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What types of citizens require opportunities for interactions with people in the local community? A quantitative study

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There are examples of governments and companies providing citizens with opportunities to interact with people in local communities. This study aimed to examine the individuals who should be provided with opportunities to interact with others in a community. We tested four hypotheses: people with greater sense of community (H1) and need to belong (H2) will have more need for provided opportunities for interaction, and people with greater sense of community (H3) and need to belong (H4) will have more positive interaction expectancy (i.e., prediction of self-perceptions improved through provided opportunities for interaction with people in the local community). By examining this outcome variable, we can better assess the potential impact of government- or company-led initiatives that provide opportunities for interaction on improving citizens' wellbeing. We conducted two online surveys with Japanese adults. The results showed that in both Studies 1 and 2 ($N = 980$ and 983, respectively), participants with a higher sense of community and need to belong were more likely to desire opportunities provided to interact with people in local communities (supporting H1 and H2). In addition, Study 2 showed that participants with a higher sense of community and a need to belong believed that such provided interaction opportunities would make them hold more positive self-perceptions (supporting H3 and H4). Additionally, in both surveys, individuals with more negative self-perceptions in interpersonal relationships had a lower need to belong. This study suggests the importance of considering people's views toward opportunities for intra-community interaction, and provides preliminary data contributing to the discussion of whether and how such opportunities should be implemented in local communities.

KEYWORDS

local community, sense of community, need to belong, interpersonal relationship, self-perceptions

1 Introduction

Positive interpersonal relationships are fundamental to human wellbeing. A seminal study on psychological wellbeing identified positive relationships as a core dimension of psychological wellbeing (Ryff, 1989). The widespread use of the PERMA model—comprising five elements: positive emotion, engagement, relationships, meaning,

and accomplishment—further underscores the integral role of interpersonal relationships in overall wellbeing (Seligman, 2011). Furthermore, emotional connections with others contribute meaningfully to an individual's daily psychological health (Reis et al., 2000). Numerous review articles have consistently emphasized (e.g., Proctor et al., 2009; Umberson and Karas Montez, 2010) that positive interpersonal relationships significantly enhance life satisfaction and health.

Especially, interacting with people who live together in the neighborhood (i.e., people in the local community) has a desirable effect on many citizens. For example, it has been shown that people who interact more frequently with others in the local community are more likely to have better health status (Bhuyan, 2004; Haldane et al., 2019) and are less likely to feel lonely and depressed (Giebel et al., 2022). In addition, cooperative behavior is more common in communities where people greet each other and talk, leading to crime reduction (Takagi et al., 2010). In Japan, where natural disasters are especially frequent, ensuring opportunities for interaction with local people is extremely important from the perspective of mutual aid for evacuation in the event of a disaster (Kakimoto and Yamada, 2013; Nakamura, 2009). It has been shown that people who are more active and responsible in community activities are more likely to be involved in disaster management initiatives (Hashimoto et al., 2018). Thus, opportunities to interact with people in the local community are important for healthy and safe lives.

Considering Japan's rapidly aging population which has resulted in one of the highest proportions of older adults globally, the role of communities has become increasingly vital. Community-based monitoring of older individuals not only helps prevent instances of solitary death but also fosters their active social participation (Tanaka and Morizane, 2016). Moreover, older adults tend to experience better mental and physical health when they are embedded within a community and receive consistent social support from those around them (Chu et al., 2023; Kobayashi et al., 2011). Consequently, investigating the relationship between community involvement and psychological wellbeing in Japan may offer valuable insights for addressing a wide range of social challenges.

1.1 Providing opportunities for interaction with people in the local community

Based on the above, in recent years, there have been examples of governments and companies providing citizens with opportunities to interact with people in the local community. For example, the Kamakura City Civic Activity Center by Kamakura City in Kanagawa Prefecture, Japan offers a service that consults individuals who want to volunteer in the local community and introduces them to non-profit organizations (Kamakura City Civic Activity Center, 2024). In addition, Agti Inc., based in Kyoto Prefecture, Japan, operates a "local circulation work-sharing" business that connects local communities, businesses, and individuals. The company has set up an "ACWA BASE," a workplace where citizens can wander in and work as much or as little as they like at any given time, providing opportunities for interaction with people in the local community (Agti Inc, 2024).

Initiatives that provide opportunities for interaction can also be found in smart cities, which have become popular in recent years. A smart city is an area with "effective integration of physical, digital, and human systems in the built environment to deliver a sustainable, prosperous, and inclusive future for its citizens" (British Standards Institute, 2014). In a smart city, active citizen participation in urban development is expected (Japan Ministry of Land, Infrastructure, Transport and Tourism, 2021), which stimulates interactions not only online but also face-to-face with neighbors. An example of such citizen participation is the "living lab," a co-creation center between smart city operators and citizens (Alam and Porras, 2018; Thees et al., 2020). In living labs, values such as "being able to meet and talk with diverse people," "feeling connected to society," and "contributing to urban development" are provided to residents (Nakatani et al., 2019; Supangkat et al., 2024). As described above, the trend of governments and companies to provide citizens with opportunities to interact with people in local communities will continue to accelerate in smart cities. Moreover, this approach to urban and community design is anticipated to expand to cities that are not traditionally considered as smart cities. Therefore, creating opportunities for social interaction should not be viewed as a priority only for technologically advanced urban areas but as a critical concern for residents across diverse urban environments.

What kinds of citizens feel that they have a greater *need for provided opportunities for interaction* with people in the local community? By answering this question, suggestions can be made regarding which citizens should be appealed to by governments and companies that provide opportunities for interaction. However, it is also likely that some people have a relatively low need for provided opportunities for interaction. If governments and companies half-heartedly provided these people with opportunities to interact with others in the local community, it would be a "thankless task," and could be detrimental to the citizens' wellbeing. Therefore, this study also focused on the characteristics of those with relatively low need for provided opportunities for interaction. It is possible that more governments and businesses will provide communities to their citizens in the future, and it is worthwhile to focus on the need for provided opportunities for interaction.

In this study, we focus not only on individuals' desire for social interaction, but also on the significance of externally provided opportunities for interaction within local communities. The former, which is the individual's internal motivation to connect with others is closely associated with the psychological need to belong (for further discussion on this concept, see the next section). In contrast, the latter reflects a recent societal trend in which opportunities for community engagement are facilitated by governments and corporations. To preserve individuals' sense of belonging, and the emotional support that emerged from community membership, it is essential for policymakers to implement supportive measures. However, top-down initiatives imposed on citizens do not necessarily enhance wellbeing, and recent discussions have emphasized the importance a bottom-up approach (Chater, 2020). Therefore, it is crucial to examine in detail what individuals most benefit from externally provided opportunities for interaction within their local community.

1.2 Sense of community and the need to belong

As a background for need for provided opportunities for interaction, this study focused on (1) *sense of community* (i.e., feeling of belonging and uniting to a specific community; Tanaka et al., 1978) and (2) *the need to belong* (i.e., fundamental need to form social bonds with others and to be socially accepted; Baumeister and Leary, 1995). Sense of community is frequently addressed in community psychology. Previous studies have consistently shown that a stronger sense of community is positively associated with participation in local activities. Individuals with a strong sense of community are more likely to feel responsible for their neighborhood and motivated to contribute to its wellbeing through concrete actions such as volunteering, attending local events, or engaging in neighborhood associations (Prezza et al., 2001; Talò et al., 2014). Specifically, those with a greater sense of community tend to spend more time with local people during holidays (Tanaka et al., 1978) and participate more actively in local activities (O'Connor, 2013). Research on smart cities has also reported that people with a strong sense of community are more satisfied with their residential areas (Macke et al., 2019). These relationships are partly explained by psychological mechanisms, such as a perceived obligation to contribute to the community. For example, a previous study showed that feeling responsible and connected in a community strengthens the sense of community itself, which in turn encourages participation in civic activities (Procentese and Gatti, 2022). Thus, a strong sense of community can foster behavioral engagement by enhancing individuals' confidence in collaborative outcomes and their identification with community goals.

