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Happiness Through Participation in Neighborhood Associations in Japan? The Impact of Loneliness and Voluntariness

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Abstract This article analyzes the relationship between subjective well-being (SWB) and participation in neighborhood associations (NHA) in Japan. While the theoretical and empirical literature suggests a strong positive correlation between participation in NHAs and SWB, recent research on Japan could not validate this result. This study shows how those diverging results can be explained by including two factors in the analysis: the voluntariness of the action as well as loneliness as a mediating variable. Using linear regression models on data from two different studies, we find that—even in the case of Japan—voluntary participation in NHAs is positively associated with SWB in two ways: directly and indirectly mediated by loneliness. This result is robust to differently sampled data and different measures of our key variables.

Résumé Cet article analyse la relation entre le bien-être subjectif (BES) et la participation à des associations de quartier au Japon. Si la littérature théorique et empirique laisse entendre une corrélation fortement positive entre la participation à des associations de quartier et le BES, des recherches récentes sur le Japon n'ont pas pu valider ce résultat. La présente étude montre comment ces résultats divergents peuvent s'expliquer en intégrant deux facteurs dans l'analyse: le caractère volontaire de l'action ainsi que la solitude comme variable médiatrice. En utilisant des modèles de régression linéaire sur les données issues de deux études différentes, nous constatons que – même dans le cas du Japon – la participation volontaire dans les associations de quartier est associée de manière positive au BES de deux façons: directement et indirectement induite par la solitude. Ce résultat est fiable pour les différentes données de l'échantillon et les différentes mesures de nos variables clés.

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Zusammenfassung Dieser Beitrag untersucht die Beziehung zwischen subjektivem Wohlbefinden und der Partizipation an Nachbarschaftsvereinigungen in Japan. Während in der theoretischen und empirischen Literatur eine starke positive Wechselbeziehung zwischen der Teilnahme an Nachbarschaftsvereinigungen und dem subjektiven Wohlbefinden nahe gelegt wird, konnten kürzliche Studien zu Japan dieses Ergebnis nicht bestätigen. Die vorliegende Studie zeigt, wie sich die abweichenden Ergebnisse erklären lassen, indem die Analyse zwei Faktoren berücksichtigt: die Freiwilligkeit der Handlung sowie Einsamkeit als eine Mediatorvariable. Nach Anwendung linearer Regressionsmodelle auf Daten aus zwei verschiedenen Studien stellen wir fest, dass - auch im Fall von Japan - eine freiwillige Teilnahme an Nachbarschaftsvereinigungen auf zweierlei Weise mit dem subjektiven Wohlbefinden positiv in Verbindung steht, und zwar direkt und indirekt beeinflusst durch Einsamkeit. Dieses Ergebnis bleibt auch bei unterschiedlich erfassten Daten und unterschiedlichen Messungen unserer Schlüsselvariablen bestehen.

Resumen El presente artículo analiza la relación entre el bienestar subjetivo (SWB, del inglés subjective well-being) y la participación en asociaciones vecinales (NHA, del inglés neighborhood associations) en Japón. Aunque el material publicado teórico y empírico sugiere una fuerte correlación positiva entre la participación en NHA y SWB, investigaciones recientes sobre Japón podrían no validar este resultado. El presente estudio muestra cómo dichos resultados divergentes pueden ser explicados mediante la inclusión de dos factores en el análisis: la voluntariedad de la acción, así como también la soledad como variable mediadora. Utilizando modelos de regresión lineal en datos procedentes de dos estudios diferentes, encontramos que - incluso en el caso de Japón - la participación voluntaria en NHA se asocia de manera positiva al SWB de dos formas: bajo la mediación directa e indirecta de la soledad. Este resultado es sólido para datos de muestreo diferentes y diferentes mediciones de nuestras variables claves.

Keywords Neighborhood associations · Subjective well-being · Japan · Civil participation · Voluntariness · Loneliness · Gender

Introduction

In happiness research, and happiness economics in particular, social phenomena and social states of affairs are assessed and evaluated by looking at their underlying correlations with subjective well-being (SWB). SWB is often measured in large-scale representative surveys asking the respondents to evaluate how happy—or satisfied with their lives—they are lately.[1] The results of this kind of research reveal causes and correlates of SWB which can be used to (1) identify social problems,[2] (2)

[1] In this article, we use the terms happiness, SWB and life satisfaction without distinction.

[2] For example, TV over-consumption, Frey et al. (2007).

capture and compare the status-quo in terms of SWB with results from the past or different countries (Blanchflower and Oswald 2011), and (3) to generate and evaluate policy measures.[3]

Despite the growing number of publications in the field of happiness research, analyses of the relationship between "happiness" and "civil society" have been relatively scarce. One of the few studies addressing "civil society" as the object of investigation is Wallace and Pichler (2009). A reason for this apparent shortcoming might be that due to its many measureable and immeasurable dimensions, the concept of "civil society" is lacking a clear-cut definition that can be easily applied in empirical analyses. However, a variety of aspects closely related to civil society have been subject to previous research indicating a positive correlation with SWB on an individual level. Particularly, political participation (Pacheco and Lange 2010), participation in the community (Cicognani et al. 2008), and social capital in general (Helliwell and Putnam 2004) show a significant positive correlation with SWB.

Although "[n]eighborhood associations are often regarded as the most genuine form of civil society organizations" (Meyer and Hyde 2004, pp. 77S), only a few studies consider the individual membership status of neighborhood associations (NHA) in their happiness estimations. Those studies that take NHA into account, usually use one dummy variable including all different kinds of associations—not only NHAs, but also sports, music, and hobby clubs—for which they report a positive correlation with SWB (Frey and Stutzer 2002, pp. 164–165). Considering that the activities of NHAs are at least partially political (Pekkanen 2006), contribute to the community (Portney and Berry 2001) and can be regarded as the most basic source of social capital (van Houwelingen 2012), this result is in line with the empirical findings on the relationship between SWB and different aspects of participation in civil society in general.

However, analyzing the correlates and determinants of happiness in Japan, Tiefenbach and Kohlbacher (2013) find that women are significantly less happy when their household belongs to a neighborhood association. Using the same data in a different model setting, they still find no positive correlation for the relationship between SWB and NHA participation on the individual level, in this case neither for women nor for men (Tiefenbach and Kohlbacher 2014). These results stand in stark contrast to the bulk of SWB-related literature on political participation, participation in the community, and social capital. They further call the underlying theoretical framework—the *self-determination theory* (SDT)—which can explain how and why active participation in any kind of associations relate to SWB, into question.

Given this apparent contradiction, the aim of this article is to conduct a more refined analysis of the relationship between participation in NHA and SWB in Japan. Therefore, this article is based on two studies. *Study one* uses the same data as in Tiefenbach and Kohlbacher (2013, 2014), but extends the analyses by including more detailed variables regarding the NHA membership status and activities. *Study two* makes use of an online sample which was exclusively designed for this project. This not only allows us to put the findings of *study one* into

[3] See, for example, the policy purposes of happiness data considered by Dolan et al. (2011).

perspective, but it also aims at a sophisticated understanding of the factors that influence the relationship between SWB and NHA activities.

In a nutshell, we find that when analyzing NHA participation two factors have to be accounted for: (a) the voluntariness of the action and (b) loneliness as mediating variable. Our results show that—even in the case of Japan—voluntary participation in NHAs is positively associated with SWB in two ways: directly and indirectly mediated by loneliness. This result is robust to differently sampled data and different measures of our key variables.

