., "How often do you feel that you lack companionship?"; where 1 = *never*, 2 = *rarely*, 3 = *sometimes*, 4 = *often*; $\alpha = .92$).

Personality. Personality was assessed using the Japanese version of the Ten-Item Personality Inventory. Participants were asked to respond to 10 questions designed to capture the multidimensional nature of personality (Gosling et al., 2003; Oshio et al., 2012). The focal variable of interest was extraversion, which was measured using two items (e.g., "I see myself as someone who is outgoing") on scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*; $\alpha = .70$).

Depression. A Japanese version of the 21-item Depression, Anxiety, and Stress Scale (DASS; Antony et al., 1998; Lovibond & Lovibond, 1995) was administered (see the following link for details: http://junhara.net/nodasemi/dass21.pdf). This instrument comprised of three self-report scales each containing seven items designed to measure depression, anxiety, and stress. Although the original oSIM study focused only on the measure of depression, we were keen to include measures of anxiety and stress in order to examine the relationship between social identity and multiple aspects of mental health. Scales ranged from 1 (*did not apply to me at all*), to 4 (*applied to me very much or most of the time*). All scales had good reliability (depression, $\alpha = .92$; anxiety $\alpha = .81$; stress $\alpha = .89$). In line with the original instructions for use, the summed score for each mental health symptom was doubled.

Table 1
Descriptive statistics for measures of user experience

User experience	Mean	*SD*
Ease of use	3.97	0.77
Enjoyment	3.77	0.91
Learning	3.58	0.81
Negative affect	2.29	1.16
Positive affect	3.10	0.82
Overall positive experience	4.05	0.80

Subjective health. One item assessed global self-rated health: "How in general would you rate your health?" (Idler & Benyamini, 1997). This question has been shown to be a good predictor of mortality risk. Responses ranged from 1 (*not healthy*) to 4 (*very healthy*).

Going out. Participants were asked to indicate how often they left their home using the following single item "How often do you usually go outside the house?" (examples of going outside the home include going shopping, taking a walk, going to a hospital, or going out to work or to participate in social activities; Fujiwara et al., 2017; where 1 = *once a week or less*; 2 = *around once every 2–3 days*; 3 = *once a day*; 4 = *twice a day or more*).[4]

Social contact. Questions regarding the frequency of communication with relatives (family members, extended family) and friends were developed based on the General Social Survey: Canada (Brzozowski, 2014) and the study by Ishiguro and Okamoto (2013). We included four types of questions, categorizing them by contact type (relatives or non-relatives) and communication mode (face-to-face or online). For instance, the question related to face-to-face communication with relatives read "How often do you engage in face-to-face communication with your relatives (family members, extended family)?" In contrast, the question concerning online communication with non-relatives was, "How often do you communicate with non-relatives (friends or neighbors) through non-face-to-face means (such as smartphones, phone calls, emails, fax, or letters)?" Response options captured eight levels of contact: (1 = *no contact*, 2 = *less than once a month*; 3 = *once a month*, 4 = *2–3 times a month*, 5 = *once a week*, 6 = *2–3 times a week*, 7 = *4–5 times a week*, 8 = *everyday*).[5]

Living alone. In line with previous studies (Fujiwara et al., 2017), we asked participants to indicate whether they lived alone (1) or not (2).

Subjective socioeconomic status. Subjective socioeconomic status (SES) was assessed using a Cantril Ladder consisting of 10 rungs, where participants were required to place themselves on one of these rungs based on their subjective evaluation of their SES, educational background, and occupation. A higher position on the ladder indicates higher SES (Cantril, 1965).

Results

User Experience

Data and analysis code are stored in the website of Open Science Framework (https://osf.io/2cpkh/). As can be seen from the descriptive statistics in Table 1, participants responded positively to oSIM. As in Bentley et al.'s (2020) original study, no participants reported any errors or difficulties in relation to any aspect of the tool's functionality.

