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Position Paper

Crime prevention through community empowerment: An empirical study of social capital in Kyoto, Japan

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ABSTRACT

Crime prevention activities led by neighborhood associations are common throughout Japan and exemplify the idea in environmental criminology that communities can be kept safe by residents themselves. In this study, we surveyed neighborhood associations in Kyoto to test a theoretical model for social capital and community based crime prevention that we developed as part of our earlier work in Kobe. Structural Equation Modeling (SEM) based on survey data and police records for street crimes and residential burglary suggest that specific efforts by community residents can enrich social capital and lead to community safety and security both subjectively and objectively. Social capital had a significant effect on the reduction of street crime, although not for burglary, and our findings suggest that social capital reduces the fear of crime and increases a sense well-being for families and seniors. Although these well-being measures are subjective, emotional change is important in a context where there is no association between actual crime rates and fear of crime. Our research may offer practical insights for the development of universal methodologies that can contribute to the prevention of crime and sense of security through community empowerment.

1. Introduction

The field of study dubbed by Paul J. and Patricia L. Brantingham as 'environmental criminology' assumes that "criminal events must be understood as confluences of offenders, victims or criminal targets, and laws in specific settings at particular times and places (Brantingham and Brantingham, 1991)." Understanding crime as a product of environment naturally suggests that crime may be prevented and controlled. Paul Brantingham and Frederic Faust compare this idea to immunology and public health (Brantingham and Faust, 1976). Primary prevention aims to prevent disease or injury from occurring by maintaining a healthier population and avoiding unhealthy behavior. Secondary prevention aims to reduce the impact of a disease or injury by treating it as soon as possible, and tertiary prevention aims to soften the impact of an ongoing illness or injury through rehabilitation and livelihood support. From a criminology perspective then, primary prevention aims to prevent crime from occurring by creating and maintaining safe environments, secondary prevention aims to address incivilities and deviances before they lead to criminal activities, and tertiary prevention aims to rehabilitate offenders through punishment, correction, probation, parole, and community support.

In this article, we focus on the idea of primary prevention in the form of community empowerment through neighborhood associations. Specifically, we investigate the plausibility of a universal model for community based crime prevention by testing findings from our empirical studies of neighborhood associations in Kobe and Kyoto. After providing some background on

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neighborhood associations in Japan, we present a literature review of social capital and crime prevention theory and describe findings from our ten year research project in Kobe on how social capital and community empowerment relate to prevention of crime and a sense of security. We then compare these findings against similar survey data we gathered in Kyoto in 2015 and conclude with a discussion on applications in practice.

2. Neighborhood associations in Japan

In Japan, neighborhood associations are called *chonaikai* (町内会) or *jichikai* (自治会). In Japanese, *chonaikai* (町内) means 'inside community,' *jichi* (自治) means 'autonomy,' and kai (会) means association. The origins of these associations reach back 1000 years ago to collectives called *yui* (結), in which members helped each other with agricultural work. The role of the *yui* evolved to help members negotiate advantageous agreements with feudal lieges, and such associations came to be called *sou* (惣). As towns developed over the centuries, tradesmen and craftsmen began to organize locally in *cho* (町) protect themselves from meaningless violence from samurai or uprisings by farmers. The *cho* then became a local administrative unit that the government used to its benefit for the collection of taxes and military conscription during the Azuchi-Momoyama (1573–1603) and Edo (1603–1868) periods. Likewise, *chonaikai* (町内会) and *jichikai* (自治会) were formalized and used by the military government leading up to World War II. They also played important roles in everyday life as well and served as the social foundation for marriages,[1] funerals and many other kinds of ceremonies and annual events.[2] Although *chonaikai* and *jichikai* were dismantled by the GHQ after World War II, residents retained their associations and simply used other names such as the Japan Red Cross Voluntary Group, Education Association, or Cultural Affairs Committee. *Chonaikai* and *jichikai* were allowed again after the Potsdam Declaration, but their connection with local government was weakened (Iwasaki et al., 1989).

Today, *chonaikai* in urban areas are organized from several *kumi* (組) or *han* (班) which contain five to ten households. There are several *chonaikai* inside each elementary school district and they generally organize into *rengo-chonaikai* (連合町内会) or *rengo-jichikai* (連合自治会) (Fig. 1). Usually the *rengo-chonaikai* is equivalent to the area covered by the local elementary school district. The elementary school district is the primary unit for community activities such as intersectional games, and the local elementary school is usually the emergency evacuation site designated by the municipal government for residents in the school district. For these reasons, Japanese people generally identify their community as their elementary school district (Hayashi, 2005).

Rengo-chonaikai manage most community activities such as annual festivals, community care for elders and children, community *bosai* (防災) disaster reduction and mitigation, and community *bohan* (防犯) crime prevention. The vitality and organization of *chonaikai* varies considerably from one region to another, but usually the *rengo-chonaikai* consists of a leader and sub leader, and sub groups for women *fujinkai* (婦人会), safety and security, environmental health, youth, and so on. The *fujinkai* watches over elders and children under the local welfare commissioners, the safety and security group patrols the community for crime and fire prevention and manages emergency evacuation drills, the environmental health group conducts cleanup activities with residents, and youth groups take charge of physical work and play active roles in community events and festivals. Committee members usually serve one or two years.

Participation in the neighborhood association is arbitrary. Participation rates have declined year by year because of the declining birthrate and aging society in Japan. The board members of neighborhood associations are usually elder men in their 60s and 70s. Spurred by high economic growth, most people now work in urban areas and commute from cities and towns that they do not spend much time in. Younger, working generations have little connection to the neighborhoods in which they live. In the past, this problem was covered by young housewives who were expected to join the local *fujinkai* and support community activities. Recently, however, the *fujinkai* has become much smaller and less significant as younger generations are forced to work to maintain household budgets.