This article is structured as follows. The second section reviews the theoretical foundations as well as empirical studies and proposes three hypotheses derived from the literature which explain why SWB and NHA might not show a positive correlation. The third and fourth sections describe the data, variables and results of our *studies one* and *two* respectively. The fifth section evaluates the results in light of the theories and literature elucidated in the second section. Finally, the sixth section concludes the paper.

Theoretical Foundations and Empirical Literature

In this section, we first briefly introduce the theoretical framework that explains why empirical investigations find a positive correlation between participation in civil society and SWB. In a second step, we review literature that gives evidence on how participation in civil society and life satisfaction are correlated by highlighting three aspects: (1) political participation, (2) participation in the community, and (3) social capital. Subsequently, we show how these three perspectives on participation relate to NHA in Japan. We then, however, present differing survey results on the case of Japanese NHA and subjective feelings of well-being. We conclude this session by offering a conceptual model that can explain why previous research results on Japan contradict most of the theoretical and empirical literature.

Theoretical Framework: Self-Determination Theory

SDT is a psychological theory of human motivation and personality based on three underlying assumptions (Deci and Ryan 2000; Deci and Vansteenkiste 2004): (A) human beings are "inherently proactive," that is they can—to some extent—control and act on the external and internal forces they are exposed to. (B) Based on this *capacity to act* humans have an "inherent tendency" toward growth, development, and well-being. However, (C) to what extent this tendency is actually realized in positive outcomes depends on their social environment. Building on this meta-theoretical framework, SDT postulates three innate psychological needs for *competence*, *relatedness*, and *autonomy*. Those needs are understood as "universal necessities" that constitute "the nutriments that are required for proactivity, optimal development, and psychological health of all people," regardless of gender, culture, and time (Deci and Vansteenkiste 2004, p. 25). The need for competence refers to the desire to *effectively* act on and deal with one's environment. The need for autonomy is closely related to that, since it is concerned with the urge to be a *causal*

agent, that is to experience a *sense of choice* when interacting with the environment. Finally, the need for relatedness refers to the propensity to seek and foster interpersonal relationships and to experience a *sense of connectedness*. However, whether the interaction with the outside world proves to be supportive for an individual—for example in terms of SWB—depends on to what degree all of the three needs are satisfied (Deci and Ryan 2000, p. 229).

In happiness economics, Frey et al. (2004) introduce the core elements of SDT within their concept of *procedural utility*. While mainstream economics has exclusively focused on results and outcomes (so called *outcome utility*), Frey et al. show that not only the outcome, but also the process of how results are reached, matters. If a process satisfies the needs of competence, relatedness and autonomy among the participating individuals, then procedural utility—often measured in terms of SWB—can be gained, even if the result of the process does not correspond to one's own goals (Benz 2007).

Literature on Participation and Happiness

The theoretical linkage between happiness and social activities has been subject to several empirical studies. We will briefly give an outline on studies that touch on three aspects related to participation in civil society and neighborhood organizations, namely (1) political participation, (2) participation in the community, and (3) social capital.

Political Participation

The idea how political participation can lead to SWB has been described by Drèze and Sen in the following way: "Participation can also be seen to have intrinsic value for the quality of life. Indeed, being able to do something through political action—for oneself and for others—is one of the elementary freedoms that people have reason to value" (2002, p. 359). Theories on political participation stress that "political participation is likely to yield psychic benefits, increasing the participating individual's sense of efficacy, political knowledge, and feeling of empowerment" (Weitz-Shapiro and Winters 2011, p. 103).

Empirical studies on the relationship between political participation and SWB basically report a positive correlation. Among the studies in support for the SDT, the effects of the *right to participate* and the effects of *actual participation* have to be distinguished. Regarding the former, Frey and Stutzer have disentangled the effects of the opportunity to participate politically from the actual benefits derived by the political outcomes for the case of Switzerland. In a series of papers they show that it is not only the outcome, but also the process—in this case the right to participate—that positively enhances SWB (Frey and Stutzer 2000a, b, 2005; Stutzer and Frey 2006). While Frey and Stutzer focus on the case of Switzerland, Dorn et al. (2007) reproduce their findings using international data from 28 countries.[4]

[4] However, in another study, Dorn et al. (2008) put the evidence for a correlation between the right to participate and SWB in the Swiss case into perspective by adding culturally determined control variables such as language.

Apart from studies on the effect of the right to participate, also the effect of actual political participation on SWB has been analyzed in the literature. Using data from the 2006/2007 European Social Survey, Pacheco and Lange (2010) show that a strong political engagement positively affects SWB. They establish this *causal* relationship by using vertical trust (in institutions) as an instrument to compensate for endogeneity.

Participation in the Community

Similar to political participation, participation in the community is considered to have a positive outcome on SWB. Studies on European countries and the US have supported the hypothesis that people who participate in civil society associations are happier on an individual level (Howard and Gilbert 2008; Wallace and Pichler 2009). Wallace and Pichler (2009) have also given evidence for a positive correlation between the participation in society and average SWB on the country level.

Cicognani et al. (2008) show that the effect of community participation on social well-being is mediated by the sense of and identification with community, but that in some countries also a direct effect of community participation on social well-being can be observed. In a similar vein, Farrell et al. (2004) show that the sense of community mediates the relationship between neighborhood stability and residents well-being. Dimensions of the sense of community include membership, influence, integration, and fulfillment of needs as well as a shared emotional connection (McMillan and Chavis 1986) and perceived characteristics such as similarities and interdependence with others and the feeling of belonging (Sarason 1974, p. 174).

The positive connection between sense of community and life satisfaction is further highlighted by studies such as Davidson and Cotter (1991), McCarthy et al. (1990), Pretty et al. (1996), and Prezza et al. (2001). The positive outcome of community participation on SWB has also been analyzed for certain population groups such as senior citizens (Graney 1975). Apart from effects on SWB, Wandersman and Florin (2000) refer to numerous studies and point out that participation in neighborhood communities not only affects the social environment and the quality of interpersonal exchange within the community, but also has an impact on individual perceptions of the self, such as increasing "confidence and efficacy." Finally, some studies also report a reverse causal relationship: Grillo et al. (2010), for example, find that satisfaction with the community leads to a higher community participation.

Social Capital

Closely connected to community participation is the discussion about social capital and its correlation with SWB. Due to its numerous definitions, empirical studies typically use a variety of proxy variables to gauge the level of social capital. Measuring social capital in terms of generalized trust, perceived corruption and civic participation, Bjørnskov (2003) finds a positive correlation with SWB on the country (macro) level. On the individual (micro) level, Leung et al. (2011), for

example, examine the correlation of SWB and different aspects of Coleman's (1988) definition of social capital consisting of: (a) trust and obligations, (b) information channels, and (c) norms and sanctions. They find significant relationships between all these aspects of social capital and happiness. Similarly, they report a positive correlation between happiness and feelings of a sense of belonging to a community. Finally, they conclude their study by pointing out that "trust"—which can be considered as a basic measure for social capital—"is an essential element of life satisfaction" (Leung et al. 2011, p. 452). While Leung et al. draw on data from Canada's 2003 General Social Survey, Portela et al. (2013) take a similar approach, using data from the European Social Survey 2008. Differentiating between several dimensions of social capital (trust, norms, and networks) as well as various measures for SWB, they find that in "particular, social networks, social trust and institutional trust are the components that show a higher correlation with subjective wellbeing" (Portela et al. 2013, p. 506).