Therefore, we proposed the following hypothesis (H1): people with greater sense of community will have more need for provided opportunities for interaction. Meanwhile, contrary to H1, it is also possible that those with high sense of community are already completely satisfied with their community and have low need for provided opportunities for interaction. Considering this possibility, this study will validate H1 in an exploratory manner. It should be noted that some subcomponents of sense of community and the need for provided opportunities for interaction can be regarded as conceptually similar. However, the former reflects perceptions of communities that already exist, whereas the latter concerns attitudes toward communities that are "provided." Therefore, although these concepts share certain similarities, in this study we treat them as conceptually distinct.

Previous studies have reported that people with higher need to belong are more likely to participate in community activities (Allendoerfer et al., 2012), trust group members, and perceive group cohesion (Ishida and Kojima, 2009). In addition, individuals with higher need to belong and strong self-identification with an in-group have better wellbeing and a greater frequency of community participation (Matsubara, 2023; Zabala et al., 2020). Moreover, a longitudinal study of older adults showed that interacting with their surroundings satisfied need to belong and reduced loneliness (Zhou et al., 2024). Thus, those with higher need to belong are more likely to be positive about being provided with opportunities to interact with people in the local community. Therefore, we proposed the following hypothesis (H2): people with higher need to belong will have more need for provided opportunities for interaction. Although it is possible to view need to belong as one of the sub-concepts of sense of community (McMillan and Chavis, 1986), this study distinguishes between need to belong and sense of community. Sense of community refers to a sense of affiliation with a specific (usually local) community group, whereas the need to belong is an emotional desire for affinity in interpersonal relationships more generally. By distinguishing between these concepts, it becomes possible to more clearly differentiate individuals' broad social needs from their specific patterns of involvement and behavior within a particular community. This distinction may, in turn, inform the more precise design of interventions and strategies to promote community formation and participation. Nevertheless, it should be emphasized that the findings of the present study are preliminary, and any implications for intervention remain tentative at this stage.

As outlined above, the present study focuses on sense of community and need to belong as key explanatory variables. In recent years, numerous local governments and private-sector organizations in Japan have promoted initiatives aimed at facilitating interpersonal interaction with local communities (e.g., Agti Inc, 2024; Kamakura City Civic Activity Center, 2024). However, these initiatives are not universally welcomed by all citizens. Accordingly, it is of practical significance to clarify which individuals are more receptive to externally provided opportunities for local interaction. Such insights could contribute to refining future urban planning and community development efforts by identifying the populations that should be strategically prioritized in these initiatives.

1.3 Negative self-perceptions in interpersonal relationships

We also focused on the negative *self-perceptions in interpersonal relationships* as a factor associated with need to belong. Self-perception is an umbrella term for beliefs and perceptions about the self (Burnett, 1994) and is composed of a wide variety of concepts, including self-efficacy in interpersonal relationships (Xiang et al., 2024), perceptions of one's own mental and physical health (Simo et al., 2018), perceptions of one's own body (Ávila-Ortiz et al., 2022), and self-identity (Sparks, 2000). In this study, we focused on self-perception, especially interpersonal relationships, as a factor associated with need to belong. Typical examples of self-perceptions in interpersonal relationships include loneliness [a negative emotion arising from a lack of satisfaction in personal and social relationships (Andersson, 1998)] and a sense of rejection or acceptance [the perception of being ignored or valued by others in interpersonal relationships (Sugiyama and Sakamoto, 2006)]. Loneliness has been reported to increase mortality among older adults (Rico-Uribe et al., 2018) and worsen attachment among university students in Japan (Nakao, 2021). In addition, a high sense of rejection and low sense of acceptance are closely connected to low self-esteem (Okada, 2011). Therefore, focusing on these variables is of great practical significance. In

Study 1, we operationally defined negative self-perceptions in interpersonal relationships as a state of high loneliness, high sense of rejection, and a low sense of acceptance. In Study 2, we focused on self-esteem to comprehensively measure self-perceptions in interpersonal relationships (details in subsequent sections). In this study, loneliness, sense of rejection, sense of acceptance, and self-esteem were analyzed collectively to demonstrate the relationship between negative self-perceptions in interpersonal relationships and other variables. The correlations between specific individual variables for each study are shown in the tables.

Regarding the relationship between self-perceptions in interpersonal relationships and need to belong, previous research has shown that lonely people are less likely to engage in social interactions (Wheeler et al., 1983). In addition, individuals who feel greater loneliness are more likely to view others negatively (Tsai and Reis, 2009), fear exclusion from others (Vanhalst et al., 2015), and believe that people will reject them (Bellucci, 2020). Moreover, people with higher levels of social inhibition and a tendency to suppress their emotional expression in interpersonal relationships tend to have lower need to belong (de Moor et al., 2018). Therefore, we believe that individuals with more negative self-perceptions in interpersonal relationships will be less likely to have need to belong. In contrast, previous studies have shown that when need to belong is triggered by loneliness or social exclusion, interpersonal interactions and prosocial behaviors are promoted to reconnect with others (Igarashi, 2020; Jamieson et al., 2010; Maner et al., 2007). Thus, we cannot exclude the possibility that individuals with more negative self-perceptions in interpersonal relationships are more likely to have need to belong. Accordingly, in this study, the relationship between negative self-perceptions in interpersonal relationships and need to belong was explored without a clear hypothesis. Clarifying this relationship could provide meaningful insights for psychological research that aims to help people build positive relationships with others in general and not just within neighborhoods. Moreover, in recent years, social isolation among older adults and the decline in face-to-face communication have become growing concerns in Japan. Therefore, this study, which focuses on negative self-perceptions in interpersonal relationships, holds significance in psychological research aimed at facilitating smoother social interactions and promoting social wellbeing among citizens.

1.4 Summary of Study 1

In Study 1, an online survey with Japanese adults was conducted to examine H1 and H2. Specifically, we considered a model in which sense of community and need to belong are associated with the need for provided opportunities for interaction. In addition, we identified negative self-perceptions in interpersonal relationships as an explanatory variable of the need to belong.

Prior research has reported that people with higher levels of general trust are more likely to engage in cooperative behavior (Takagi et al., 2010), and may tend to be more positive and accepting of people living together in the community. In addition, those who are economically wealthy tend to have greater sense of community (Christens and Lin, 2014) and participate in local activities (Saegert and Winkel, 2004). In this study, we asked about subjective wealth to avoid participants' withdrawal from the survey by directly asking about annual income. It has been reported that people living in areas with a higher population density have fewer neighborhood partners and a lower sense of belonging to the community (Harada and Sugisawa, 2014; Schellenberg et al., 2018). Previous research has also shown that single people and men have a lower sense of belonging to their communities than cohabitants and women (Schellenberg et al., 2018). In addition, relatively older people have been shown to have greater sense of community than younger people (Ishimori, 2004; Talò et al., 2014). Based on the above, in Study 1, we controlled for general trust, subjective wealth, population density of the residential area, residential type (living alone or not), age, and sex.

Previous studies have shown that individuals who have resided in a particular area for an extended period tend to report a stronger sense of belonging to their local communities (Prezza et al., 2009; Schellenberg et al., 2018). Accordingly, it is plausible that long-term residents are already highly satisfied with their community life and, as a result, may express a lower demand for additional opportunities for social interaction, regardless of their current level of perceived sense of community. Furthermore, individuals with longer residence histories may have already established their roles within the community and developed personal strategies for coping with negative self-perceptions in interpersonal relationships (e.g., visiting favorite places in the community to regain emotional balance). In light of these considerations, the present study also assessed participants' length of residence and examined whether this variable moderates the relationships among the core concepts.

1.5 Summary of Study 2

The main objective of Study 2 was to examine the reproducibility of the results of Study 1. Therefore, as in Study 1, we conducted an online survey with Japanese adults. In Study 2, two additional changes were made to the analytical model. First, in addition to loneliness, sense of acceptance, and sense of rejection, self-esteem was examined as an explanatory variable (i.e., negative self-perceptions in interpersonal relationships). According to the sociometer theory, self-esteem conveys information about the extent to which the self is liked and accepted by others (Leary et al., 1995). People have been shown to have lower self-esteem when rejected by others (Leary, 2005). Therefore, in Study 2, the self-perceptions in interpersonal relationships were examined more comprehensively, including self-esteem.