Another problem contributing to declining membership is the impression among younger generations that the burdens outweigh the benefits. Members must pay dues (to cover basic operational cost for association) and may sometimes be required to staff community events and festivals. They might also have to serve as a committee member or group leader, which entails a significant commitment of time and energy especially as local government assign more and more social welfare and risk management tasks to neighborhood associations. For example, a city's urban policy division may ask the neighborhood association to conduct more children's safety patrols while the crisis management and disaster prevention division may ask the neighborhood association to conduct programs for disaster prevention and mitigation. The same group of people in the neighborhood associations tends to take on the burden of these responsibilities. Many younger people also do not want to have to socialize with neighbors, especially association members. Some associations are in fact very exclusive and keep new residents out and call them strangers. Some associations even ask for membership fees as high as USD2,000.[3] On the other side of the coin, association members see non-members as freeloaders who do not appreciate what the neighborhood association does for the community. In Kobe, for example, association members keep

[1] Marriage and wedding customs are changing and many Japanese couples choose to celebrate in wedding halls, churches or shrines. Not too long ago, however, weddings were held in the home of the bride or groom, and the marriage was not so much a union between man and wife, but a union between *ie* (家), or families. Feudalism (Japanese Feudalism is not same as European Feudalism and discussions are still continuing on the timing and type of establishment) and Confucianism culture dictated that marriages be arranged by parents, relatives and landlords. Landlords were expected to watch over young residents as parents. These ideas have weakened but some customs still remain.

[2] There are many types of annual events in Japanese community and their derivation, style, and timing are varied by region and those details are beyond the objective of this article. The main point in here is these events run by Chonaikai and Jichikai.

[3] In some associations, especially in rural areas where most old residents are farmers, members pay for construction and maintenance of roads, ditches and other infrastructure over many years. In the interest of fairness, the association wants new residents to bear reasonably equivalent expenses. New residents, however, do not understand why the association considers USD 2000 to be a reasonable fee.

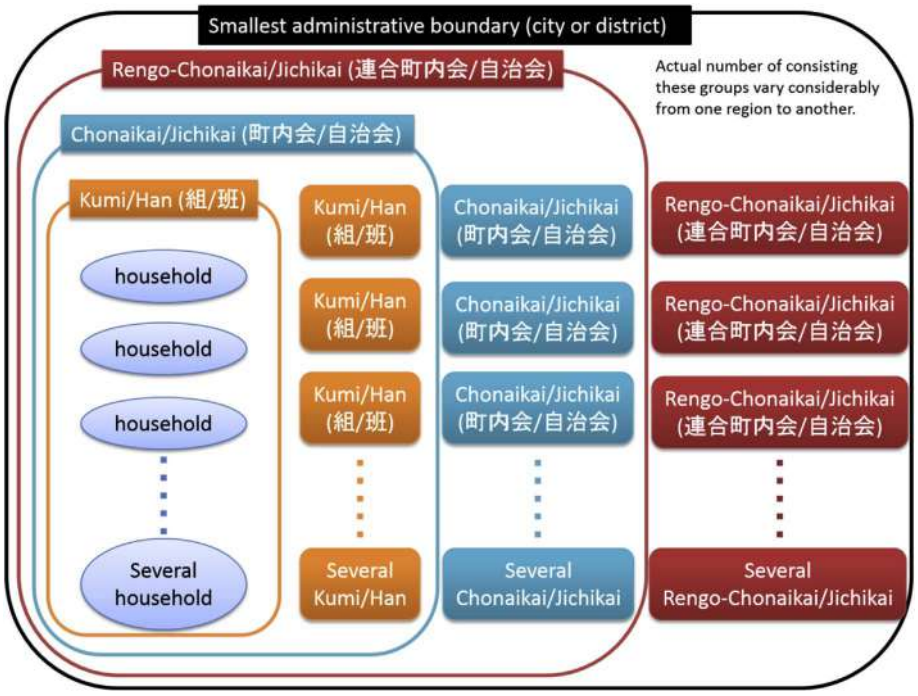

Fig. 1. Usual framing of *Rengo-jichikai/Rengo-chonaikai*.

neighborhood garbage disposal stations clean, install CCTVs, and conduct safety patrols.

3. Environmental criminology and social capital

In *The Death and Life of Great American Cities*, Jane Jacobs argues that public peace is "kept primarily by an intricate, almost unconscious, network of voluntary controls and standards among the people themselves, and enforced by the people themselves (Jacobs, 1971: 32)." The idea is that crime can be prevented by creating environments in which residents both consciously and subconsciously participate in local social networks. Jacobs' book was a catalyst for a number of subsequent theories on how to prevent crime. Two of the earliest and most influential theories focused on the physical design of living environments: criminologist C. Ray Jeffery's crime prevention through environmental design (CPTED) in 1971 and architect Oscar Newman's defensible space in 1972.[4] Newman proposed that neighborhoods should be designed to support self-help in the maintenance of security. That is, he argued that neighborhoods should address the elements of 1) territoriality, 2) natural surveillance, 3) image, and 4) milieu to enable residents to be the main actors in ensuring the safety of their community. In a related vein, Ronald V. Clarke proposed a theory of situational crime prevention and implementation of "opportunity-reducing measures that (1) are directed at highly specific forms of crime, (2) involve the management, design or manipulation of the immediate environment in as systematic and permanent way as possible, (3) make crime more difficult and risky, or less rewarding and excusable as judged by a wide range of offenders (Clarke, 1997: 4)." The most popularly recognized idea on crime prevention, however, is the 'broken windows' theory, in which James Q. Wilson and George L. Kelling argue that neglecting incivilities such as graffiti-covered walls, underage smoking, and bad manners will weaken informal control by residents and increase opportunities for criminal activities (1982). The theory shot to public fame when Kelling became an advisor to New York City law enforcement operations under Mayor Rudolph William Louis "Rudy" Giuliani III. Giuliani conducted a Zero Tolerance policing policy based on broken windows theory and credited it with a successful reduction in the number of crimes in the city. This success, however, was arguably attributable also to increased budgets and numbers of police officers as well as job assistance programs. Other cities that did not have Zero Tolerance policing policies also experienced crime reductions that were attributed to the Rockefeller Drug Laws and fewer young men aged between sixteen and twenty-four years old.