Finally, since local community organizations, such as NHAs, generate social capital in all of the above mentioned domains, they are considered to enhance "individual and social well-being" (Reisch and Guyet 2007, p. 166). Confirming evidence is provided by Miller and Buys (2008). In a case study of an Australian community they show that community activities as well as feelings of trust and safety are positively related to life satisfaction and happiness.

Neighborhood Associations in Japan

NHA and neighborhoods in general are considered to be the "wellspring of social capital" (Portney and Berry 2001, p. 71) and this view also applies to the case of Japanese NHAs (van Houwelingen 2012; Kanaya 2008; Pekkanen and Tsujinaka 2008; Nishide 2009). In Japan, NHAs are a particular and widespread form of civil society organizations at the community level. Around 300,000 NHAs exist throughout the country, each consisting of about 100–300 households (Pekkanen 2006, p. 87). As most households in the community tend to be a member of the local NHA, the number of members is estimated to be very high, but signs for declining interest can be identified among younger generations, too (van Houwelingen 2012; Pekkanen 2006; Kanaya 2008; Haddad 2011). For an exact definition of NHA, we draw on Pekkanen (2006):

> NHA are voluntary groups whose membership is drawn from a small, geographically delimited, and exclusive residential area (a neighborhood) and whose activities are multiple and are centered on that same area (Pekkanen 2006, p. 87).

The decision to join the local NHA or not is *formally* a voluntary one, but it cannot be denied that "many Japanese participate in NHAs […] because they feel that to do otherwise would affect their reputation with neighbors" (Pekkanen 2006, p. 91). The reason why NHAs are still considered to be "voluntary" associations is that non-participation is constrained by social compulsion, but not by coercion (Pekkanen 2006). Social compulsion, however, is a common constraint of many other associations, not only in Japan, but also in Western countries.

Although the activities of NHAs vary pretty much depending on the association and its member structure, basically two types of activities can be distinguished, and both can be related to the generation of social capital: (1) political participation and administrative cooperation and (2) participation in the community. We briefly review both types of activities below and highlight how they relate to the production of social capital.

Political Participation and Administrative Cooperation

Although not all NHAs, and within them not all of their members, can be considered to participate politically, NHAs actually advocate local policies by petitioning the local government and by contacting members of the local assembly (Tsujinaka et al. 2009). They also participate in election campaigns of local assembly candidates, which is one reason why they are considered to be a valuable tool for politicians to reach people and to build up supporting networks (Pekkanen 2006, pp. 97–98). What kind of political activities are pursued depends strongly on the political opportunity structure and on the respective trust relations with the political decision makers (Tsujinaka et al. 2009, p. 187).

Apart from those activities which are directly related to the political process,[5] NHAs also cooperate with the local government, for example, by disseminating information, surveys, personnel recommendations, and disaster schemes (Thränhardt 1990; Mori 2002; Tsujinaka et al. 2009). Although NHAs are compensated for these administrative activities by payments of the local government, they still have to be regarded as independent civil society organizations (Pekkanen 2006; van Houwelingen 2012). However, the activities of NHAs are by far not limited to political–administrative issues.

Participation in the Community

Apart from political and administrative activities, NHA engage in a large variety of community activities which are of equal importance (Yasui 1985). The different activities in the neighborhood range from organizing local shrine festivals and sports events to cleaning local parks, building and maintaining a community center as well as crime and fire prevention activities and frequent disaster drills. Apart from that, NHAs can also be considered as a local key institution providing support for various groups like children, the elderly as well as the socially deprived (Thränhardt 1990; Tsujinaka et al. 2009; Pekkanen 2006).

Through the above mentioned activities NHA members form networks within and outside the organization which can be characterized by a high level of generalized trust and mutual benefit (Pekkanen 2006; Taniguchi and Marshall 2014; Pekkanen and Tsujinaka 2008). All these characteristics have been related to social capital (Putnam 2000). However, not only NHA members, but also the social

[5] Mori (2002) even characterizes activities such as petitioning the local government and the relations with local assemblymen during election campaigning as cooperation with the administration (*gyōsei kyōryoku*).

environment benefits by this "generation of social capital" which is one reason why NHAs are being actively promoted by local governments (Pekkanen 2006).

Gender and NHA

Another important characteristic of NHA participation is that it is structured by gender. This is first and foremost the case for leadership positions: Tsujinaka et al. (2009) surveyed NHA throughout Japan and found only 3 % females among the NHA presidents (Tsujinaka et al. 2009, p. 73). The way membership within a NHA is counted—by household and not by individuals—goes back to an understanding of males as household heads within a gender-segregated social system. This in turn might have some impact on how leadership positions are filled within NHA (Pekkanen et al. 2014, p. 52). The gender allocation for activities in NHA in general is less distinctive at least in numbers: While it has also been shown that men generally are more active in NHA than women, anecdotal evidence suggests a stronger female participation (Pekkanen 2006, pp. 96–97). However, assignments of males and females within the NHA can differ: Females often participate through the women's group (*fujinkai*) which can be either a subgroup of the NHA itself or an affiliated group with which the NHA can cooperate closely (Tsujinaka et al. 2009, p. 104). These women's groups, often consisting of elderly housewives (Pekkanen and Tsujinaka 2008, p. 716), have their own leaders and are involved in auxiliaries for a variety of NHA activities. Yet, the question remains open to what extent female participants in NHA are included in decision-making processes.

SWB and NHAs in Japan

While the different strands of theoretical and empirical literature reviewed above suggest a positive correlation between NHA participation and SWB, two recent studies on Japan show conflicting results. Using data from the Japanese National Survey on Lifestyle Preferences (NSLP) 2011, Tiefenbach and Kohlbacher (2013) show that women report significantly lower levels of happiness when their household belongs to a NHA. Apart from standard socio-demographics, they also control for the subjective loneliness of the respondents. This might actually influence the results in a way that makes comparisons to other studies, which do not use subjective variables as predictors, difficult. However, in a follow-up study, in which subjective loneliness is not part of the control variables, Tiefenbach and Kohlbacher (2014) show for the same data that personal participation in NHAs does not show a positive correlation with happiness, neither for women nor for men. Taken together, the results suggest that NHA membership and participation are not correlated with SWB in the case of Japan.

Hypotheses

To explain the diverging empirical findings for the case of Japan, we draw on the SDT. According to the SDT, human well-being is mainly determined by three factors: *autonomy*, *competence*, and *relatedness*.

Given the rather semi-voluntary nature of NHAs in Japan, it can be assumed that joining and participating in NHAs is in many cases not an autonomous decision. Accordingly, we formulate the following hypothesis:

H1 People voluntarily participating in NHAs are happier than people who are involuntarily or not participating.

Apart from the decision to join NHAs the activities pursued inside these groups mainly focus on community related events such as the organization of festivals. Therefore, it is likely that most of them do not foster any "skills" or "competences" of the average participant. Neither is it likely that they help the average member to become more "autonomous" or to make more "autonomous decisions." Accordingly, fostering interpersonal relationships is the main source of procedural utility associated with NHA activities. This seems especially plausible when considering that previous studies on Japan (discussed above) come to different results when omitting or including loneliness, which can be understood as a negative measure for interpersonal relationships. Therefore, we assume that voluntary as well as involuntary NHA participation lead to lower levels of subjective loneliness:

H2a People voluntarily participating in NHA are less lonely than people who are not participating.