Second, in addition to the need for provided opportunities for interaction, we measured the *positive interaction expectancy* (i.e., prediction of self-perceptions improved through provided opportunities for interaction with people in the local community), as an outcome variable. One of the main goals of governments and companies is to provide citizens with opportunities to interact with neighborhoods, thereby affirming citizens' self-perceptions and improving their wellbeing. As mentioned in the explanation of H1 and H2, people with higher sense of community and need to belong tend to prefer to interact with people in their community and seek more opportunities to do so. In addition,

individuals with greater sense of community and need to belong may perceive themselves more favorably, and their self-perceptions may become more positive when provided with opportunities to interact with people in the local community. Therefore, in Study 2, we proposed and examined the following hypotheses: people with greater sense of community will have more positive interaction expectancy (H3) and people with greater need to belong will have more positive interaction expectancy (H4). Regarding the positive interaction expectancy, questionnaire items were comprehensively developed on how each explanatory variable (i.e., loneliness, sense of acceptance, sense of rejection, and self-esteem) changed by providing opportunities for interaction with people in the local community.

In Study 2, an online survey was administered to a sample of Japanese adults to test Hypotheses 1 through 4 (H1–H4). Additionally, an exploratory analysis was conducted to examine whether the results of hypothesis testing varied as a function of participants' length of residence, which was consistent with Study 1 and their level of engagement in local community activities.

2 Study 1

2.1 Methods

2.1.1 Participants

Participants were recruited using Lancers, Japan's leading crowdsourcing service. An online survey was conducted anonymously in May 2024. Each participant received 150 yen as compensation for participating in the survey. Participants were 980 Japanese adults (579 men and 401 women). Participants who answered incorrectly to the trap item, "Please select the second 'agree' from the right" ($n = 8$) were excluded from the analysis because they were not deemed to have read the questions carefully. Thus, the analysis included 972 participants (571 men and 401 women) with a mean age of 44.06 years (range: 21–77 years, $SD = 10.14$). No a priori power analysis was performed to calculate the sample size, but the *post-hoc* power was found to be sufficiently high (see Section 2.2 for details).

2.1.2 Procedure and analysis

The participants read the description of the study on the opening screen, agreed to participate, and completed the survey. Participants responded to questionnaire items regarding sense of community, need to belong, need for provided opportunities for interaction, loneliness, sense of rejection, sense of acceptance, general trust, subjective wealth, residential area (by municipality), residential type, age, sex, and years of residence. Statistical software R (ver. 4.2.0) was used for analysis. The data, R code, list of questions (Appendix A), and histograms for each variable (Appendix B) are available on the Open Science Framework (OSF) repository (https://osf.io/76htu/).

2.1.3 Questionnaire items

Each of questionnaire item was rated on a six-point Likert scale (1: "extremely disagree," 2: "disagree," 3: "somewhat disagree," 4: "somewhat agree," 5: "agree," and 6: "extremely agree"), unless instructed otherwise.

Sense of community consists of four sub-concepts: (1) solidarity, defined as the extent to which individuals actively cooperate with others to improve the community; (2) self-determination, referring to the belief that citizens should have the right to make decisions for the benefit of the community; (3) attachment, indicating the level of pride in and emotional connection to the community; and (4) dependency on others, representing the belief that responsibilities should be left to the government or highly motivated individuals (Ishimori, 2004). These were measured using 12 items taken from Ishimori et al. (2013). This scale consisted of four sub-concepts (three items each): (1) solidarity, including, "I want to participate in social activities such as volunteering in my community"; (2) self-determination, including, "To solve problems in the community, it is important to build an equal relationship between the community residents and the government"; (3) attachment, including, "I feel a sense of pride and attachment to the community in which I live"; and (4) dependency on others, including, "I believe that environmental improvements in the community should be left to the government." The mean of each set of three items was calculated, with higher scores indicating greater sense of community in solidarity, self-determination, and attachment, but lower sense of community in dependency on others. The reliability coefficients (Cronbach's α) for each sub-concept were 0.92, 0.74, 0.86, and 0.79, respectively. Although the sense of community and need to belong are conceptually related, the results of this study indicate only a moderately positive correlation between the two variables, suggesting that they represent distinct concepts.

Need to belong was measured using 10 items taken from Takezawa and Kodama (2004), including, "If I could, I would go with someone wherever I go." The mean was calculated ($\alpha = 0.92$), with higher scores indicating greater need to belong.

Need for provided opportunities for interaction was measured using four items, including, "I would like local government and businesses to provide opportunities to interact with people in the local community." The mean was calculated ($\alpha = 0.77$), with higher scores indicating greater need for provided opportunities for interaction.

In Study 1, negative self-perceptions in interpersonal relationships, were operationally defined as a psychological state characterized by high levels of loneliness and perceived rejection, along with a low sense of acceptance. Loneliness was measured using six items (Toyoshima and Sato, 2021), including, "I feel all alone." The mean was calculated ($\alpha = 0.90$), with higher scores indicating greater loneliness. Sense of rejection was measured using eight items taken from Sugiyama and Sakamoto (2006), including, "I tend to be perceived badly by others." The mean was calculated ($\alpha = 0.95$), with higher scores indicating a greater sense of rejection. Sense of acceptance was measured using eight items taken from Sugiyama and Sakamoto (2006), including, "I am understood by others." The mean was calculated ($\alpha = 0.94$), with higher scores indicating greater sense of acceptance.

We controlled for general trust, subjective wealth, population density of the residential area, residential type, age, and sex. General trust was measured using six items (Yamagishi and Komiyama,

1995), including, "Most people are fundamentally honest." The mean was calculated ($\alpha = 0.91$), with higher scores indicating greater general trust. Subjective wealth was measured using a single item from Shimizu et al. (2023): "How do you feel about your current financial situation?" The options were "1: extremely hard," "2: hard," "3: somewhat hard," "4: somewhat affordable," "5: affordable," and "6: extremely affordable," with higher scores indicating greater subjective wealth. The population density of the residential area was collected by asking about the residential area by municipality, and the answers were merged with data from the 2020 National Census (Japan Statistical Bureau, 2020). Because of the large skew in the distribution of population density (skewness = 1.37, $z = 17.49$, $p < 0.001$), it was common-log transformed and used for analysis. Residential type was asked in a two-options question, "living alone or not," with 206 participants (21.19%) living alone. To conduct an exploratory analysis of the moderating effect of participants' years of residence, we asked a single item: "How many years have you lived in the area where you currently reside?" The options were "1: <1 year," "2: 1–5 years," "3: 5–10 years," "4: 10–15 years," "5: 15–20 years," "6: 20–25 years," "7: 25–30 years," and "8: ≥30 years."

2.2 Results

The means, standard deviations, and correlation coefficients of each variable are presented in Table 1. As noted above, all the measures used in Study 1 demonstrated high reliability coefficients. Furthermore, no ceiling or floor effects were observed. The correlation coefficients between the variables supported H1 and H2. For H1, participants with higher solidarity, self-determination, and attachment in sense of community had a higher need for provided opportunities for interaction (in order, $r = 0.66$, 95% confidence interval [CI] [0.62, 0.69], $p < 0.001$; $r = 0.41$, 95% CI [0.36, 0.46], $p < 0.001$; $r = 0.43$, 95% CI [0.37, 0.48], $p < 0.001$). In addition, participants with a lower dependency on others (with lower scores indicating greater sense of community) had a higher need for provided opportunities for interaction ($r = -0.48$, 95% CI [−0.53, −0.43], $p < 0.001$). For H2, participants with higher need to belong had greater need for provided opportunities for interaction ($r = 0.42$, 95% CI [0.37, 0.47], $p < 0.001$).