The majority of these theories tended to focus on the physical aspects of environment and deviated from Jacobs' original argument that community safety and security are dependent on networks of residents. In *Bowling Alone* (2000), however, Robert D. Putnam reformulated Jacobs' 'networks' as 'social capital[5]' or the "connections among individuals – social networks and the norms of

[4] In Japan, CPTED is used to refer to 'defensible space.'

[5] Social capital redefines older sociological concepts such as 'solidarity' by Durkheim (1897) and 'weak ties' by Granovetter (1973) that identify the social ties between persons as the yarn from which larger society is spun, and connects them to Bourdieu's (1983/1986) idea that social ties can be converted into currency for personal benefit. There are two types of social capital: individual goods, which benefit only the person with specific social ties (e.g. connections), and collective goods, which benefit all members belonging to a particular group. Collective goods are important for community crime prevention because all residents can reap the benefits

reciprocity and trustworthiness that arise from them." He presented empirical findings that "high levels of social capital, all else being equal, translate into lower levels of crime" (Putnam, 2000: 308). Other similar studies have concluded that social capital has a significant effect on homicide rates with no effect from variables such as unemployment rate and population age composition (Rosenfeld et al., 2001), that cohesion and shared expectations of the wider community lower the rate of crime and disorder (Sampson et al., 1997), and that strong community networks reduce the potential for violent crime by helping young people to acquire a sense of status and self-esteem (Kawachi et al., 1999). In Japan, a number of studies on the relationship between social capital and crime were conducted after the launch of a Cabinet Office project on social capital and enrichment of life in 2002 (Cabinet Office, 2002). Ishida identified three types of social capital – bonding, bridging and linking – and found that the perception of crime risk was increased by bonding and bridging but reduced by linking (Ishida, 2009). In regard to crime victimization, Takagi et al. (2012) conducted a survey in a residential ward in Tokyo and found an inverse association with social capital according to the Spatial Durbin Model but no significant relationship according to multilevel regression analysis.

4. Community based crime prevention in Kobe

We studied the relationship between social capital and community safety and security in the context of Kobe over a period spanning more than ten years. Our starting point was a follow-up to a 2004 study by the city of Kobe on community recovery and '*machi-zukuri*'[6] after the Great Hanshin-Awaji Earthquake of 1995. The city conducted a total of thirty-six grass-roots workshops with earthquake survivors and identified autonomy, solidarity and five other critical elements for life recovery from disaster. At around this time in the early 2000s, some government officers and professionals had taken interest in the applicability of Putnam's social capital theory to Japan, but there was still very little notion of how social capital could be nurtured in neighborhood communities.[7] A study group consisting of local government officers, civilians, university students, business operators and academic experts was established to examine nine case studies of community activity. Since social capital was not a familiar concept outside of academia, the study group began by discussing measures of social capital and ways to enhance it. In summary, they concluded that having rich social capital means that people have learned to take care of, trust, help and become involved in the lives of others through the gradual development of relationships and friendships, and that social capital can be enhanced through eight specific types of activities: 1) interest in and attachment to community, 2) greetings, 3) events, 4) involvement of children, 5) participation of various residents, 6) resolving problems held in common, 7) support of public administration and 8) community governance (Tatsuki, 2007).

Based on these conclusions, Tatsuki (2008) used data from the 2007 Kobe City Neighborhood and Tenants Association Survey to construct a theoretical model on the impact that social capital enrichment factors and social capital amount have on community incivility, crime risk perception, insecurity, and incidents of arson. Community incivility is a broken window concept referring to the level of graffiti, juvenile loitering, littering, and other breaches of public order. Perception of risk refers to the subjective perception of the risk of becoming a victim of some kind of crime, while insecurity refers to the subjective fear of crime. As a result of structural equation model (SEM) analysis, the eight social capital-enhancing factors were consolidated into five factors: 1) diversity of resident participation, 2) community events, 3) community governance, 4) interest in and attachment to community and 5) greetings. The model explains how these five factors affect the amount of social capital, how the amount of social capital affects incivility, and how incivility influences the number of arson incidents, crime risk, and fear for crime (Fig. 2). It shows how efforts by community residents or activity groups to increase the five social capital-enhancing factors will enrich community social capital and lead to community safety and security both subjectively and objectively.

Matsukawa and Tatsuki (2011a) then conducted SEM to test this Tatsuki (2008) model using 2007, 2008 and 2010 data from the Kobe City Neighborhood and Tenants Association Survey, arson data from 1996 to 2009, and larceny data from 2006 to 2009. Results confirmed the stability and reproducibility of the model and newly revealed a direct effect from social capital to criminal record (Fig. 3).

Since these results were somewhat complicated, however, Matsukawa and Tatsuki used simultaneous multi-sample analysis to re-test the Tatsuki (2008) model with the same obtained data (2011b). The model became more stable and the identified causal coefficients were found to be identical across the three separate year samples, suggesting that they were very accurate estimates for future intervention planning (Fig. 4).

5. Community based crime prevention in Kyoto

To test our findings from Kobe, we now shift the context to Kyoto. Based on survey data, we attempt to identify the origins of social capital, measure the amount of social capital in the community, and determine the products of that social capital. Our purpose

(*footnote continued*)

of a safe community. Nan Lin (2001) has cautioned against mixing up individual and collective social capital and Alejandro Portes (1998, 2000) argues that social capital studies should take care to 1) define the concept both theoretically and empirically to avoid tautology, 2) establish some controls for directionality between social capital enrichment factor and social capital itself, 3) control for the presence of other factors and 4) identify the historical origins of community social capital in a systematic manner.

[6] *Machi-zukuri* (まちづくり) literally means 'create town' and is sometimes translated as urban design, community/neighborhood planning, or community development. It essentially means grass-roots democratic activities to improve neighborhood communities. The city of Kobe cited three important aims: 1. enhancement of regional strength through collaboration and participation in community development, 2. development of sustainable and comprehensive methods of town planning based on individual specific tasks, and 3. support of social capital through horizontal and open networks.