H2b People involuntarily participating in NHA are less lonely than people who are not participating.

Since the negative correlation between subjective loneliness and SWB is well established in the international literature (Salimi 2011; Goodwin et al. 2001; Diener and Ryan 2009) as well as in the case of Japan (Tiefenbach and Kohlbacher 2014) we further assume that voluntary and involuntary NHA participation indirectly has positive effects on SWB mediated by loneliness.

H3a Voluntary NHA participation has an indirect positive effect on happiness partly mediated by loneliness.

H3b Involuntary NHA participation has an indirect positive effect on happiness partly mediated by loneliness.

Our conceptual model (summarized in Fig. 1) not only explains (1) why activities in NHAs are not necessarily positively correlated with SWB in Japan, but it also shows (2) why including or excluding loneliness from the controls has a substantial influence on the results.

Despite progressive gender-related legislation, Japan is known for persisting gender inequalities especially regarding participation in leadership positions and decision-making processes (World Economic Forum 2013; Holdgrün 2013). This gender imbalance is also clearly visible for leadership positions within the NHA (Tsujinaka et al. 2009, p. 73) and gender has an impact on assignments within the NHA in general, as women tend to participate through the women's group. Therefore, we expect to see different effects between men and women. Consequently, we are interested in revealing—exploratively—gender differences in the assumed pathways of our conceptual model. For this reason, we analyze not

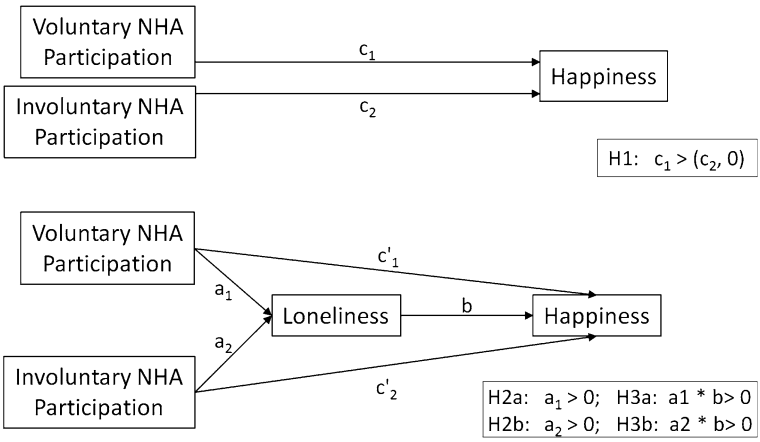

Fig. 1 Conceptual model and hypotheses

only the total sample, but also run separate estimations on the male and female subsamples. Since loneliness and voluntariness can be measured with a variety of concepts we conduct two studies using different measures and sample schemes to increase the robustness and generalizability of our results.

Study One

Study one applies the conceptual model outlines above to data from the National Survey of Lifestyle Preferences (NSLP) 2011. The following subsections describe our data, method, and results.

Data

The Survey

Since 2010 the Cabinet Office of the Government of Japan has put the focus of one of its major annual surveys, the NSLP, on happiness and its correlates. *Study one* is based on 2011 data of the NSLP. Apart from questions regarding individual happiness, the survey's second focus is on so called "new public commons," that is, activities in NGOs and community-based associations. In a two-stage randomized stratified procedure 5,000 Japanese men and women between the age of 15 and 80 years have been selected to participate in the survey. An independent market research agency (*Shin Joho Center, Inc.*) was commissioned to deliver and collect the questionnaires from the respondents. The questionnaire items are explained in person to the participants after which they had a few days to complete the survey. The data collection took place between March 3 and March 29 in 2011. In total, 3,578 completed questionnaires have been collected which equals a response rate of 71.6 %.

Since the process of the data collection was interrupted by the triple disaster of March 11, 2011 (Mimura et al. 2011), chances are that the results have been biased. However, Tiefenbach and Kohlbacher (2014) have shown that although the pre-disaster and post-disaster groups are unbalanced regarding the observable control variables, there was no statistically significant effect on the average happiness level before and after March 11.[6] However, to avoid biasing the results with respondents who have been directly affected by the disaster, Tiefenbach and Kohlbacher (2014) excluded the main three disaster areas (Miyagi, Fukushima, and Iwate) from their analysis. Following their approach, we drop all observations from those three prefectures from our dataset.

Variables of Interest

We measure SWB by using the self-evaluated happiness level of the respondents. The survey item reads: "How happy are you currently?", and the respondents can indicate their personal happiness level on a scale ranging from 0–10. We measure NHA participation with a dummy variable taking the value "1" for all respondents that either (a) "participate regularly" or that (b) "participated in the past" in NHA activities. We further combine this variable with a dummy measuring the *voluntariness of the household membership*. One item asks respondents to name up to three reasons, why their household belongs to a neighborhood association. Respondents are considered to be *involuntarily participating* if (i) they are participating in NHAs as defined above and (ii) if they name one or more of the following reasons: because (1) "it's an obligation," (2) "it's a rule at the condominium where I live," (3) "I was persuaded," (4) "other people around me participate too." All other respondents participating in NHAs are considered to be participating voluntarily. We chose this definition to single out persons who are to *some extent* influenced by other people in their decision to participate in NHA, as we assume that this category is of more relevance than people who are subject to coercion. For reasons of brevity the variable is labeled as "involuntary NHA participation." However, the reader should keep in mind that it is rather interpreted as "not completely voluntary NHA participation."

Apart from variables regarding the NHA membership status we also include an index of subjective loneliness. The respondents are asked to indicate their feelings of loneliness in four different life domains (family, region, workplace, and school) on a scale ranging from 1(=not lonely at all) to 5(=very lonely).[7] By calculating the average of the four areas of loneliness we constructed an *overall loneliness index*.

Finally, we include several socio-demographic variables which are usually controlled for in happiness economics, such as household income, age, age-squared, gender, family status (cohabitation with one's spouse as a proxy for marriage;

[6] Comparing the mean scores before and after the disaster a *t* test shows that the post 3–11 group consists of less women, less married people, respondents of younger age, less homeowners, less housewives, less people without work and people with a lower number of children (all differences are significant at the 5 % level). Using propensity score analysis Tiefenbach and Kohlbacher (2014) show that despite the above mentioned differences in the observables the happiness estimates are not biased.

[7] We recoded the original scale which ranged from 1 (=very lonely) to 5 (=not lonely at all).

Table 1 Summary statistics of the NSLP 2011

Variable	Obs	Mean	SD	Min	Max
Dependent variable					
Happiness	3,430	6.47	2.02	0	10
Independent variables					
Voluntarily participating in NHAs	3,578	0.16	0.36	0	1
Involuntarily participating in NHAs	3,578	0.15	0.36	0	1
Overall loneliness index	3,365	2.14	0.86	1	5
Control variables					
Women	3,438	0.51	0.50	0	1
Age	3,438	48.56	17.08	15	79
Household income	3,026	494.65	302.62	50	1,200
Homeownership	3,428	0.78	0.42	0	1
Family relations					
Married	3,224	0.70	0.46	0	1
Number of children	3,385	1.41	1.12	0	9
Children under the age of 6 years dummy	3,385	0.16	0.49	0	3
Employment relations					
Managerial position	3,429	0.06	0.23	0	1
Civil servant	3,429	0.04	0.19	0	1
Board of directors (company)	3,429	0.02	0.15	0	1
Working in a non-private organization (incl. board of directors)	3,429	0.01	0.12	0	1
Entrepreneur	3,429	0.11	0.31	0	1
Temporary employee	3,429	0.17	0.38	0	1
Housewife	3,429	0.14	0.34	0	1
Student	3,429	0.08	0.27	0	1
Without work	3,429	0.16	0.36	0	1

Excluded are the disaster affected prefectures Miyagi, Fukushima, and Iwate

children number and a dummy for children under the age of 6 years), homeownership, employment relationship,[8] and the prefecture of the respondent.