To test H1 and H2, a structural equation modeling (SEM) was conducted on a model in which sense of community and need to belong are associated with the need for provided opportunities for interaction. Additionally, a negative self-perception in interpersonal relationships was used as an explanatory variable of need to belong (Figure 1). We controlled for general trust, subjective wealth, population density (common-log transformed), residential type, age, and sex by drawing paths from them toward each key variable listed in Figure 1 (these paths are not shown because they would complicate the figure). The goodness of fit of the model was moderate (RMSEA = 0.09, CFI = 0.96, GFI = 0.96, AIC = 20373.60, BIC = 20739. 55). As no a priori power analysis was conducted in this study, we examined whether the statistical power was sufficient through a *post-hoc* analysis (Zhang et al., 2019). The *post-hoc* power of the model based on RMSEA =

TABLE 1 Means, standard deviations, and correlation coefficients of each indicator (Study 1).

		M	*SD*	Range	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Solidarity	2.96	1.07	1–6	–												
2	Self-determination	4.16	0.74	1–6	**0.41**	–											
3	Attachment	3.42	1.10	1–6	**0.52**	**0.26**	–										
4	Dependency on others	3.86	0.88	1–6	**−0.66**	**−0.36**	**−0.51**	–									
5	NB	3.44	0.89	1–6	**0.39**	**0.26**	**0.34**	**−0.26**	–								
6	NPOI	3.34	0.85	1–6	**0.66**	**0.41**	**0.43**	**−0.48**	**0.42**	–							
7	Loneliness	3.68	1.00	1–6	**−0.38**	**−0.20**	**−0.34**	**0.31**	**−0.25**	**−0.22**	–						
8	Sense of acceptance	3.66	0.91	1–6	**0.36**	**0.25**	**0.33**	**−0.26**	**0.30**	**0.21**	**−0.80**	–					
9	Sense of rejection	2.76	0.98	1–6	**−0.17**	**−0.18**	**−0.20**	**0.19**	*−0.07*	**−0.09**	**0.66**	**−0.72**	–				
10	General trust	3.54	0.88	1–6	**0.33**	**0.20**	**0.33**	**−0.25**	**0.23**	**0.21**	**−0.49**	**0.52**	**−0.44**	–			
11	Subjective wealth	3.02	1.03	1–6	**0.19**	0.04	**0.17**	**−0.12**	**0.10**	0.06	**−0.44**	**0.48**	**−0.38**	**0.26**	–		
12	Population density	3.28	0.68	0.69–4.37	0.05	**−0.08**	0.02	0.00	0.04	0.03	*−0.08*	*0.08*	−0.02	0.00	**0.08**	–	
13	Years of residence	5.43	2.22	1–8	−0.04	0.00	**0.14**	**−0.08**	−0.01	0.01	0.06	**−0.09**	0.02	0.04	**−0.13**	**−0.09**	–
14	Age	44.06	10.14	21–77	**0.12**	*0.07*	**0.12**	**−0.25**	0.04	*0.08*	**−0.09**	0.03	**−0.11**	**0.17**	0.01	−0.02	**0.22**

The bold type indicates $p < 0.01$ and the italicized type indicates $p < 0.05$. NB, Need to Belong; NPOI, Need for Provided Opportunities for Interaction; PIE, Positive Interaction Expectancy. Population density was common-log transformed.

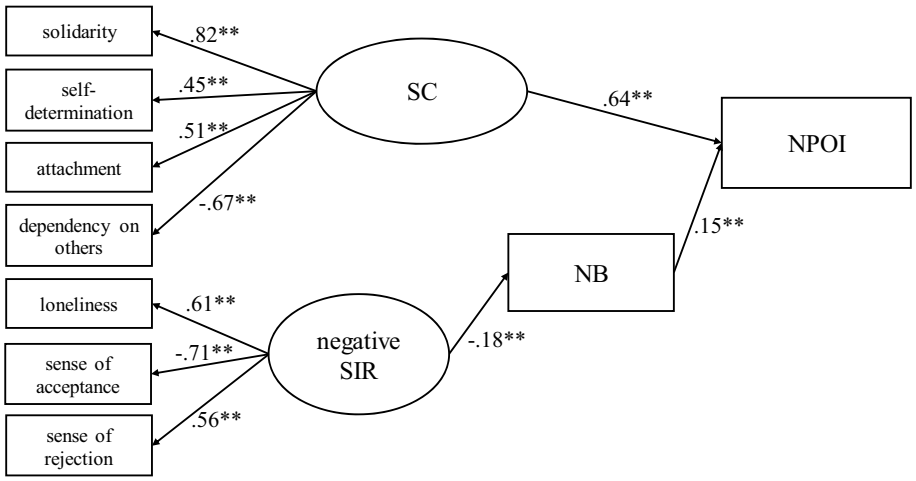

FIGURE 1
The SEM results on need for provided opportunities for interaction as an outcome variable (Study 1). $^{**}p < 0.01$. The coefficients were standardized. SC, Sense of Community; NPOI, Need for Provided Opportunities for Interaction; NB, Need to Belong; SIR, Self-perceptions in Interpersonal Relationships.

0.05, $\alpha = 0.05$, degree of freedom (df) = 24, $N = 972$ (MacCallum et al., 1996) was found to be 1-β > 0.99, indicating a high level of statistical power.

Results of the SEM showed that participants with a higher sense of community had a higher need for provided opportunities for interaction ($\beta = 0.64$, 95% CI [0.56, 0.72], $p < 0.001$). In addition, those with a higher need to belong had a higher need for provided opportunities for interaction ($\beta = 0.15$, 95% CI [0.09, 0.20], $p < 0.001$). Participants with more negative self-perceptions in interpersonal relationships had a lower need to belong ($\beta = -0.18$, 95% CI [−0.29, −0.08], $p < 0.001$). Therefore, H1 and H2 were supported. Additional analyses comparing the main variables between men and women, along with supplementary correlation coefficients for age, are available in Appendix C on the OSF. In addition, we compared our proposed model with a simpler alternative in which each explanatory variable was individually associated with the outcome variable. The model presented in the main text showed a better fit than the simpler alternative. For the results, please refer to Appendix D on the OSF.

2.2.1 Exploratory analysis of the moderating effect

The mode of response for years of residence was "≥30 years," and the distribution was skewed (see Appendix B on the OSF; skewness = −0.20, $z = -2.50$, $p = 0.01$). Thus, we conducted an exploratory multi-group SEM, dividing the participants into two groups: those with less than 30 years of residence ($n = 669$) and those with more than 30 years of residence ($n = 303$). The results of hypothesis testing were like those described above for both groups (see Appendix E on the OSF). Accordingly, we found no significant moderating effect of participants' years of residence.

2.3 Discussion

Study 1 showed a strong association between sense of community and need for provided opportunities for interaction (supporting H1). People with high sense of community are, by definition, highly motivated to participate in existing local communities, such as neighborhood councils in their residential areas. This study examined the desire for future exchange opportunities provided by governments and companies. Thus, the results suggest that those with high sense of community are more likely to desire opportunities to interact with people not only in the existing local community, but also in an additional community. However, we did not examine whether H1 was supported (1) only for those who were not very involved in their existing community, or (2) for those who were frequent participants in their existing community. By clarifying this, suggestions can be made regarding the extent to which citizens who participate in local communities should be targeted when providing opportunities for interaction. Therefore, in Study 2, an additional exploratory analysis was conducted by measuring the extent of participation in the local community and investigating whether the results of the hypothesis testing differed depending on the participants' degree of participation.

In Study 1, the participants with greater sense of community and need to belong had more need for provided opportunities for interaction. As mentioned in the Introduction, it is important from a practical point of view to determine whether the provision of interaction opportunities by governments and companies will lead to positive self-perceptions in interpersonal relationships and improve citizens' wellbeing. Therefore, in Study 2, in addition to need for provided opportunities for interaction, we asked about the positive interaction expectancy. It is also important to conduct a survey of citizens in a specific area before and after actual interaction opportunities are provided to demonstrate changes in citizens' self-perceptions. However, achieving this requires

longitudinal studies in specific municipalities and community units where opportunities for interaction are provided, which is beyond the scope of this study. Therefore, this study addressed positive interaction expectancy with the aim of gaining knowledge that will contribute to future field studies.