[7] At the time, most empirical studies of social capital used macro data at the city or prefectural level.

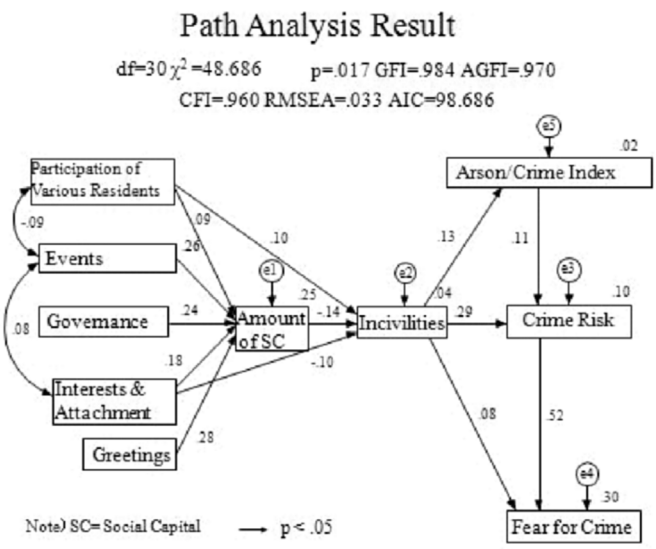

Fig. 2. SEM result from Tatsuki (2008).

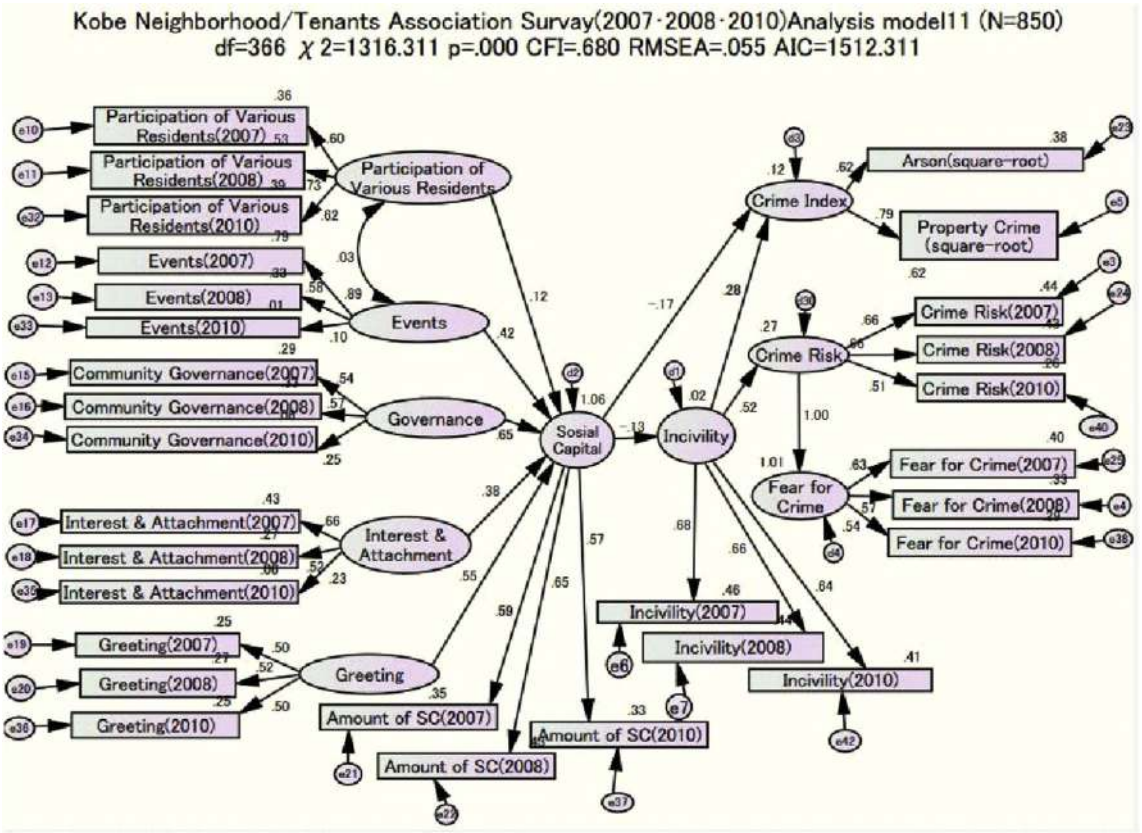

Fig. 3. SEM result from Matsukawa and Tatsuki (2011a).

is to confirm the repeatability of the Kobe social capital model (2008) and thereby propose useful methodologies for community empowerment that may be applied across cities with different characteristics. Although our previous studies used zip code area as a unit of analysis, in this study we chose to use elementary school district area, specifically *moto gakku*, since most communities in Japan are organized by associations within school districts.