Descriptive Details

Participants reported a range of social groups, including family, the workplace, friends, and hobby groups. Among the 1,289 social groups, 26.30% (339/1,289) were categorized as family groups, 22.03% (284/1,289) were workplace groups, 28.78% (371/1,289) were friend groups, and 22.89% (295/1,289) were "other" groups.

[4]The order of the ratings was flipped for readability.

[5]The order of the ratings was flipped for readability.

Social groups categorized as "other" included various types of social groups, such as parent committees, sports gyms, online communities, and neighborhood associations.

Internal Consistency

The results of bivariate correlations are presented in Tables 2–4. Participants took on average 11 min to complete their social identity maps. The median number of groups depicted on each map was four and the total number of groups ranged from 0 to 10. Participants included a median of three positive oSIM groups, two representative oSIM groups, two supportive oSIM groups, and three high-contact oSIM groups. Other than compatible oSIM links, all the oSIM indices were significantly intercorrelated.

Convergent Validity

Ratings of the group-listing task (number of groups and number of positive groups) were positively and significantly correlated with the number of groups included in oSIM (hereafter "oSIM groups"), the number of positive oSIM groups, the number of representative oSIM groups, the number of supportive oSIM groups, and the number of high-contact oSIM groups (all rs > .34, all ps < .01) but not with the proportion of compatible oSIM links. Supporting the idea that oSIM measures include elements of both quantity and quality of social group memberships, the self-report multiple group membership scale was significantly correlated with the five oSIM variables other than with the proportion of compatible oSIM links (all rs > .32, all ps < .01). Self-reported social support was also positively and significantly correlated with all oSIM variables except the number of groups (rs > .15, ps < .01). Self-reported group compatibility was positively and significantly correlated with the proportion of compatible oSIM links between oSIM groups ($r = .22$, $p < .01$).

Discriminant Validity

Age, gender, and social desirability were not significantly correlated with any oSIM variables (ps > .05). However, there were some significant correlations with personality traits. In particular, extraversion was significantly positively correlated with all oSIM variables except proportion of compatible oSIM links (all rs > .23, all ps < .05). Agreeableness was also significantly positively correlated with all oSIM variables (all rs > .14, all ps < .05). Conscientiousness was significantly positively correlated with the number of positive oSIM groups ($r = .18$, $p < .01$), the number of representative oSIM groups ($r = .28$, $p < .01$), and the number of high-contact oSIM groups ($r = .12$, $p < .05$). In contrast, neuroticism was significantly *negatively* correlated with all oSIM variables (all rs < –.16, all ps < .01). Finally, openness to experience was significantly positively correlated with the number of oSIM groups ($r = .22$, $p < .01$), the number of positive oSIM groups ($r = .22$, $p < .01$), the number of representative oSIM groups ($r = .27$, $p < .01$), and the number of supportive oSIM groups ($r = .18$, $p < .01$). These results suggest that oSIM may not achieve complete discriminant validity from personality measures. However, these correlations may be meaningful and consistent with the social identity perspective—individuals with higher extraversion tend to seek out and maintain more social connections, while individuals with higher neuroticism may not seek to develop and maintain positive group memberships.

Predictive Validity

There was a significant positive relationship between going out more and the number of representative oSIM groups ($r = .15$, $p < .05$). Not living alone had a significant positive relationship with the number of representative oSIM groups ($r = .14$, $p < .05$), the number of supportive oSIM groups ($r = .14$, $p < .05$), and the number of high-contact oSIM groups ($r = .14$, $p < .05$). Having more contact with (1) family on online, (2) friends on online, and (3) friends in person also had significant positive relationships with all oSIM variables except proportion of compatible oSIM links (all rs > .12, all ps < .05). Having more contact with family in person was also significantly positively correlated with the number of representative oSIM

Table 2
Means, standard deviations, and correlations among oSIM indices and self-report measures