3 Study 2

3.1 Methods

3.1.1 Participants

Participants were recruited using Lancers and an online survey was anonymously conducted in June 2024. Each participant received 150 yen as compensation for participating in the survey. Participants were 983 Japanese adults (601 men and 382 women). Like Study 1, participants who responded incorrectly to the trap item, "Please select the second 'agree' from the right" ($n = 7$) were excluded from the analysis. Thus, the analysis included 976 participants (596 men and 380 women) with a mean age of 44.27 years (range: 18–77 years, $SD = 10.57$). No a priori power analysis was performed to calculate the sample size, but the *post-hoc* power was found to be sufficiently high (see Section 3.2 for details).

3.1.2 Procedure and analysis

The participants read the description of the study on the opening screen, agreed to participate, and completed the survey. The participants responded to questionnaire items regarding sense of community, need to belong, need for provided opportunities for interaction, positive interaction expectancy, loneliness, sense of acceptance, sense of rejection, self-esteem, general trust, subjective wealth, residential area (by municipality), residential type, age, sex, years of residence, and degree of participation in the local community. Statistical software R (ver. 4.2.0) was used for analysis. The data, R code, list of questions (Appendix A), and histograms of each variable (Appendix B) are available on the OSF.

3.1.3 Questionnaire items

Each questionnaire item was rated on a six-point Likert scale (1: "extremely disagree," 2: "disagree," 3: "somewhat disagree," 4: "somewhat agree," 5: "agree," and 6: "extremely agree"), unless instructed otherwise. The items for sense of community [solidarity ($\alpha = 0.92$), self-determination ($\alpha = 0.75$), attachment ($\alpha = 0.85$), and dependency on others ($\alpha = 0.80$)], need to belong ($\alpha = 0.93$), and need for provided opportunities for interaction ($\alpha = 0.75$) were like those in Study 1.

Positive interaction expectancy was measured using four items (e.g., "If opportunities to interact with people in the local community were provided by local governments and businesses, I would feel less alone"). The items for positive interaction expectancy were comprehensively developed based on how each explanatory variable (i.e., loneliness, sense of acceptance, sense of rejection, and self-esteem) changes by providing opportunities for interaction with people in the local community. The mean was calculated ($\alpha = 0.91$), with higher scores indicating more positive interaction expectancy.

Among self-perceptions in interpersonal relationships, loneliness ($\alpha = 0.90$), sense of rejection ($\alpha = 0.94$), and sense of acceptance ($\alpha = 0.94$) were like those in Study 1. Self-esteem was measured using 10 items (Sakurai, 2000), including "On the whole, I am satisfied with myself." The mean was calculated ($\alpha = 0.94$), with higher scores indicating greater self-esteem.

As in Study 1, we controlled for general trust ($\alpha = 0.90$), subjective wealth, population density of the residential area, residential type [a total of 222 persons (22.75%) lived alone], age, and sex.

As variables that could moderate the results of the hypothesis testing, we investigated the degree of participation in the local community, in addition to years of residence. We used three items taken from Ishimori (2009), including "Participation in neighborhood associations," after the leading sentence, "How often do you participate in each of the following activities?" The response options were 1: "do not participate at all," 2: "do not participate," 3: "slightly do not participate," 4: "slightly participate," 5: "participate," and 6: "participate very often." The mean was calculated ($\alpha = 0.87$), with higher scores indicating greater participation in the local community.

3.2 Results

The means, standard deviations, and correlation coefficients of each variable are presented in Table 2. As noted above, all the measures used in Study 2 demonstrated high reliability coefficients. Furthermore, no ceiling or floor effects were observed. The correlation coefficients between the variables supported all four hypotheses. For H1, participants with higher solidarity, self-determination, and attachment in sense of community had a higher need for provided opportunities for interaction (in order, $r = 0.67$, 95% CI [0.63, 0.70], $p < 0.001$; $r = 0.35$, 95% CI [0.30, 0.41], $p < 0.001$; $r = 0.37$, 95% CI [0.32, 0.42], $p < 0.001$). In addition, participants with lower dependency on others (with lower scores indicating greater sense of community) had higher need for provided opportunities for interaction ($r = -0.51$, 95% CI [−0.56, −0.46], $p < 0.001$). For H2, participants with higher need to belong had greater need for provided opportunities for interaction ($r = 0.38$, 95% CI [0.32, 0.43], $p < 0.001$). For H3, participants with higher solidarity, self-determination, and attachment in sense of community had a more positive interaction expectancy (in order, $r = 0.53$, 95% CI [0.48, 0.57], $p < 0.001$; $r = 0.33$, 95% CI [0.27, 0.38], $p < 0.001$; $r = 0.33$, 95% CI [0.28, 0.39], $p < 0.001$). In addition, participants with a lower dependency on others (with lower scores indicating greater sense of community) had a more positive interaction expectancy ($r = -0.33$, 95% CI [−0.39, −0.28], $p < 0.001$). For H4, participants with a higher need to belong had a more positive interaction expectancy ($r = 0.40$, 95% CI [0.35, 0.45], $p < 0.001$). Note that, along with previous studies (e.g., O'Connor, 2013; Prezza et al., 2001; Talò et al., 2014), participants with higher solidarity, self-determination, and attachment had a greater participation in the local community (in order, $r = 0.62$, 95% CI [0.58, 0.65], $p < 0.001$; $r = 0.24$, 95% CI [0.18, 0.30], $p < 0.001$; $r = 0.38$, 95% CI [0.32, 0.43], $p < 0.001$). In addition, participants with lower dependency on others (with lower scores

TABLE 2 Means, standard deviations, and correlation coefficients of each indicator (Study 2).

		M	*SD*	Range	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Solidarity	2.94	1.09	1–6	–															
2	Self-determination	4.18	0.76	1–6	**0.39**	–														
3	Attachment	3.41	1.11	1–6	**0.47**	**0.26**	–													
4	Dependency on others	3.90	0.90	1–6	**−0.65**	**−0.37**	**−0.45**	–												
5	NB	3.40	0.91	1–6	**0.37**	**0.24**	**0.31**	**−0.19**	–											
6	NPOI	3.29	0.84	1–6	**0.67**	**0.35**	**0.37**	**−0.51**	**0.38**	–										
7	PIE	3.31	0.99	1–6	**0.53**	**0.33**	**0.33**	**−0.33**	**0.40**	**0.62**	–									
8	Loneliness	3.67	1.01	1–6	**−0.38**	**−0.18**	**−0.32**	**0.28**	**−0.29**	**−0.19**	**−0.19**	–								
9	Sense of acceptance	3.66	0.91	1–6	**0.37**	**0.26**	**0.32**	**−0.27**	**0.34**	**0.22**	**0.25**	**−0.79**	–							
10	Sense of rejection	2.75	0.97	1–6	**−0.18**	**−0.16**	**−0.17**	**0.14**	**−0.11**	−0.05	*−0.07*	**0.66**	**−0.73**	–						
11	Self-esteem	3.41	1.04	1–6	**0.31**	**0.14**	**0.25**	**−0.26**	**0.17**	**0.15**	**0.14**	**−0.68**	**0.70**	**−0.61**	–					
12	General trust	3.55	0.86	1–6	**0.33**	**0.24**	**0.33**	**−0.24**	**0.25**	**0.23**	**0.28**	**−0.48**	**0.56**	**−0.41**	**0.38**	–				
13	Subjective wealth	2.98	1.06	1–6	**0.20**	**0.08**	**0.18**	**−0.13**	**0.10**	0.05	**0.09**	**−0.41**	**0.44**	**−0.38**	**0.50**	**0.24**	–			
14	Population density	3.30	0.67	0.69–4.37	0.04	*−0.06*	0.00	0.01	0.02	0.01	0.00	−0.06	*0.07*	−0.06	**0.10**	−0.02	**0.09**	–		
15	Community participation	2.22	1.11	1–6	**0.62**	**0.24**	**0.38**	**−0.46**	**0.30**	**0.42**	**0.34**	**−0.46**	**0.40**	**−0.22**	**0.37**	**0.33**	**0.23**	−0.04	–	
16	Years of residence	5.40	2.25	1–8	*−0.07*	−0.03	**0.13**	−0.02	−0.01	−0.02	−0.06	0.05	**−0.11**	**0.09**	**−0.11**	0.02	**−0.15**	**−0.12**	0.00	–
17	Age	44.27	10.57	18–77	**0.12**	0.03	**0.16**	**−0.23**	0.05	*0.07*	0.04	**−0.08**	0.04	−0.05	**0.12**	**0.16**	0.00	−0.06	**0.21**	**0.25**

The bold type indicates $p < 0.01$ and the italicized type indicates $p < 0.05$. NB, Need to Belong; NPOI, Need for Provided Opportunities for Interaction; PIE, Positive Interaction Expectancy. Population density was common-log transformed.