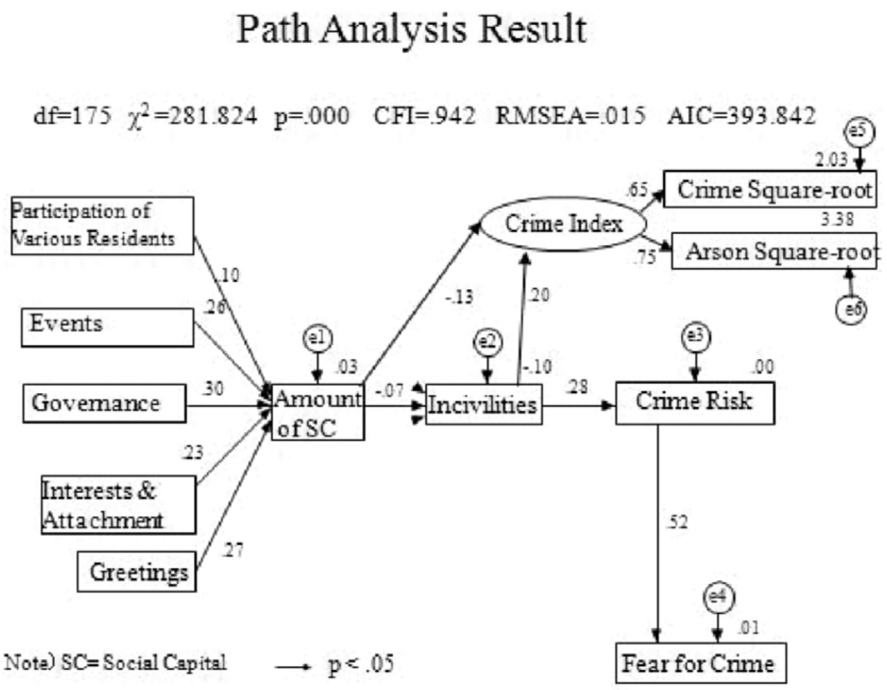

Fig. 4. SEM result from Matsukawa and Tatsuki (2011b).

5.1. Target area

Kyoto was the ancient capital of Japan for over 1000 years and, having escaped air raids during World War II, it has retained many of its old neighborhoods, temples, shrines, streets,[8] and other physical characteristics. The Old Kyoto area is called Rakunai (洛内) while other parts of Kyoto are referred to as Rakugai (洛外).[9] The Rakunai area is special because the *chonaikai* have long histories and are very autonomous and well-funded. They are active in carrying out the annual Gion festival[10] and many residents are involved in traditional crafts such as nishijin-brocade[11] and kiyomizu-ware.[12] The smallest unit of community is a kind of *chonaikai* called *ryogawacho* (両側町), which literally means neighborhood on both sides of the street. In the Rakunai area, the oldest and smallest *ryogawacho* consist of about 20 households across the street from each other. The *chonaikai* also group together in larger community associations based on elementary school districts, as is the case in most of Japan. Aging populations and a diminishing number of children has caused many elementary school districts to merge, but in Kyoto, especially in the Rakunai area, the old elementary school districts (*moto gakku* (元学区)) have been retained as the basis for community associations.[13] Kyoto is also unique in that 10 percent of residents are students. With twenty-six colleges and universities in the city, Kyoto is second only to Tokyo in the number of higher education institutions (94 colleges and universities in Tokyo's 23 wards).

5.2. Data

We relied on survey data from the 2015 Neighborhood Association Survey of Kyoto. Of all 6,524 *chonaikai* in Kyoto, responses

[8] Streets in Kyoto follow a beautiful grid pattern that is broken up by winding side streets around temples and shrines. Although Kyoto has neighborhood (cho) names just like other cities in Japan, addresses have traditionally always been based on the nearest street intersection rather than on the name of the neighborhood (cho) and plot and building number (usually determined by order of construction). For example, the address of Doshisha University in Kyoto is Imadegawa-dori Kawasuma Higashi-iru (今出川通烏丸東入ル). Imadegawai and Karasuma are the names of the intersecting streets, and Higashi-iru means 'go east' from the intersection. 'Agaru (上ル)' means 'go up' (north) and 'sagaru (下ル)' means 'go down' (south).

[9] In the modern administration of Kyoto, Rakunai consists of the Kamigyo (上京区) and Nakagyo (中京区) districts. The rest of Kyoto is divided into nine other administrative districts.

[10] The Gion festival is one of the most famous festivals in Japan. It goes for the entire month of July and is crowned by a parade, the *Yamaboko Junkō* (山鉾巡行) on July 17 and July 24. It originated as a purification ritual called *goryo-e* (御霊会) during the ninth century to appease the gods that caused plague and pestilence, the eruption of Mount Fuji in 864 and the Jogan (Sanriku) earthquake in 869. It has been an annual event ever since 970.

[11] Nisijin-brocade (*Nishijin-ori*) is a traditional textile produced in the Nishijin (西陣) district of Kamigyō-ku in Kyoto, Japan. It was started around the end of the fifth century. Nishijin-ori uses many different types of colored yarns, weaving them together into decorative designs. Twelve techniques were designated as Traditional Craft of Japan.

[12] Kiyomizu-ware is a type of Kyō ware traditionally from the Gojōzaka (五条坂) district near Kiyomizu Temple in Kyoto. It started around the 16th century and is now almost synonymous with kyo-ware since other types have died out.

[13] Local elementary schools that have been officially closed down are actually still used or rented out by residents, many of whom have contributed to funding construction and maintenance of facilities.

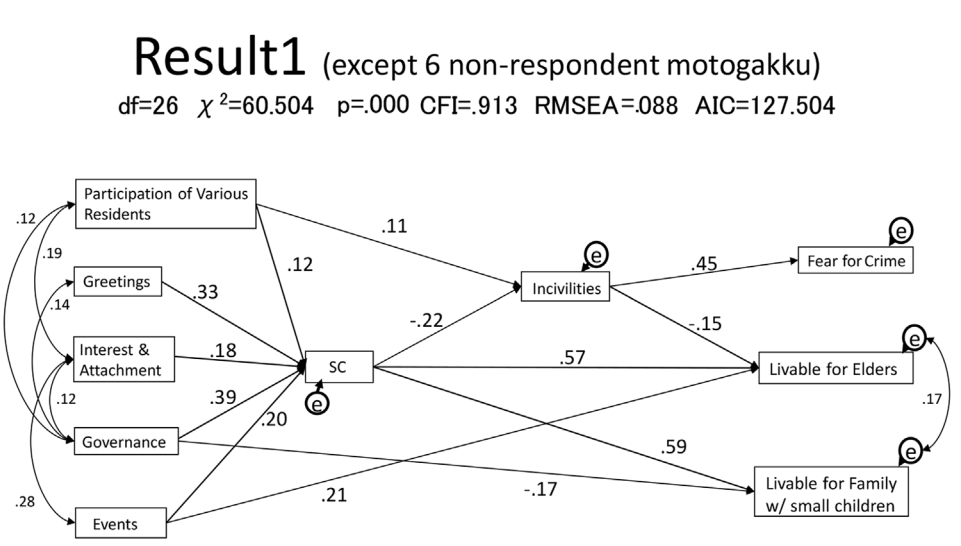

Fig. 5. Kyoto model.