Descriptives

Table 1 shows the summary statistics of the NSLP 2011 sample described above.

Analysis

The following sections describe the applied statistical methods and their results.

[8] The following employment relationships are compared to the reference group of regular employees: managing position, civil servant, directorial board (company), non-private organization (incl. directorial board), entrepreneur, temporary employee, housewife, student, and without work.

Table 2 Mediation model of the total sample, NSLP 2011 (*study one*)

NSLP 2011 Total sample	(1)	(2)	(3)		
	Happiness OLS	Loneliness OLS	Happiness SUREG		
Variables	Direct	Direct	Direct	Indirect	Total
Voluntary participation	0.344***	−0.215***	0.162*	0.168***	0.331***
	(0.098)	(0.044)	(0.091)	(0.035)	(0.097)
Involuntary participation	−0.085	−0.057	−0.132	0.045	−0.086
	(0.095)	(0.043)	(0.089)	(0.033)	(0.095)
Not participating in NHA	Reference group				
Loneliness			−0.781***		
			(0.039)		
Controls	Yes	Yes	Yes	Yes	Yes
Observations	2,911	2,860	2,856	2,856	2,856
R^2	0.157	0.060			

Standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

Method

Following the standard procedure in happiness economics, we apply several OLS multivariate regression models to the NSLP 2011 data. To estimate the direct effect of voluntary (c_1) and involuntary (c_2) NHA participation on SWB we estimate the happiness levels of the respondents by entering the variables described above into the right-hand side of the following equation:

$$H_i = \alpha + c_1 V + c_2 P + \gamma' X_i + \varepsilon_{1i} \quad (1)$$

where H indicates the reported happiness level of respondent i; V and P denote voluntary and involuntary participation and X_i denotes further control variables (specified above), while γ' is a vector representing their coefficients. Finally, α and ε denote the intercept and the error term, respectively.

In a next step, we replace the dependent variable with our measure of subjective loneliness L_i:

$$L_i = \alpha + a_1 V + a_2 P + \gamma' X_i + \varepsilon_{2i} \quad (2)$$

Here, a_1 and a_2 indicate the direct effect of voluntary (V) and involuntary (P) NHA participation on loneliness.

In a final step, we then include both equations in a system of seemingly unrelated regressions to estimate the indirect and total effects of V and P on H.

$$H_i = \alpha + c_1' V + c_2' P + bLi + \gamma' X_i + \varepsilon_{1i} \quad (3a)$$

$$L_i = \alpha + a_1 V + a_2 P + \gamma' X_i + \varepsilon_{2i} \quad (3b)$$

where $a_1 * b$ and $a_2 * b$ are the indirect effect of voluntary and involuntary NHA participation on happiness mediated by loneliness.

We run each of our models on the whole sample as well as separately for women and men. Finally, we account for endogeneity with an generated instrumental variable approach.

Results

Basic Results The results for the total sample are reported in Table 2. Compared to non-participation voluntary NHA participation is positively correlated with more happiness (model 1) and less loneliness (model 2). This is not the case for involuntary NHA participation. Finally, the mediation model 3 shows that voluntary NHA participation has both a direct effect on happiness and an indirect effect mediated by loneliness. Both effects are of similar size (0.162 and 0.168) and result in a total effect of 0.331 happiness points (on a scale from 0–10). This effect is relatively large in size considering that it ranges between *being a house-owner* with a coefficient of 0.264 and *having a child under the age of 6 years* with a coefficient of 0.453 happiness points.

The mediation paths estimated in model 3 are plotted in Fig. 2.

Effect Heterogeneity: Gender differences In a next step, we estimate models 1–3 separately for men and women. For the sake of brevity, we only show the mediation path here (Fig. 3) and report the estimation results in the Appendix (Tables 6, 7).

While men show qualitatively the same mediation path as observed in the total sample (Fig. 2), the results for the female subsample differ in two remarkable ways. First, not only voluntary but also involuntary NHA participation is negatively correlated with loneliness in the case of women. Second, unlike for men voluntary NHA participation has no direct positive effect on happiness in the case of women. Conversely, however, involuntary NHA participation has a direct negative effect on happiness. In total women show a positive happiness effect of 0.230 for voluntary NHA participation and a negative happiness effect of −0.261 for involuntary NHA participation.

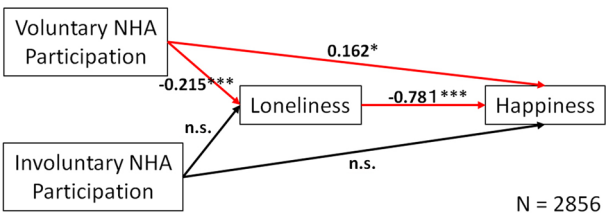

Fig. 2 Mediation model of the total sample, NSLP 2011 (*study one*). Levels of statistical significance: ***$p < 0.01$, **$p < 0.05$, *$p < 0.10$, n.s. not significant

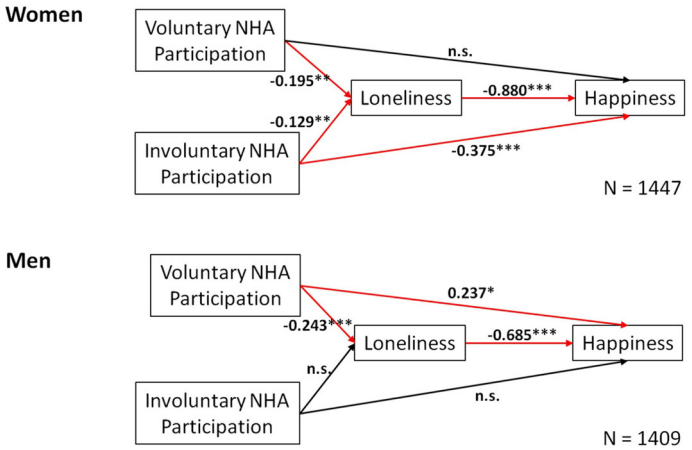

Fig. 3 Mediation model of the subsample for men and women, NSLP 2011 (*study one*). Levels of statistical significance: ***$p < 0.01$, **$p < 0.05$, *$p < 0.10$, n.s. not significant

Endogeneity In a final step of the analysis, we address the question of causality. Although mediation analysis estimates the direct and indirect "effects" of an independent variable on an outcome variable, this does not yet imply a causal relationship. In our case, it could be possible that people with a lower level of happiness are more likely to perceive their NHA participation as involuntary. In a similar way, it is also possible that the causal pathway runs in both directions (simultaneity). With cross-sectional data a common way to deal with endogeneity (including reverse causality) is to apply an instrumental variable approach. However, in our study it is difficult to find adequate instruments which are highly correlated with NHA participation and loneliness, but not directly correlated with the error term in the happiness equation (ref). Therefore, we rely on Lewbel's generated instruments approach using the Stata command ivreg2h (see Lewbel 2012; Baum and Schaffer 2012). With this approach, we generate instruments for voluntary and involuntary NHA participation as well as for loneliness and then re-estimate Eqs. (1), (2), and (3a). The results are reported in the Appendix (Fig. 6). In a nutshell, we find that most of the established correlations remain significant even after accounting for endogeneity. However, in the total sample the direct effect of voluntary NHA participation on happiness turns insignificant (Fig. 6a). The mediation paths in the subsamples of men (Fig. 6b) and women (Fig. 6c) remain significant and also their effect size does not considerably change.