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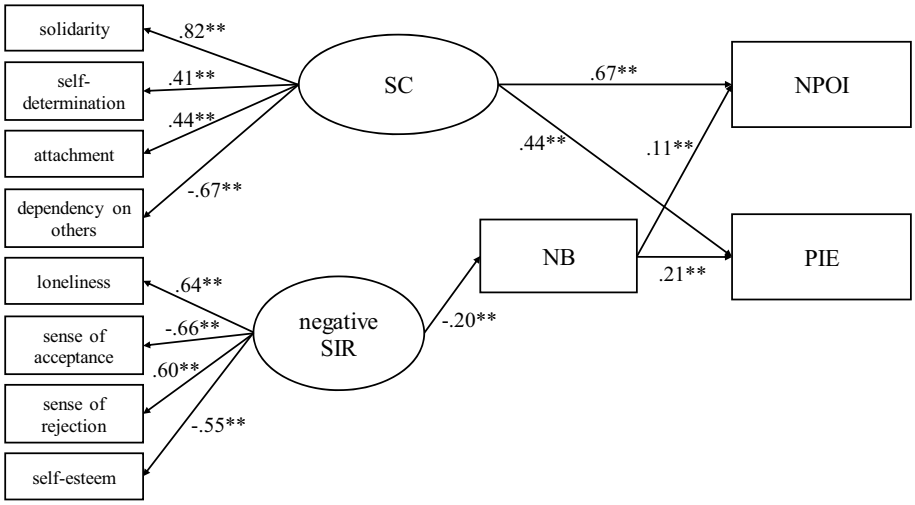

FIGURE 2
The SEM results on the need for provided opportunities for interaction and positive interaction expectancy as outcome variables (Study 2). $^{**}p < 0.01$. The coefficients were standardized. SC, Sense of Community; NPOI, Need for Provided Opportunities for Interaction; NB, Need to Belong; SIR, Self-perceptions in Interpersonal Relationships; PIE, Positive Interaction Expectancy.

indicating greater sense of community) had a greater participation ($r = -0.46$, 95% CI [–0.51, –0.41], $p < 0.001$).

To test the four hypotheses, an SEM was conducted on a model in which sense of community and need to belong are associated with the need for provided opportunities for interaction and positive interaction expectancy. Additionally, the level of negative self-perceptions in interpersonal relationships (loneliness, sense of acceptance, sense of rejection, and self-esteem) was used as an explanatory variable of the need to belong (Figure 2). Like Study 1, we controlled for general trust, subjective wealth, population density (common-log transformed), residential type, age, and sex. The goodness of fit of the model was moderate (RMSEA = 0.08, CFI = 0.96, GFI = 0.96, AIC = 24721.81, BIC = 25175.98). As a no a priori power analysis was conducted in this study, we evaluated the adequacy of statistical power through a *post-hoc* analysis (Zhang et al., 2019). Based on RMSEA = 0.05, $\alpha = 0.05$, df = 39, and a sample size of $N = 976$ (MacCallum et al., 1996), the model's *post-hoc* power was calculated to be 1-β > 0.99, indicating high level of statistical power.

Results of the SEM showed that participants with a higher sense of community had higher need for provided opportunities for interaction ($\beta = 0.67$, 95% CI [0.59, 0.75], $p < 0.001$). In addition, those with a higher need to belong had higher need for provided opportunities for interaction ($\beta = 0.11$, 95% CI [0.05, 0.16], $p < 0.001$). Meanwhile, participants with a higher sense of community had a more positive interaction expectancy ($\beta = 0.44$, 95% CI [0.36, 0.51], $p < 0.001$), as did those with a higher need to belong ($\beta = 0.21$, 95% CI [0.15, 0.26], $p < 0.001$). Like Study 1, individuals with more negative self-perceptions in interpersonal relationships had a lower need to belong ($\beta = -0.20$, 95% CI [–0.30, –0.09], $p < 0.001$). Accordingly, H1, H2, H3, and H4 were supported. As in Study 1, comparisons of the main variables between men and women in this study, along with supplementary correlation coefficients for age, are available in Appendix C on the OSF. In addition, we compared our proposed model with a simpler alternative in which each explanatory variable was individually associated with the outcome variable. The model presented in the main text showed a better fit than the simpler alternative. For the results, please refer to Appendix D on the OSF.

3.2.1 Exploratory analysis of the moderating effect

The mode of response for years of residence was "≥30 years," and the distribution was skewed (see Appendix B on the OSF; skewness = −0.22, $z = -2.80$, $p = 0.005$). Thus, we conducted an exploratory multi-group SEM, dividing the participants into two groups: those with less than 30 years of residence ($n = 676$) and those with more than 30 years of residence ($n = 300$). The results of hypothesis testing were like those described above for both groups (see Appendix E on the OSF).

Additionally, the results of hypothesis testing may differ depending on the degree of participation in the local community. Therefore, we conducted an exploratory multi-group SEM, dividing participants into two groups: participants who responded with "1: do not participate at all" for all three questionnaire items ($n = 291$), and those who did not (i.e., participants with community participation; $n = 685$). The results of the hypothesis testing were like those in the main text for both groups (see Appendix F on the OSF). In summary, there was no significant moderating effect of participants' years of residence or degree of participation in the local community.

3.3 Discussion

Like Study 1, H1 and H2 were supported in Study 2. Additionally, participants with higher sense of community and need to belong had a more positive interaction expectancy, supporting H3 and H4. Although this study was limited to

an investigation of correlations, it is possible that increasing sense of community and need to belong among citizens may enhance their need for provided opportunities for interaction and positive interaction expectancy. This possibility should be examined through both experimental and longitudinal studies.

A correlation was found between individuals with more participation in the local community and greater need for provided opportunities for interaction and more positive interaction expectancy. In other words, people who are frequently involved with existing local communities are more likely to desire additional communities. Prior research has reported considerable individual differences in how often and intensely citizens want to be involved in their local communities. In a large-scale survey of Japanese adults (Japan Broadcasting Corporation, 2018), 33% of respondents said that their ideal relationship with their next-door neighbors was "only a simple greeting," 48% said it was "a casual, informal discussion," and 19% said it was "a relationship in which we frequently consult and help each other." In other words, ideals regarding the frequency and depth of interactions with neighbors vary widely among individuals. Given the above, when governments and companies provide citizens with opportunities for interaction, operators should closely scrutinize which citizens want more active communities. This perspective should be carefully discussed because it relates to ethical issues concerning citizens who are less willing to engage in opportunities to interact with neighborhoods (see the General Discussion for details).

4 General discussion

In this study, we conducted two online surveys with Japanese adults and found that participants with higher sense of community and need to belong had greater need for provided opportunities for interaction and a more positive interaction expectancy. In the future, in response to the weakening of local communities, it is expected that municipalities and private companies will increasingly implement initiatives that provide opportunities for interaction with local community. This study, which examines the types of individuals who are likely to accept or avoid such initiatives, holds significant practical value. This is because the findings of this study can inform the development of concrete strategies by municipalities and companies when designing and implementing community-based initiatives, by identifying which groups of people to actively engage and which groups may require special consideration. Moving forward, it will be important to closely monitor the kinds of initiatives that are implemented and to continue investigating how they are received by citizens.