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10
1. Number of oSIM groups (Quantity)	4.21	1.18										
2. Number of positive oSIM groups (Quality)	3.19	1.38	.69** [.63, .75]									
3. Number of representative oSIM groups (Quality)	1.95	1.41	.45** [.35, .53]	.58** [.50, .65]								
4. Number of supportive oSIM groups (Quality)	2.54	1.39	.57** [.48, .64]	.64** [.56, .70]	.62** [.54, .68]							
5. Number of high-contact oSIM groups (Quantity)	2.77	1.46	.54** [.45, .61]	.50** [.41, .58]	.43** [.33, .52]	.44** [.35, .53]						
6. Proportion of compatible oSIM links (Quality)	0.74	0.29	−.10 [−.21, .02]	.07 [−.04, .18]	.05 [−.06, .17]	.09 [−.02, .21]	.03 [−.09, .14]					
7. Group list: Number of groups (Quantity)	4.37	1.50	.72** [.66, .77]	.56** [.47, .63]	.37** [.27, .46]	.42** [.33, .51]	.41** [.31, .51]	−.08 [−.19, .04]				
8. Group list: Number of positive groups (Quality)	3.19	1.50	.53** [.44, .61]	.74** [.68, .79]	.44** [.35, .53]	.51** [.42, .59]	.34** [.24, .44]	.04 [−.07, .16]	.69** [.62, .74]			
9. Self-report: Multiple group membership (Quantity)	3.33	1.38	.36** [.26, .46]	.49** [.40, .57]	.46** [.36, .55]	.37** [.26, .46]	.32** [.22, .42]	.05 [−.06, .17]	.36** [.26, .46]	.49** [.39, .57]		
10. Self-report: Social support (Quality)	4.43	0.96	.05 [−.06, .17]	.27** [.16, .38]	.26** [.15, .37]	.29** [.18, .39]	.15** [.04, .26]	.19** [.08, .30]	.09 [−.02, .21]	.26** [.15, .36]	.33** [.22, .43]	
11. Self-report: Group compatibility (Quality)	3.65	1.14	.24** [.13, .34]	.45** [.35, .53]	.40** [.30, .50]	.30** [.19, .40]	.24** [.13, .35]	.22** [.11, .33]	.26** [.15, .36]	.42** [.32, .51]	.72** [.66, .77]	.39** [.29, .48]

Note: Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). *M* = mean; *SD* = standard deviation; oSIM = online social identity mapping.
** $p < .01$.

Table 3
Means, standard deviations, and correlations among oSIM indices, social contact variables, and personality traits

Variable	*M*	*SD*	1. Number of oSIM groups (Quantity)	2. Number of positive oSIM groups (Quality)	3. Number of representative oSIM groups (Quality)	4. Number of supportive oSIM groups (Quality)	5. Number of high-contact oSIM groups (Quantity)	6. Proportion of compatible oSIM links (Quality)
12. Going out	2.65	0.86	.03 [−.09, .14]	.10 [−.02, .21]	.15* [.03, .26]	.03 [−.08, .15]	.07 [−.04, .18]	.00 [−.12, .11]
13. Contact with family in person	6.89	2.21	.04 [−.08, .15]	.08 [−.03, .20]	.12* [.00, .23]	.14* [.03, .25]	.19** [.07, .30]	.09 [−.03, .20]
14. Contact with family online	5.1	2.00	.16** [.05, .27]	.28** [.17, .38]	.27** [.17, .38]	.26** [.15, .37]	.30** [.19, .40]	.01 [−.10, .13]
15. Contact with friends in person	4.66	1.92	.19** [.07, .30]	.21** [.10, .32]	.12* [.00, .23]	.15* [.03, .26]	.25** [.14, .36]	.06 [−.05, .18]
16. Contact with friends online	5.1	2.03	.16** [.04, .27]	.24** [.12, .34]	.18** [.06, .29]	.16** [.04, .27]	.26** [.15, .36]	.02 [−.09, .14]
17. Living alone or not	1.82	0.39	−.01 [−.12, .11]	.03 [−.08, .15]	.14* [.03, .25]	.14* [.03, .25]	.14* [.02, .25]	.10 [−.01, .21]
18. TIPI-J: Extraversion	3.24	1.36	.23** [.12, .34]	.36** [.26, .46]	.41** [.31, .50]	.27** [.16, .38]	.26** [.15, .37]	.09 [−.02, .20]
19. TIPI-J: Agreeableness	4.89	1.20	.17** [.05, .28]	.26** [.15, .37]	.27** [.16, .37]	.21** [.10, .32]	.16** [.04, .27]	.14* [.03, .25]
20. TIPI-J: Conscientiousness	3.97	1.45	.11 [−.01, .22]	.18** [.06, .29]	.28** [.17, .39]	.01 [−.10, .13]	.12* [.01, .24]	.06 [−.06, .17]
21. TIPI-J: Neuroticism	4.38	1.51	−.22** [−.33, −.11]	−.32** [−.42, −.22]	−.35** [−.45, −.25]	−.21** [−.32, −.10]	−.16** [−.27, −.05]	−.19** [−.29, −.07]
22. TIPI-J: Openness to Experience	3.68	1.35	.22** [.11, .33]	.22** [.10, .32]	.27** [.16, .37]	.18** [.07, .29]	.11 [−.01, .22]	.08 [−.04, .19]