were collected from the leaders of 3,025 *chonaikai*. The collection rate of 46.4% is very high compared to other social surveys in Japan, which recently average around 30%. The 2015 Neighborhood and Tenants Association Survey of Kyoto consisted of 48 questions divided into seven measures: 1) relationship between neighborhood associations and apartment complex residents (6 items), 2) social capital enrichment factors (diversity of resident participation, community events, community governance, interest in and attachment to community, and greetings; 16 items), 3) amount of social capital (8 items), 4) community incivility (6 items), 5) fear of crime (4 items), 6) family friendly community (4 items) and 7) senior friendly community (4 items).

Crime data was drawn from Kyoto Police records on eleven types of street crime in 2014 and 2015 (robbery, extortion, indecency assault, vandalism, motor vehicle theft, motorcycle theft, bicycle theft, snatching, vehicle load theft, vehicle parts theft, and vending machine theft) and three types of burglary theft in 2015 (break-in while resident is absent, sleeping, or unaware).

5.3. Discussion

We quantified variables from the 2015 Neighborhood and Tenants Association Survey using principal component analysis, factor analysis and optimal scaling. We then conducted Structural Equation Modeling (SEM) analysis to analyze those variables in combination with crime data. We also conducted correspondence (dual scaling) analysis and cluster analysis using SPSS ver.24 and Amos ver.24 by IBM to analyze the relationship between neighborhood associations and apartment complex residents.

5.3.1. Repeatability of the social capital model (SEM analysis)

SEM analysis using social capital variables from the survey confirmed the repeatability of the social capital model from our previous studies. The results, which we refer to as the Kyoto Model (Fig. 5 below), indicate that 1) the five community empowerment factors enhance social capital, and that 2) social capital has a significant impact on community livability in terms of reducing fear of crime and increasing perceptions of family and senior friendliness.

There were a number of differences between the results of this study and our previous studies. This is due partly to our inability to perform multi-level analysis, since the Kyoto survey was conducted only once in 2014, as well as the fact that we added new items that were not included in our Kobe survey. One difference is that in Matsukawa and Tatsuki (2011b), collective goods had a significant effect on crime rate and fear of crime while individual goods had no significant effect. We plan to confirm these results based on a second Kyoto survey (amended with a few new questions) planned for 2016 or 2017. A second difference is that this study shows that community incivility is a dependent variable of social capital. This confirms our initial basic model but contradicts findings in Matsukawa and Tatsuki (2011b) that social capital and community incivility are independent. It is possible that our results in this study are more stable than our results from Matsukawa and Tatsuki (2011b). Finally, our addition of variables for family friendliness and senior friendliness expanded the results of social capital. Social capital affects crime prevention objectively and reduces fear of crime, and at the same time makes the community more comfortable for socially vulnerable people such as elders and children.

5.3.2. Clustering by dual scaling and SEM analysis

Our next step was to conduct dual scaling analysis using the variables of the relationship between neighborhood associations and apartment complex residents. There were three questions: 1) Are there apartment complexes in your area? (1. None; 2. I represent a tenant association; 3. Rental apartments; 4. Condominium apartments; 5. Both apartments and condominiums), 2) Have apartment residents joined your association? (1. Every resident must join; 2. Some residents join voluntarily; 3. No one has joined but some residents participate our activities; 4. Residents pay the membership fee but do not participate; 5. No relationship), and 3) What is your opinion about cooperation with apartment residents? (1. We cooperate with each other, 2. Some board members cooperate, 3.

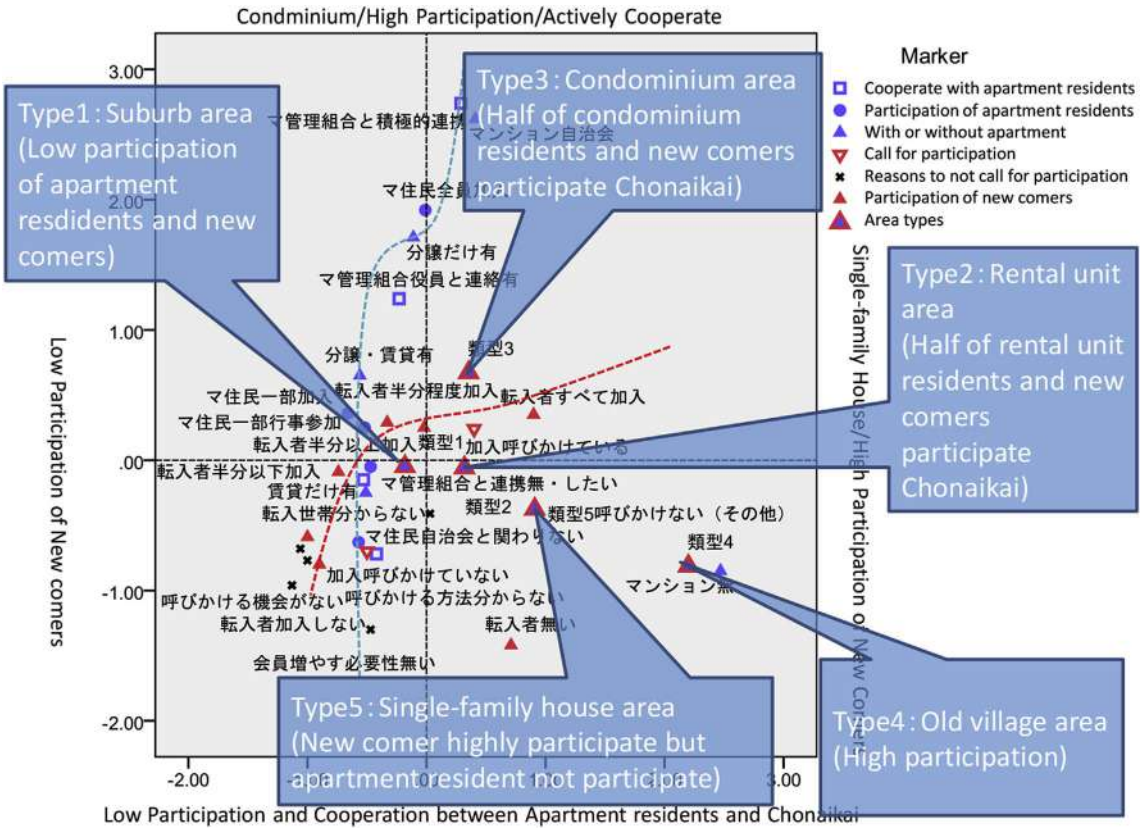

Fig. 6. Result of dual scaling.