Study Two

Since the NSLP data (*study one*) uses very specific measures for loneliness and NHA participation and leaves only very restricted options to gauge the voluntariness of the participation, we conducted *study two* to verify the findings presented above.

Table 3 Summary statistics of the DIJ online sample 2013

Variable	Obs	Mean	SD	Min	Max
Dependent variable					
Happiness	1,660	6.17	2.14	0	10
Independent variables					
Personal NHA participation involuntarily	1,660	0.28	0.45	0	1
Personal NHA participation voluntarily	1,660	0.22	0.41	0	1
Loneliness	1,660	2.74	1.09	1	5
Control variables					
Women	1,660	0.50	0.50	0	1
Age	1,660	44.45	13.76	20	69
Household income	1,351	531.13	310.29	50	1,200
Family relations					
Married	1,660	0.66	0.47	0	1
Number of children	1,660	1.24	1.19	0	9
Children under the age of 6 years dummy	1,660	0.16	0.37	0	1
Employment relations					
Managerial position	1,660	0.06	0.23	0	1
Civil servant	1,660	0.03	0.16	0	1
Board of directors (company)	1,660	0.02	0.14	0	1
Working in a non-private organization (incl. board of directors)	1,660	0.02	0.12	0	1
Entrepreneur	1,660	0.07	0.26	0	1
Temporary employee	1,660	0.14	0.34	0	1
Housewife	1,660	0.25	0.43	0	1
Student	1,660	0.05	0.22	0	1
Other	1,660	0.02	0.12	0	1
Without work	1,660	0.07	0.26	0	1
Unemployed	1,660	0.04	0.19	0	1

Data

The Sample

In September 2013, the German Institute for Japanese Studies (DIJ) conducted an internet survey (*Survey on Social Activities*, DIJS 2013) through *Macromill*, which is with over 1 million panel registrants one of the leading online research companies in Japan. From the population of the *Macromill* panel registrants 20,000 people were randomly chosen in the screening process and an e-mail questionnaire was sent to them on September 26, 2013. The survey was closed after the sample size of 1,660 respondents was reached on September 27, 2013. The sampling frame was designed to compare an equal amount of respondents participating and not participating in NHAs, equally distributed across gender and age. Accordingly, the sample is composed of 830 men and 830 women equally distributed in the age

groups of 20–29 years, 30–39 years, 40–49 years, 50–59 years, and 60–69 years (332 respondents in each age group, respectively). Further, half of the respondents are actively engaged in NHAs (participating at least once a year), while the other half of the respondents are not taking part in NHA activities (including passive members who are registered, but not actively participating).

Variables of Interest

The variables of interest are basically the same as in *study one*. The outcome variable happiness is gauged by the same question, "How happy are you currently?", measured on the same 0–10 scale. As kind of a robustness check we use different items to measure NHA participation, voluntariness, and loneliness. Regarding NHA participation the respondents report how often they participate in NHA activities. Respondents who are actively participating at least once a year are considered as "participating in NHA activities." We then further differentiate between involuntary and voluntary participation. The respondents are asked "In case you could freely decide your rate of participation, would you participate at the same rate as now?". Respondents answering "No, I would participate less," and "No, I wouldn't participate at all" are considered to be participating involuntarily. All other respondents are treated as participating voluntarily. Similar to s*tudy one*, we chose this definition to single out persons who engage in NHA, but are not completely free in their decision. For reasons of brevity the variable is labeled as "involuntary NHA participation." However, the reader should keep in mind that it is rather interpreted as "not completely voluntary NHA participation."

Regarding loneliness we ask the respondents, "How lonely do you feel in your daily life" and they can indicate their level of loneliness on a 1–5 scale with "5" meaning "I feel very lonely."

Finally, we control for the same standard socio-demographics as in *study one*: household income, age, age-squared, gender, family status (being married; children number and a dummy for children under the age of 6 years), employment relationship,[9] and the prefecture of the respondent.

Descriptives

Table 3 shows the summary statistics of the DIJ online sample described above.

Analysis

The following sections describe the applied statistical methods and their results.

[9] The following employment relationships are compared to the reference group of regular employees: managing position, civil servant, directorial board (company), non-private organization (incl. directorial board), entrepreneur, temporary employee, housewife, student, without work, and unemployed.

Method

We follow our analytical strategy introduced under the "Method" section of *study one*. Again, we estimate each of our equations for the whole sample as well as separately for women and men.

Results

Basic Results The results for the total sample are reported in Table 4. Similarly to *study one*, we find that voluntary NHA participation is positively correlated with more happiness (model 1) and less loneliness (model 2). Again this is not the case for involuntary NHA participation. Finally, the mediation model 3 shows that voluntary NHA participation has both a direct effect on happiness and an indirect effect mediated by loneliness. Compared to *study one* the effect sizes differ with the direct effect of NHA participation on happiness being bigger in size (0.448, $p < 0.01$) and on a higher level of statistical significance than the indirect effect (0.119, $p < 0.1$). Taken together the total effect of NHA participation amounts to 0.567 happiness points ranging somewhere between *being a woman* (0.665) and *being a temporary employee* (−0.496).

The mediation paths estimated above are plotted in Fig. 4.

Effect Heterogeneity: Gender Differences Looking closer at the gender differences we show the mediation paths models for women and men below in Fig. 5. The estimation results are reported in the Appendix (Tables 8, 9).

Compared to the total sample, we find diverging results for both subsamples. For women, we find no relationship between any kind of NHA participation and

Table 4 Mediation model of the total sample, DIJS 2013 (*study two*)

DIJS 2013 Total sample	(1)	(2)	(3)		
	Happiness OLS	Loneliness OLS	Happiness SUREG		
Variables	Direct	Direct	Direct	Indirect	Total
Voluntary participation	0.567***	−0.129*	0.448***	0.119*	0.567***
	(0.144)	(0.073)	(0.123)	(0.068)	(0.140)
Involuntary participation	0.084	0.073	0.151	−0.067	0.084
	(0.136)	(0.069)	(0.116)	(0.064)	(0.132)
Not participating in NHA	Reference group				
Loneliness			−0.921***		
			(0.046)		
Controls	Yes	Yes	Yes	Yes	Yes
Observations	1,346	1,346	1,346	1,346	1,346
R^2	0.190	0.138			

Standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

Fig. 4 Mediation model of the total sample, DIJS 2013 (*study two*). Levels of statistical significance: ***$p < 0.01$, **$p < 0.05$, *$p < 0.10$, n.s. not significant