Note: Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). *M* = mean; *SD* = standard deviation; oSIM = online social identity mapping; TIPI-J = Japanese version of the Ten-Item Personality Inventory.
* $p < .05$, ** $p < .01$.

Table 4
Means, standard deviations, and correlations among oSIM indices, demographic variables, and mental health outcomes

Variable	*M*	*SD*	1. Number of oSIM groups (Quantity)	2. Number of positive oSIM groups (Quality)	3. Number of representative oSIM groups (Quality)	4. Number of supportive oSIM groups (Quality)	5. Number of high-contact oSIM groups (Quantity)	6. Proportion of compatible oSIM links (Quality)
23. Age	42.49	9.34	−.01 [−.12, .11]	−.02 [−.13, .10]	.00 [−.11, .12]	−.03 [−.15, .08]	−.08 [−.19, .04]	.03 [−.09, .14]
24. Gender	1.58	0.49	.03 [−.09, .14]	−.03 [−.14, .09]	.02 [−.10, .13]	−.11 [−.22, .00]	−.06 [−.18, .05]	−.10 [−.21, .01]
25. Social desirability	5.24	1.35	.05 [−.06, .16]	−.05 [−.16, .07]	.03 [−.09, .14]	.09 [−.03, .20]	.08 [−.03, .20]	−.00 [−.12, .11]
26. Loneliness	23.35	6.47	−.19** [−.29, −.07]	−.42** [−.51, −.32]	−.45** [−.54, −.36]	−.27** [−.37, −.16]	−.23** [−.33, −.12]	−.21** [−.32, −.10]
27. Depression	23.86	9.51	−.06 [−.17, .05]	−.29** [−.39, −.18]	−.28** [−.39, −.17]	−.11 [−.22, .00]	.00 [−.11, .12]	−.22** [−.33, −.11]
28. Anxiety	18.56	5.88	−.03 [−.14, .09]	−.20** [−.30, −.08]	−.20** [−.31, −.09]	−.09 [−.20, .03]	.04 [−.07, .16]	−.14* [−.25, −.02]
29. Stress	23.72	8.60	−.03 [−.15, .08]	−.23** [−.33, −.11]	−.16** [−.27, −.04]	−.06 [−.18, .05]	.04 [−.07, .16]	−.22** [−.33, −.11]
30. Life satisfaction	16.82	6.99	.16** [.05, .27]	.36** [.26, .46]	.36** [.26, .46]	.24** [.13, .34]	.15** [.04, .26]	.18** [.06, .29]
31. Subjective health	2.89	0.76	.18** [.07, .29]	.32** [.21, .42]	.26** [.15, .36]	.16** [.05, .27]	.13* [.01, .24]	.17** [.05, .28]
32. Cantril Ladder	4.27	1.67	.14* [.02, .25]	.31** [.20, .41]	.34** [.23, .43]	.24** [.13, .34]	.25** [.14, .35]	.20** [.08, .31]

Note. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). *M* = mean; *SD* = standard deviation; oSIM = online social identity mapping.
* $p < .05$, ** $p < .01$.