We will cooperate if there is an opportunity in the future, 4. Unnecessary).

The results of dual scaling are shown in Fig. 6 and the map in Fig. 7 shows 222 *moto gakku* separated into the clusters. Results of correspondence analysis show two axes to clustering and five clusters among the 222 *moto gakku*. The x-axis shows household size and the degree of new resident membership in community associations. The y-axis shows condominium versus rented apartment and the degree of cooperation with apartment residents. The first quadrant has more condominium apartments than rented apartment for single households, and the neighborhood association tries to invite new residents to community activities and there is cooperation with apartment residents. The second quadrant has more condominium apartments than rented apartments for family households, and while there is some cooperation with apartment residents, new residents are not invited to join activities. The third quadrant has more rented apartments for family households and there is no cooperation with neighborhood associations and it is difficult to invite new residents to join community activities. The fourth quadrant has more rented apartment for single households, and the neighborhood association attempts to invite new residents to participate, but there is no cooperation.

In the first cluster, which we call the “student area,” there are many rental apartments and heavy resident turnover. The membership rate of the neighborhood association among new residents and apartment residents is low. In the map, first cluster *moto gakku* are in the area close to large universities such as Doshisha University, Kyoto University and Ritsumeikan University. This implies that first cluster areas are not actual residential areas and that most of the residents in those areas are university students. Most of the apartments in those areas are for single use and have very low rents. The low neighborhood association membership rate is probably due to the fact that most university students usually plan to leave Kyoto after four years of study to get jobs in their hometowns or urban areas like Osaka or Tokyo.

In the second cluster, or the “old residential areas,” there are many rental apartments, but half of the new residents and apartment residents are members of their neighborhood association. In the map, second cluster areas are gathered in the center of the city as well as in the suburbs, close to the railroads and stations. The fact that most residents live in rented apartments but choose to participate in the neighborhood association suggests young or single households, not university students. More young, single people have been moving into older residential areas recently.

In the third cluster, or the “condominium area,” there are many condominium apartments, and about half of new residents and apartment residents are members of the neighborhood association. These areas were redeveloped with new tower condominiums aimed at households with children. The fourth cluster, or “rural area,” consists of old rural areas scattered across mountains framing the northern part of Kyoto. Neighborhood association membership rates are high and the degree of commitment to community activities is high as well. Finally, the fifth cluster, or “detached houses area,” consists of residential areas with many detached houses,

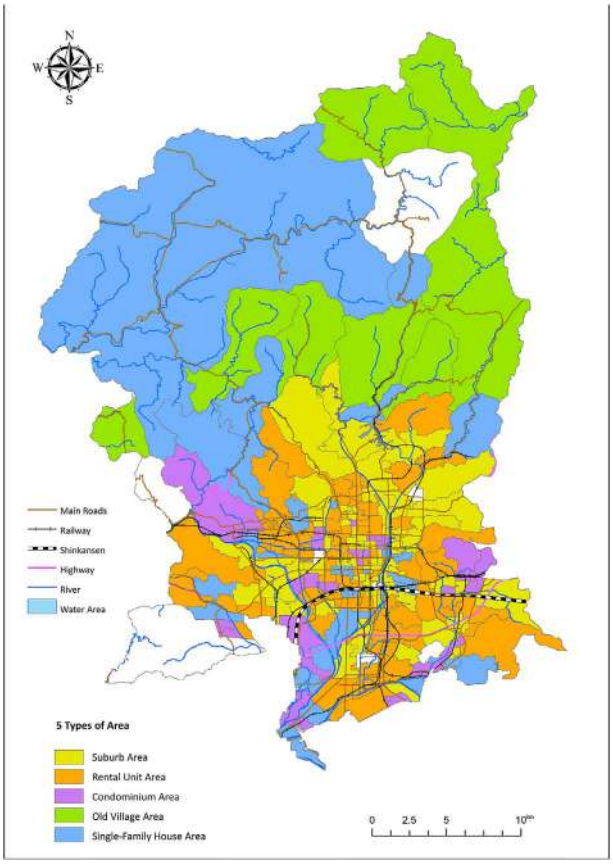

Fig. 7. Map of clustering analysis result.

mainly at the edge of Kyoto. Almost half of the new residents are neighborhood association members, but apartment residents have low commitment to community activities.