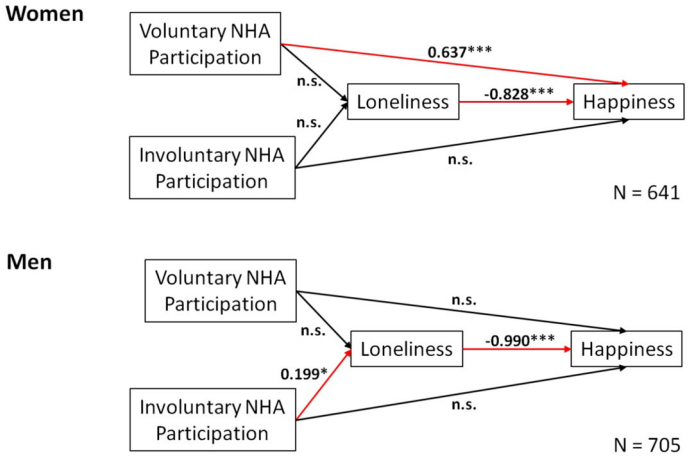

Fig. 5 Mediation model of the subsample for men and women, DIJS 2013 (*study two*). Levels of statistical significance: ***$p < 0.01$, **$p < 0.05$, *$p < 0.10$, n.s. not significant

loneliness. Subsequently, for women voluntary NHA participation only has a strong direct effect on happiness (0.637). For men, involuntary NHA participation leads to more loneliness (instead to less loneliness as expected) and thus has a negative indirect effect on happiness. Further, we find that men do not show a direct effect on happiness neither for voluntary nor for involuntary participation.

Endogeneity Finally, we apply the same generated instruments approach as in *study one*. However, due to the small number of observations in the subsamples we can only account for endogeneity in the total sample. The results are reported in the Appendix (Fig. 7). When accounting for endogeneity the relationship between voluntary NHA participation and loneliness turns insignificant leaving only the direct effect on happiness in place.

Discussion

This section discusses the results of *study one* and *study two* in light of the hypotheses formulated above. Table 5 summarizes the hypotheses and the major results of both studies.

Table 5 Hypotheses and findings

Hypotheses	Explanation	Study one	Study two	Result
H1: $c_1 > (c_2, 0)$	Voluntarily participating people are happier	○	○	Confirmed
H2a: $a_1 > 0$	Voluntarily participating people are less lonely	○	Δ(T)	Confirmed
H2b: $a_2 > 0$	Involuntarily participating people are less lonely	Δ(w)	×(m)	Not confirmed
H3a: $a_1 * b > 0$	Indirect positive effect of voluntary NHA participation via loneliness on happiness	○	Δ(T)	Confirmed
H3b: $a_2 * b > 0$	Indirect positive effect of involuntary NHA participation via loneliness on happiness	Δ(w)	×(m)	Not confirmed

○ Completely confirmed for the total sample as well as for the male and female subsamples; ×(m) not confirmed, the male subsample even showed the opposite relationship; Δ(w) only partly confirmed for the female subsample; Δ(T) confirmed for the total sample, but not robust in the male and female subsamples

Hypothesis H1 (that voluntarily participating respondents are happier than people who are involuntarily or not participating in NHAs), was equally confirmed by both studies. Further H2a (that voluntarily participating respondents are less lonely than people who are involuntarily or not participating in NHAs) and H3a (that voluntary NHA participation has an indirect positive effect on happiness partly mediated by loneliness) were confirmed by both studies. However, *study two* could confirm H2a and H3a only for the total sample, but the finding was not robust in the male and female subsamples. Finally, H2b (that respondents involuntarily participating in NHA are less lonely than people who are not participating) and H3b (that involuntary NHA participation has an indirect positive effect on happiness partly mediated by loneliness) could not be confirmed. In *study one*, both H2b and H3b were only confirmed for the female subsample, but *study two* showed opposite results for the male subsample: here involuntary male NHA participants showed higher levels of loneliness and subsequently lower levels of happiness.

Comparing the results of *study one* and *study two* the most remarkable feature is that on the aggregate level—using the total sample—both studies confirm the same regression pathways. Compared to non-participation voluntary NHA participation positively effects happiness in two ways: directly as well as indirectly—mediated via lower levels of loneliness. Both paths are not confirmed for involuntary NHA participation which has no significantly different effects compared to non-participation. Remarkable is that these results are gained by two different studies, using differently sampled data with different measures of loneliness, NHA participation, and voluntariness.

Our conceptual model plausibly explains why not accounting for (a) voluntariness and (b) loneliness as mediator can lead to very different results when analyzing the happiness effects of NHA participation. When accounting for both factors a positive correlation between voluntary NHA participation and SWB can be found even in the case of Japan. This finding immediately raises two related issues.

Our analysis shows that the voluntariness of the participation in NHAs significantly influences the positive SWB effect usually associated with civic participation. However, the descriptive data presented in Table 1 (*study one*) and Table 3 (*study two*) indicate that about half of all NHA participants can be considered as participating involuntarily in the understanding that they are not completely free in their decision to engage in NHA. So, if voluntariness is considered to be a crucial component or necessary condition for civic participation, it seems questionable whether NHA membership is a good measure for civil society participation in the case of Japan. This further leads to the question whether our research findings are specific to Japan or whether they also have implications for research on civic participation on an international general scale.

To address both questions it is necessary to point out that although NHA participation in Japan is to some extend conducted involuntarily, because the activities are subject to social pressure, this does not imply coercion. Further, although we coded the voluntariness of the participation—for sake of simplicity—with dummy variables, social pressure is not a digital phenomenon either existent or not. It should be conceived as a continuum ranging from low to high levels of social

pressure. Japan's NHA might be a very prominent example for social pressure affecting group activities, but this is not a Japan-specific phenomenon. In many countries and societies a variety of social activities is exposed to social pressure (Pekkanen 2006, pp. 91–92). Consequently, research should analyze to what extent the positive association between civic participation and SWB is biased due to social pressure in other countries. Regarding the measurement of civil society participation in Japan NHA membership still can be used as a valid indicator as long as researchers keep in mind that NHA participation is subject to relatively higher levels of social pressure.

While the main objective of our research project was achieved, our results are less clear regarding the gender differences we were supposed to explore. Although we find significant differences in the regression paths between men and women, those differences do not converge in the two studies. In *study one* women—unlike men—do not show a direct effect of voluntary NHA participation on happiness. Conversely, for involuntary NHA participation they show a direct and an indirect effect (via loneliness) on happiness, while both are insignificant for men. *Study two* more or less yields the opposite results. Here, neither voluntary nor involuntary NHA participation has an indirect effect on happiness in the case of women. For men, however, only the negative indirect effect of involuntary NHA participation is significant. The stronger negative direct and indirect effect of involuntary NHA participation in the case of women could be explained by a gendered distribution of assignments within household units, a still common pattern within the Japanese society. Wives—married to husbands in fulltime employment with long overtime working hours who cannot participate themselves—might struggle to balance many tasks such as household chores, childcare and caretaking of elder family members next to own employment, and it is imaginable that the impact of social pressure to participate in NHA over and above all these obligations is highly negative. On the other hand, it can be assumed that participation of male members becomes more likely when they are self-employed or retired and can use their time in a more flexible way. As such, the context of voluntary and involuntary participation for men would be different. However, as this does not yet explain the converse findings of *study two*, this calls for further research to explain voluntary and involuntary NHA participation with regard to gender.