Table 5
Means, standard deviations, and correlations among group listing variables, self-report measures, and mental health outcomes

Variable	*M*	*SD*	7. Group list: Number of groups (Quantity)	8. Group list: Number of positive groups (Quality)	9. Self-report: Multiple group membership (Quality)	10. Self-report: Social support (Quantity)	11. Self-report: Group compatibility (Quality)
26. Loneliness	23.35	6.47	−.21** [−.32, −.10]	−.39** [−.48, −.29]	−.65** [−.71, −.57]	−.47** [−.55, −.37]	−.66** [−.72, −.59]
27. Depression	23.86	9.51	−.07 [−.19, .04]	−.28** [−.38, −.17]	−.41** [−.50, .31]	−.43** [−.52, −.34]	−.47** [−.55, −.37]
28. Anxiety	18.56	5.88	.01 [−.10, .13]	−.20** [−.31, −.09]	−.26** [−.37, −.15]	−.22** [−.33, −.11]	−.32** [−.42, −.22]
29. Stress	23.72	8.60	−.03 [−.14, .09]	−.26** [−.36, −.15]	−.32** [−.42, −.21]	−.27** [−.37, −.16]	−.41** [−.50, −.31]
30. Life satisfaction	16.82	6.99	.12* [.01, .23]	.30** [.19, .40]	.48** [.39, .56]	.39** [.29, .49]	.48** [.39, .56]
31. Subjective health	2.89	0.76	.12* [.01, .24]	.26** [.15, .36]	.39** [.29, .48]	.29** [.18, .39]	.42** [.32, .51]
32. Cantril Ladder	4.27	1.67	.18** [.06, .29]	.27** [.16, .37]	.35** [.24, .45]	.28** [.17, .38]	.37** [.26, .46]

Note: Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). *M* = mean; *SD* = standard deviation; oSIM = online social identity mapping.
* $p < .05$, ** $p < .01$.

groups ($r = .12$, $p < .05$), the number of supportive oSIM groups ($r = .14$, $p < .05$), and the number of high-contact oSIM groups ($r = .19$, $p < .01$). Life satisfaction (SWLS) was significantly positively correlated with all oSIM variables ($rs > .15$, $ps < .01$), and most highly correlated with the number of positive oSIM groups ($r = .36$, $p < .01$) and the number of representative oSIM groups ($r = .36$, $p < .01$). Subjective health was significantly positively correlated with all oSIM variables ($rs > .13$, $ps < .05$) especially the number of positive oSIM groups ($r = .32$, $p < .05$). The Cantril Ladder was also significantly positively correlated with all oSIM variables (all $rs > .14$, all $ps < .05$). In contrast, loneliness was significantly negatively correlated with all oSIM variables ($rs < -.19$, $ps < .05$). Depression, anxiety, and stress were all negatively correlated with the number of positive oSIM groups, the number of representative oSIM groups, and the proportion of compatible oSIM links (all $rs < -.14$, all $ps < .05$).

Comparison Between oSIM and Self-Report Measures

To provide a more comprehensive understanding of how oSIM compares with traditional self-report measures, we conducted additional correlation analyses between self-report measures (group listing task, multiple group membership, and social support) and our key outcome variables (loneliness, mental health, and well-being; Table 5). The results are generally consistent with the oSIM results summarized in Table 4. For example, "7. Group list: Number of groups" showed significant negative correlation with loneliness ($r = -.21$, $p < .05$), and it showed significant positive correlation with life satisfaction, subjective health, and Cantril Ladder ($rs = .12$, .12, and .18, respectively; all $ps < .05$). In addition, as with the oSIM results summarized in Table 4, "8. Group list: Number of groups" showed significant negative correlation with loneliness, depression, anxiety, and stress ($rs = -.39$, $-.28$, $-.20$, and $-.26$, respectively; all $ps < .05$), and it showed significant positive correlation with life satisfaction, subjective health, and Cantril Ladder ($rs = .30$, .26, and .27, respectively; all $ps < .05$). These results suggest that oSIM measures similar aspects of social group membership to those measured in self-report (i.e., relating to quality and quantity).