In both studies, individuals with more negative self-perceptions in interpersonal relationships had lower need to belong. This is consistent with previous research that found that people with higher levels of loneliness are more likely to avoid interacting with others (e.g., Vanhalst et al., 2015; Wheeler et al., 1983). However, our results are inconsistent with the findings which show that motivations for interpersonal interactions increase when need to belong is triggered by loneliness and social exclusion (Igarashi, 2020; Jamieson et al., 2010; Maner et al., 2007). One reason for this inconsistency may be that the sense of rejection among the participants in this study was not high. The mean values of the sense of rejection were 2.76 (SD = 0.98; Study 1) and 2.75 (SD = 0.97; Study 2). The results of the one-group t-test showed that these values were significantly lower than the scale's midpoint (3.5), which represents "undecided" (see Appendix G on the OSF). Thus, the participants in this study did not feel strong social exclusion, even if their self-perceptions were negative, and they were not highly motivated to engage in interpersonal interactions. Conversely, people with an extremely high sense of rejection and who feel strongly excluded from their surroundings may have high need to belong. Research on such individuals is important in psychiatry and clinical psychology and should be conducted in the future.

The findings of this study suggest that individuals with a stronger sense of community and a higher need to belong are more receptive to opportunities for interaction and tend to hold more positive expectations about such interactions. Nevertheless, these results are preliminary and should be interpreted with caution. Even so, they hold some implications for practice. In particular, governments and companies seeking to respond to the weakening of local communities may benefit from tailoring their initiatives to the characteristics of different segments of the population. Providing opportunities for community interaction can serve as an important means of intervention; however, its effects are not uniform. For individuals who are already receptive, such opportunities may encourage further engagement, whereas for those who are more hesitant or less connected, it is necessary to design measures that lower barriers to participation. As indicated by this study, individuals with a negative self-concept may, paradoxically, experience an even more negative self-view when community opportunities are explicitly "provided" to them. Thus, the provision of interaction opportunities carries the risk of unintended adverse effects for some individuals, underscoring the need for careful and sensitive program design. When providing any form of community to residents, it will be essential to first conduct needs assessments to ensure that services are neither excessive nor insufficient and that they reach those who genuinely require them. Moving forward, research should continue to examine how such initiatives are perceived and what effects they yield in practice.

4.1 People who want to be provided with opportunities for interaction with people in the local community

In this study, we found that participants with higher sense of community had higher need for provided opportunities for interaction. This result is consistent with previous studies, which found that people with greater sense of community are more likely to participate in local activities (O'Connor, 2013; Prezza et al., 2001; Talò et al., 2014). In Study 2, a correlation was observed between individuals with higher sense of community and participating more frequently in their local communities. Therefore, providing interaction opportunities to people with a stronger sense of community may make a variety of community organizations active.

In addition, providing a community to those with higher sense of community may indirectly promote community participation

among people with lower sense of community. In a previous study on smart cities, one of the projects that provided additional communities to citizens, trust in business operators was reported to be higher among people who thought of other residents' attitudes toward the project as positive (Shimizu et al., 2022). Moreover, studies on the acceptance of science technology have shown that people with a higher percentage of neighbors with solar panels are more likely to adopt the equipment (Rai and Robinson, 2013). Therefore, it is possible that (1) people with high sense of community will actively engage in local activities after being provided with interaction opportunities, and (2) others who observe these activities (even if they are indifferent to the community at first) will gradually develop trust in the community and (3) finally join in local activities frequently.

Future research should examine the sub-concepts of sense of community in detail. The sense of community encompasses four sub-concepts: solidarity, self-determination, attachment, and dependency on others (with lower scores indicating greater sense of community). In this study, sense of community was modeled as a latent variable within SEM. This approach allowed us to examine its role as an overarching concept and to explore its relationship with other key variables. Simultaneously, we recognize the value of analyzing these sub-concepts individually. Among them, solidarity emerged as a strong positive contributor to the sense of community, while dependency on others functioned as a negative contributor (Figures 1, 2). Additionally, solidarity showed a moderate to moderately high association with the need for provided opportunities for interaction ($r = 0.66$ in Study 1 and $r = 0.67$ in Study 2). However, these values are not so high as to suggest that they represent the same concept. Furthermore, as noted in the introduction, sense of community reflects perceptions of communities that already exist, whereas the need for provided opportunities for interaction represents attitudes toward communities that are externally "provided." Therefore, these two concepts can be regarded as conceptually distinct. At the same time, future research should more closely examine the extent to which people distinguish between attitudes toward communities that are "provided" and those that already exist.

Previous research has shown that the sub-concepts of sense of community are differentially associated with community behaviors. In a previous study conducted in an urban area of Japan (Ishimori, 2009), greater participation in neighborhood associations, involvement in local hobby groups, daily social interaction within the community, and helping behavior during times of need were associated with a lower level of dependency on others. In contrast, the number of friends in the community with whom one could speak openly was associated with a higher level of solidarity (Ishimori, 2009). Meanwhile, a survey conducted in a rural area of Japan found that higher attachment was the strongest explanatory variable of both overall satisfaction with the region and residential intentions (Ishimori, 2004). In another nationwide survey of adults in Japan, the strongest explanatory variable of willingness to participate in coastal cleanup activities was a higher level of "solidarity and attachment," a factor combining the two sub-concepts of solidarity and attachment (Hori et al., 2020). These various findings highlight the importance of considering the distinct sub-concepts of sense of community when designing interventions. Accordingly, governments and organizations should tailor their approaches to the specific characteristics of each residential area and the particular outcomes they aim to promote in terms of community participation.

This study showed that those with higher need to belong had greater need for provided opportunities for interaction. Prior research has shown that need to belong is fulfilled through participation in external communities (Allendoerfer et al., 2012). The fulfillment of need to belong may lead to a reduction in loneliness and depression (Barbour et al., 2023; Zhou et al., 2024) and contribute to people's wellbeing. Thus, providing opportunities to interact with people in the local community is desirable for citizens with high need to belong. In addition, as mentioned in the Introduction, many governments and companies in Japan have begun to provide community-building assistance to citizens (e.g., Agti Inc, 2024; Kamakura City Civic Activity Center, 2024). The findings of this study confirm the validity of these efforts by targeting citizens who want to build their communities actively.

However, based on our results, it cannot be said that citizens generally have a high need for provided opportunities for interaction with people in the local community. This is because the mean values of need for provided opportunities for interaction were 3.34 ($SD = 0.85$; Study 1) and 3.29 ($SD = 0.84$; Study 2), and the results of the one-group t-test showed that these values were significantly lower than the scale's midpoint (3.5), which represents "undecided" (see Appendix H on the OSF). Therefore, governments and companies should take a careful approach, such as conducting a survey in advance, to ascertain whether residents really desire such interaction opportunities. In addition, citizens may react differently depending on whether the project provider is a government or a business company. Although the distinction is beyond the scope of this study, we think of it as an important perspective to utilize our findings in the practical field.

Governments and companies that facilitate community-building efforts must carefully assess the extent to which citizens desire externally provided opportunities for interaction. When such entities offer more community engagement than is needed or welcomed, it can lead to inefficient resource allocation and also create an unintended burden for individuals. To avoid this, it is essential to develop policies informed by bottom-up approaches grounded in citizen feedback and participatory surveys that reflect actual community needs. Given that communities differ in type, scale, and cohesion, and that the ideal form of community varies across individuals, more detailed research is needed to determine what kinds of community structures are most appropriate and desirable. Ongoing research into the need for externally provided opportunities for interaction can support governments and organizations in accurately identifying and responding to the diverse needs of the population. In addition, there may be a discrepancy between what citizens *perceive as necessary* and what is *objectively lacking and actually needed*. Therefore, it is essential to examine not only subjective indicators but also objective measures—such as the number of neighbors one interacts with and participation rates in neighborhood associations—to accurately assess the extent of community needs and identify what kind of community should be fostered. The

findings from such assessments should be actively incorporated into the policies of local governments and companies.