In a similar vein the endogeneity tests yield different results for both studies. While in *study one* the direct effect of voluntary NHA participation loses its significance when accounting for endogeneity, in *study two* the indirect effect (via loneliness) is rendered insignificant.

The bottom line of these diverging findings is that both (a) gender differences and (b) endogeneity of NHA participation should be subject to further research. Although both studies yield similar results on an aggregate level, the differences in the subsamples indicate that different measures and sample schemes have a sizable impact on the results.

Conclusion

The starting point of this research project was the apparent discrepancy between the theoretical and empirical literature which suggested a strong positive correlation between NHA and SWB, and recent findings on Japan which could not validate this result. This study shows how those diverging results can be explained by including two factors in the analysis: the voluntariness of the action as well as loneliness as a mediating variable. Using linear regression models on data from two different studies, we found that—even in the case of Japan—voluntary participation in NHAs is positively associated with SWB in two ways: directly and indirectly mediated by loneliness. This result is robust to differently sampled data and different measures of our key variables. Although significant gender differences are reported in both studies, their results do not converge. While we established a valid conceptual model for the analysis of civic participation in general, our results suggest that further research is needed to better identify gender differences and causal pathways between NHA participation, loneliness, and happiness.

Acknowledgments We are grateful to the Cabinet Office of the Government of Japan for providing us with the raw data of the National Survey on Lifestyle Preferences 2011. This project on neighborhood associations in Japan would not have been possible without the generous support of the German Institute for Japanese Studies (DIJ). Any errors or opinions are ours alone.

Appendix

See Tables 6, 7, 8, and 9 and Figs. 6, 7.

Table 6 Mediation model of the female subsample, NSLP 2011 (*study one*)

NSLP 2011 Women	(1)	(2)	(3)		
	Happiness OLS	Loneliness OLS	Happiness SUREG		
Variables	Direct	Direct	Direct	Indirect	Total
Voluntary participation	0.247*	−0.194***	0.059	0.172***	0.230*
	(0.139)	(0.061)	(0.126)	(0.054)	(0.136)
Involuntary participation	−0.268**	−0.128**	−0.375***	0.113**	−0.261**
	(0.130)	(0.058)	(0.118)	(0.050)	(0.128)
Not participating in NHA	Reference group				
Loneliness			−0.880***		
			(0.055)		
Controls	Yes	Yes	Yes	Yes	Yes
Observations	1,475	1,449	1,447	1,447	1,447
R^2	0.154	0.076			

Standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

Table 7 Mediation model of the male subsample, NSLP 2011 (*study one*)

NSLP 2011 Men	(1)	(2)	(3)		
	Happiness OLS	Loneliness OLS	Happiness SUREG		
Variables	Direct	Direct	Direct	Indirect	Total
Voluntary participation	0.424***	−0.244***	0.238*	0.167***	0.404***
	(0.140)	(0.065)	(0.132)	(0.045)	(0.138)
Involuntary participation	0.081	0.028	0.080	−0.019	0.061
	(0.143)	(0.066)	(0.134)	(0.044)	(0.141)
Not participating in NHA	Reference group				
Loneliness			−0.685***		
			(0.055)		
Controls	Yes	Yes	Yes	Yes	Yes
Observations	1,436	1,411	1,409	1,409	1,409
R^2	0.190	0.083			

Standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

Table 8 Mediation model of the female subsample, DIJS 2013 (*study two*)

DIJS 2013 Women	(1)	(2)	(3)		
	Happiness OLS	Loneliness OLS	Happiness SUREG		
Variables	Direct	Direct	Direct	Indirect	Total
Voluntary participation	0.770***	−0.160	0.637***	0.133	0.770***
	(0.225)	(0.120)	(0.190)	(0.094)	(0.212)
Involuntary participation	0.125	−0.009	0.118	0.007	0.125
	(0.191)	(0.102)	(0.162)	(0.080)	(0.180)
Not participating in NHA	Reference group				
Loneliness			−0.828***		
			(0.066)		
Controls	Yes	Yes	Yes	Yes	Yes
Observations	641	641	641	641	641
R^2	0.202	0.160			

Standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

Table 9 Mediation model of the male subsample, DIJS 2013 (*study two*)

DIJS 2013 Men	(1)	(2)	(3)		
	Happiness OLS	Loneliness OLS	Happiness SUREG		
Variables	Direct	Direct	Direct	Indirect	Total
Voluntary participation	0.340*	−0.094	0.247	0.093	0.340*
	(0.200)	(0.102)	(0.164)	(0.096)	(0.189)
Involuntary participation	−0.071	0.199*	0.127	−0.197**	−0.071
	(0.203)	(0.104)	(0.167)	(0.098)	(0.193)
Not participating in NHA	Reference group				
Loneliness			−0.990***		
			(0.064)		
Controls	Yes	Yes	Yes	Yes	Yes
Observations	705	705	705	705	705
R^2	0.243	0.220			

Standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

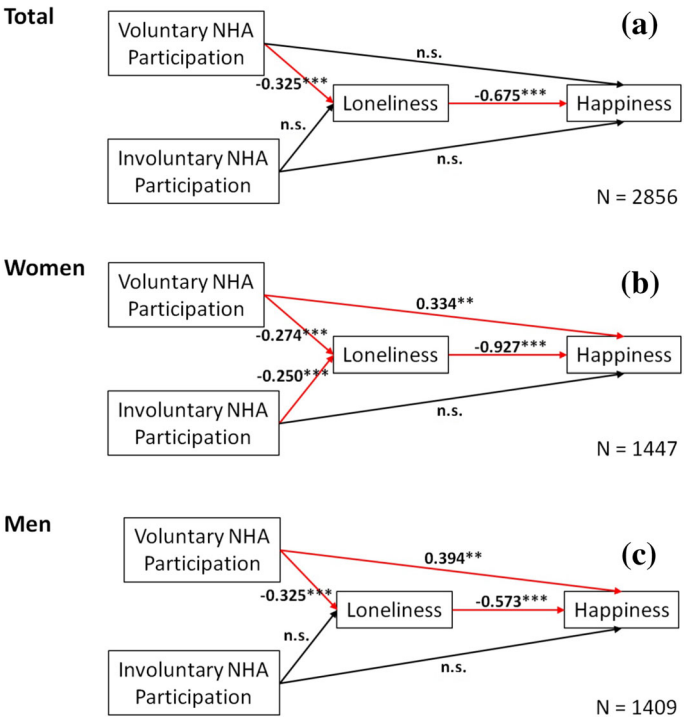

Fig. 6 Mediation model with endogeneity corrected coefficients, NSPL 2011 (*study one*). Levels of statistical significance: ***$p < 0.01$, **$p < 0.05$, *$p < 0.10$, n.s. not significant

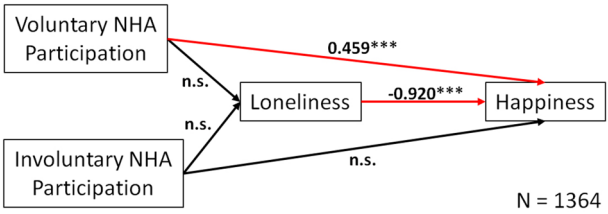

Fig. 7 Mediation model with endogeneity corrected coefficients, DIJS 2013 (*study two*). Levels of statistical significance: ***$p < 0.01$, **$p < 0.05$, *$p < 0.10$, n.s. not significant

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