Discussion

The present study confirmed the validity of online social identity mapping (oSIM) for the Japanese population in a way that speaks to its applicability across different cultural contexts. Consistent with the original study by Bentley et al. (2020), our findings indicate an overall positive user experience, suggesting that the oSIM interface is user-friendly, even for people from non-English-speaking countries. Our findings were also largely similar to those of the original study. In particular, the original study used a group-listing task to identify both the number of groups that a person belonged to and the number of positive groups, and showed that this had strong positive correlations with oSIM. In our study, we observed a similar pattern, thereby confirming that oSIM effectively measures both the quantity and quality of group memberships among Japanese participants.

More specifically, we found that all six oSIM variables—namely (a) number of oSIM groups, (b) number of positive oSIM groups, (c) number of representative oSIM groups, (d) number of supportive oSIM groups, (e) number of high-contact oSIM groups, and (f) proportion of compatible oSIM links—demonstrated significant positive correlations with SES as indexed by the Cantril Ladder, as well as with life satisfaction and subjective health. These findings align closely with the original study in terms of life satisfaction. The results underscore the crucial role of social identity in maintaining quality of life and well-being, and they highlight oSIM's effectiveness as a tool that can capture multifaceted aspects of social identity. At the same time, this study is the first to provide evidence of a strong relationship between SES, subjective health, and oSIM variables. This speaks to the fact that SES is a strong predictor of social identity

capital and, partly through this, of health (C. Haslam et al., 2018; see also Marmot, 2015; Marmot & Wilkinson, 2005).

Similarly, all six primary oSIM variables were significantly negatively correlated with loneliness, as measured by the 10-item UCLA Loneliness Scale. This indicates that both the quantity and quality of group memberships, as quantified by oSIM, are good predictors of loneliness. However, the number of positive groups and representative groups was more highly correlated with loneliness ($r = -.42$ and $r = -.45$, respectively) than other oSIM variables (all other rs $> -.27$, zs >3.25). In line with observations by Bentley et al. (2020), this suggests that the quality of a person's group memberships plays a more important role in influencing loneliness than merely the number of groups they belong to.

Depression, anxiety, and stress were also found to be associated with the number of positive oSIM groups, the number of representative oSIM groups, and the proportion of compatible oSIM links, while the simple quantity of group memberships (i.e., the number of oSIM groups) and number of high-contact oSIM groups were not significantly correlated with these mental health measures. This aligns with findings from Bentley et al.'s (2020) original study, which found that depression was linked to the number of positive, representative, and supportive oSIM groups, as well as the proportion of compatible oSIM links. This suggests that these patterns are relatively stable across different cultural contexts. It appears that the mere quantity of group memberships may not be sufficient to predict mental health conditions. Instead, it appears to be the quality of these memberships that predicts self-esteem and mental health (Cruwys et al., 2014; Ellemers & Jetten, 2013; Greenaway et al., 2015).

The comparison between oSIM and self-report measures revealed that both showed similar patterns of the relationships with key outcome variables, such as loneliness, mental health, and well-being. On the other hand, self-report measures of social support showed stronger negative correlations with mental health conditions compared to the number of supportive oSIM groups. This difference might be attributed to the fact that the self-report measure of social support has eight items and may assess social support more broadly than the number of supportive oSIM groups—encompassing multiple forms of support (emotional, cognitive, material). In contrast, oSIM measurement of supportive groups may capture more specific aspects of social support (e.g., participants might focus more on just one particular form of support).