4.2 Ethical issues

This study found that participants with more negative self-perceptions in interpersonal relationships were less likely to have greater need for provided opportunities for interaction. Study 2 also revealed that these individuals had a less positive interaction expectancy. Therefore, it is possible that the opportunities provided for interaction with people in the local community may reinforce loneliness and a sense of rejection among those with negative self-perceptions in interpersonal relationships. In contrast, for those with positive self-perceptions in interpersonal relationships, more interaction opportunities with other residents would create a more vibrant and livable environment. This raises the concern that individual differences in the original self-perceptions in interpersonal relationships held by each citizen may become more pronounced when opportunities for interaction are provided. It is also possible that people with negative self-perceptions in interpersonal relationships develop a strong sense of inferiority when they see others enjoying their life. This study did not clarify the extent to which such longitudinal processes occurred. However, more attention should be paid to the ethical issue of how providing interaction opportunities can increase individual differences in citizens' self-perception. If many people are indifferent to such opportunities, the aforementioned ethical issues are less likely to arise. However, governments and companies that provide opportunities for interaction should strive to fully understand how local citizens perceive such opportunities.

4.3 Effect of population density

In Study 1, there was a negative correlation between a higher population density (common-log transformed) in the residential area and a lower level of loneliness. A similar negative correlation was observed in Study 2, but the trend remained marginally significant. This result does not align with the findings of previous studies, which showed that people living in urban areas have fewer neighbors with whom they interact face-to-face (Harada and Sugisawa, 2014) and higher levels of emotional loneliness (Chen and Gong, 2022). One reason for the difference in the results is that this study was conducted through an online survey using a crowdsourcing service. This approach was used to collect large-scale data from adults from a wide range of regions in Japan, which may have resulted in bias toward participants with high information technology (IT) skills. For such participants, even if they live in densely populated areas and have few neighbors with whom they interact in-person, online connections may help them feel less alone. In addition, given that intragenerational individual differences in IT skills among older adults are greater than those among youths (Hunsaker and Hargittai, 2018), the impact of IT skill bias on results is likely to be significant, especially among older adults. Therefore, the results should be reexamined using mail surveys or other methods.

4.4 Limitations

This study has five major limitations. First, we were unable to measure the specific interaction opportunities that the participants envisioned in their responses to the questions. This study measured the need for provided opportunities for interaction using items such as, "I would like local government and businesses to provide opportunities to interact with people in the local community." However, responses were likely to vary depending on how participants imagined the frequency, location, and coercion of interaction opportunities. Therefore, future consideration should be given to what participants' imagined interaction opportunities are and how the results might vary depending on their image. It should be noted that the question of "which" interaction opportunities are likely to be accepted or rejected by citizens is beyond the scope of this study. However, for governments and companies, clarifying this point is of great practical significance and should be considered in the future.

The second concerns the validity of the need for provided opportunities for interaction questionnaire items. Specifically, the items, "I think there are already enough opportunities to interact with people in the local community" (reversed item) and "I wish there was a more accessible local community to participate in" might not have adequately measured attitudes toward the opportunities "provided" to interact with people in the local community. This is because scores on these items would have been higher for both (a) participants who wanted interaction opportunities to be provided by governments and companies and (b) those who did not want to be provided with such opportunities but would have liked to take action to secure the opportunities on their own. However, the reliability coefficients of need for provided opportunities for interaction were $\alpha = 0.77$ (Study 1) and 0.75 (Study 2), which were deemed acceptable. In addition, in both Studies 1 and 2, a one-factor structure was obtained for the need for provided opportunities for interaction and confirmatory factor analysis showed a good fit (see Appendix I on the OSF). Therefore, the need for provided opportunities for interaction items used in this study are considered to have a certain degree of reliability and validity. However, the concept of need for provided opportunities for interaction has not been fully explored, and future studies should refine these questionnaire items.

The third focus of this study is on correlations among psychological variables, without examining causal relationships. Although our hypotheses were grounded in prior research cited in the introduction, the observed associations may also operate in the opposite direction. For instance, while we proposed that negative self-perceptions in interpersonal relationships are associated with the need to belong, it is equally plausible that individuals' need to belong is shaped by their existing negative perceptions of interpersonal relationships. Such bidirectionality is theoretically meaningful and deserves further investigation. However, the cross-sectional nature of our data limits our ability to assess causal directionality or potential reverse causality with confidence. The model tested in this study represents only one of several theoretically plausible alternatives. Future studies should aim to refine the model by incorporating additional mediating or moderating variables, or by substituting some variables with conceptually related measures. For example, introducing

concepts such as social anxiety or perceived social support may help clarify the mechanisms linking interpersonal perceptions and the need to belong. Moreover, to better understand the temporal and causal dynamics among these variables, future research should adopt longitudinal or experimental designs. Such approaches would provide stronger empirical evidence for the hypothesized pathways and help disentangle complex reciprocal relationships.

Fourth, this study employed an online self-report survey, which meant that participants' response environments could not be standardized. However, online surveys are a valuable research method that enables the collection of large-scale data within a short period. Therefore, despite the above limitations, their continued use is considered important. In addition, this study did not control social desirability bias in self-reported responses. Although the study did not focus on highly sensitive topics such as morality or prejudice, where social desirability might exert a strong influence, it is still possible that some participants were inclined to respond more positively about their local community. Future studies should consider controlling individual differences in social desirability tendencies.

Fifth, the participants in this study were limited to Japanese individuals. Therefore, it is currently unclear whether the findings can be generalized to different cultural contexts. On the other hand, Japan is one of the countries with the highest proportion of older people in the world due to its rapidly aging population. Since many other countries are expected to face similar demographic challenges in the near future, disseminating findings from Japanese local communities internationally is meaningful. Future research should aim to replicate and validate these findings in other cultural settings.

4.5 Conclusions

This study examines the characteristics of people who are likely (or unlikely) to desire opportunities for interaction with local people in anticipation of the possibility that governments and companies will actively provide such opportunities in the future. The results showed that participants with higher sense of community and need to belong had greater need for provided opportunities for interaction and more positive interaction expectancy. By contrast, individuals with more negative self-perceptions in interpersonal relationships had lower need to belong. The results of this study suggest that policies that provide opportunities for interaction with people in the local community tend to be accepted and appreciated by those with high sense of community and positive self-perceptions in interpersonal relationships. By contrast, participants with negative self-perceptions in interpersonal relationships had a less positive interaction expectancy (Study 2); thus, additional interaction opportunities may reinforce such negative self-perceptions in interpersonal relationships. We believe that this study is significant, as it comprehensively examines the new topic of attitudes toward opportunities provided for interaction with people in the local community. The movement to provide opportunities for social interaction central to this research is not limited to smart cities but is likely to gain relevance across a wide range of urban environments in the future. Accordingly, it is important to continue investigating individuals' attitudes toward participation in externally provided community.

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found at: The data used in the analysis are posted on the Open Science Framework (OSF) repository (https://osf.io/76htu/).

Ethics statement

The studies involving humans were approved by the Ethics Committee of the University of Tokyo. The studies were conducted in accordance with the local legislation and institutional requirements. The Ethics Committee/Institutional Review Board waived the requirement of written informed consent for participation from the participants or the participants' legal guardians/next of kin because this study was conducted online.

Author contributions

YS: Conceptualization, Data curation, Formal analysis, Methodology, Writing – original draft. YK: Conceptualization, Writing – review & editing. YI: Conceptualization, Writing – review & editing. SF: Conceptualization, Writing – review & editing. TT: Conceptualization, Writing – review & editing. MO: Conceptualization, Writing – review & editing. TH: Conceptualization, Writing – review & editing. KK: Conceptualization, Funding acquisition, Project administration, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/frsps.2025.1560264/full#supplementary-material

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