However, it is also conceivable that poor mental health could negatively influence people's perceptions of the groups they belong to. Along these lines, previous studies have shown that depressive symptoms are linked to lower subjective social status, which in turn is associated with increased self-stigma (Bharat et al., 2020). Consistent with this point, a recent meta-analysis has highlighted the complexity of the relationship between mental health conditions and social identification, indicating that while high social identification with a group generally correlates with lower depression, the type of group and the nature of social identity content have a significant role to play in shaping these relationships (Postmes et al., 2019). Future research is clearly needed to unravel this relationship further. It should also be noted that, contrary to the findings of Bentley et al. (2020), we found no significant correlation between the number of supportive groups and depression. This difference might reflect cultural differences in the way social support functions or is perceived across Western and East Asian contexts. Previous research indicated that East Asians tend to perceive groups as networks of personally connected individuals rather than as depersonalized entities (Kavanagh & Yuki, 2017). Additionally, compared to Westerners, East Asians tend to experience greater feelings of indebtedness and obligation when expressing gratitude (Oishi et al., 2019) and are generally more reluctant to seek support from others (Kim et al., 2008). These findings also align with evidence that receiving support from groups can impose a greater psychological burden for people in East Asian cultures (Chang et al., 2016). Although

future study is needed to explore this issue, this cultural difference may explain why the number of supportive groups had different patterns of association with depression in our Japanese sample than in previous Western samples.

The bivariate correlation analysis of the six oSIM variables revealed that the proportion of compatible oSIM links was not consistently related to other oSIM variables. This suggests that the proportion of compatible oSIM links assesses a distinct aspect of group membership and likely arises from the fact that this measure taps into the existence of identity conflict (e.g., stemming from differing behavioral norms; Hirsh & Kang, 2016). Supporting this interpretation, the results from the group-listing task (namely, the number of groups and the number of positive groups) and self-reports of multiple group memberships were not significantly correlated with the proportion of compatible links.

Speaking to the broad utility of the oSIM process, it appears that the translation of oSIM into Japanese can provide us with a new tool to elucidate the cultural difference in social identity processes. The relevance of such questions is raised by Yuki and colleagues who argued that individuals in East Asian and Western cultures conceptualize group and intergroup processes somewhat differently (Kavanagh & Yuki, 2017; Yuki, 2003; Yuki et al., 2005). More specifically, they argued that East Asians tend to perceive groups as a web of personally connected individuals rather than as a depersonalized entity in the manner suggested by social identity theory. Consistent with this theorizing, these researchers found, for instance, that Japanese people trusted outgroup members with whom they might be connected via a mutual acquaintance as much as they trusted ingroup members (Yuki et al., 2005). Contrastingly, Americans trusted such outgroup members less than they did ingroup members, displaying a category-based intergroup trust that is consistent with the traditional social identity perspective (Yuki et al., 2005). According to the social identity perspective, perceived homogeneity of the group should predict the strength of social identification, but Yuki (2003) found that this was not the case for Japanese participants. Overall, Yuki and colleagues suggested that the way individuals conceptualize social groups and social identity processes might therefore differ across different cultures. That said, very few studies have explored how social identity processes vary across different cultures and the current cross-cultural psychological literature on social identity deserves more research (Kavanagh & Yuki, 2017). We argue that the Japanese version of oSIM could foster the next wave of cross-cultural investigation into social identity processes by allowing scholars to elucidate how the quality, quantity, and the network of social groups are independently and interactively associated with intergroup and interpersonal outcomes, such as loneliness. In this way, oSIM research may benefit not only from applied research on loneliness but may also help to address a wide range of theoretical and applied research questions that draw on, and seek to refine, social identity theorizing.

In conclusion, this study validates the use of online social identity mapping (oSIM) for the Japanese population, and showcases both its utility and its adaptability. oSIM allows users to graphically represent the group memberships from which they derive a sense of social identity in an online format. It also enables the assignment of ratings to each group based on factors such as importance, and visually depicts the relationships between these groups—that is, the degree of compatibility between the different groups that a person sees themselves as belonging to. Consequently, repeated measurements with oSIM can visually track the dynamic changes or developments in group membership over time. This tool is particularly useful for investigating the effects of interventions intended to improve social connectedness, such as social prescribing and participation in community groups (e.g., sports clubs, Men's Sheds). Moreover, by examining the state of social connections among a specific set of respondents, one can also assess the risk of isolation within any given community. In particular, it is clear that oSIM is an effective and engaging way to map out both the quantity and quality of a

person's social group memberships in ways that highlight its potential to be used for a wide range of research purposes—from analyzing social connections to evaluating the impact of social interventions. Its utility across cultural contexts also points to the significant role it can play in addressing global challenges, such as social isolation and loneliness, providing a practical means for researchers and policymakers to understand and enhance social connectedness. The application of oSIM in different research and community settings confirms its importance in advancing social psychology and public health. Looking ahead, the continued exploration of oSIM's utility across different cultural landscapes promises to enrich our understanding of social identity processes in ways that can help us create more connected, and healthier, communities around the world.

Conflict of Interest

The authors declare no conflicts of interest associated with this manuscript.

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Data Availability Statement

Data and code can be accessed by OSF (https://osf.io/2cpkh/).

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Appendix A

Social identity constructs that online social identity mapping can measure

Quantity of group membership
The number of groups
The number of high-contact groups
Quality of group membership
The number of positive groups
The number of representative groups
The number of supportive groups
Proportion of compatible links

Appendix B

Questions used for user experience and multiple group membership

User experience
Ease of use
I found the mapping tool simple to use. 私は，このマッピングツールは使いやすいと思いました。
The instructions for the mapping tool were clear. このマッピングツールの説明は理解しやすかったです。
The mapping tool was user-friendly. このマッピングツールは利用者に優しい作りでした。
I found the mapping tool website confusing. (reversed-score item) 私は，このマッピングツールの画面(インターフェース)がわかりにくいと思いました。
I found the mapping tool frustrating to use. (reversed-score item) 私は，このマッピングツールの使い勝手に不満がありました。
Enjoyment
I enjoyed using the mapping tool. 私は，このマッピングツールを使うのを楽しみました。
I found the mapping tool interesting. 私は，このマッピングツールが面白いと思いました。
Learning
In using the mapping tool, I learnt something about myself. このマッピングツールを使うことで，自分自身について学ぶことができました。
Seeing my map made me appreciate who I am. 自分のマップを見ることで，自分が何者なのかがわかりました。
Positive affect
I would recommend the mapping tool to others. 私は，このマッピングツールを他の人にも勧めたいです。
Seeing my map made me feel good about myself. 自分のマップを見ることで，良い気分になりました。
Negative affect
Seeing my map made me feel depressed. 自分のマップを見ることで，気持ちが落ち込みました。
Seeing my map made me feel sad. 自分のマップを見ることで，悲しくなりました。
Overall experience
Overall, using the mapping tool was a good experience. 全般的に，このマッピングツールを使うことは良い経験でした。
Multiple group membership
I belong to lots of different groups. いろいろな集団に所属している。
I join in the activities of lots of different groups. いろいろな集団の活動に参加している。
I have friends who are members of lots of different groups. いろいろな集団のメンバーの友人がいる。
I have strong ties with lots of different groups. いろいろな集団と強い絆で結ばれている。

Appendix C

Variables compared with online social identity mapping variables in this study

Category	Variable	Purpose
Self-reported measures of group membership	Quality and quantity of group membership	Convergent validity
Mental health measures	Depression, anxiety, stress	Predictive validity
Well-being measures	Life satisfaction, subjective health	Predictive validity
Behavioral measures	Going out, social contact frequency	Predictive validity
Control variables	Social desirability, personality traits	Discriminant validity
Sociodemographic variables	Age, gender, living alone, subjective SES	Background/control