We next conducted SEM analysis and added the x-axis and y-axis as the two variables to represent community characteristics in the Kyoto model (Fig. 8). The x-axis variable shows high condominium rate, high neighborhood association membership rate, and high commitment of apartment residents to the neighborhood association. The y-axis variable shows high detached houses rate and high neighborhood association membership rates for new residents. Results indicate that the x-axis variable increases 'community

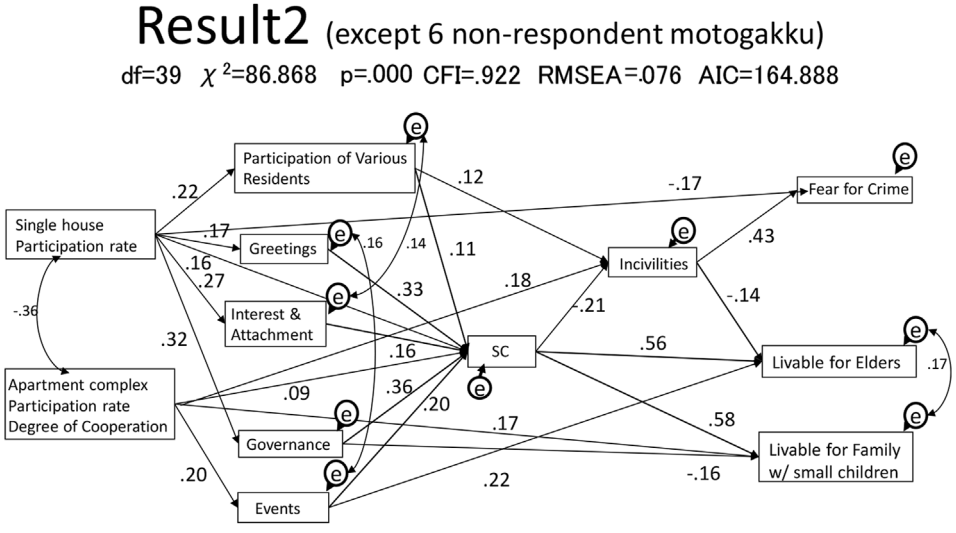

Fig. 8. SEM Result of Added x & y-axis variables.

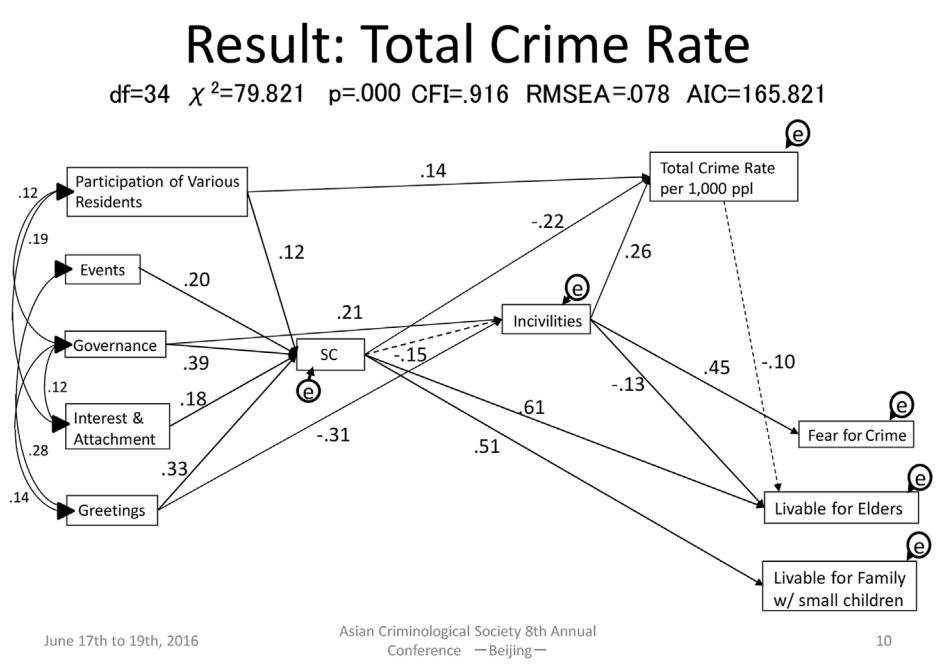

Fig. 9. Crime total.

events,' 'community incivility,' and 'comfort for families with small children.' The y-axis variable increases 'diversity of residents' participation', 'community governance, 'interest in and attachment to community,' 'greetings,' and directly decreases 'fear of crime.' This suggests that areas with many long term residents should continue current efforts to make their communities more livable. On the other hand, areas populated with apartment residents should try to desterilize community events to encourage apartment residents to commit to community activities. There is potential for membership and participation in the neighborhood association among families with small children who are living in apartments.

5.3.3. Types of crime (SEM analysis)

We next added crime data to the Kyoto model and conducted SEM analysis (Fig. 9 through Fig. 11). Results (Fig. 9) suggest that social capital has a direct effect on decrease in total crime rate (the total number of street crimes and burglary theft per 1000 people). When street crime and burglary theft were tested separately, however, results show that social capital has a direct effect on reduction of street crime (Fig. 10), but that there is no relationship between burglary crime rate and other variables (Fig. 11). This suggests that while social capital has some potential to directly reduce street crime rates, there is likely some other factor (such as the socio-economic status of residents) with a more significant effect on burglary theft. Thus, the Kyoto model may be a useful model in the police department's efforts to fight high street crime rates, especially for motorcycle theft.

6. Conclusion

In conclusion, there are three major findings in this study. First, our old Kobe model, that explains, among others, how specific community residents' efforts enrich community social capital, was reproduced with Kyoto data. Kyoto is very different from Kobe in its history and social demographics, so this suggests that the Kobe model may be generally and universally applicable to different types of cities. Second, we found that social capital not only reduces the fear of crime, but also increases community livability for both elders and children. Although well-being variables were measured subjectively and may not represent actual well-being, emotional change is important in a context where there is no association between actual crime rates and fear of crime. Third, we found that the effect of social capital on the reduction of crime is significant for street crime but not for invasion crime. Since this suggests that there is a more significant variable(s) for invasion crime, this study may be improved with a consideration of CPTED variables.

Revealing the relationships and interactions between social environmental factors and environmental design factors will lead to more specific and effective crime prevention by residents. The results of our study can be used as a tool for communities to understand their own characteristics from a social capital perspective and consider what kind of activities would make their communities more livable. In Kobe, for example, the civil participation division of the local government created a leaflet to encourage people to participate more in community activities (Fig. 12). Instructional courses were also held for neighborhood association board members, who had the opportunity to grade their own neighborhoods using simplified social capital survey items and chart their community's characteristics and strengths and weaknesses on a hexagonal graph (Fig. 13). In this way, social environmental criminology research can contribute to better community empowerment practices.

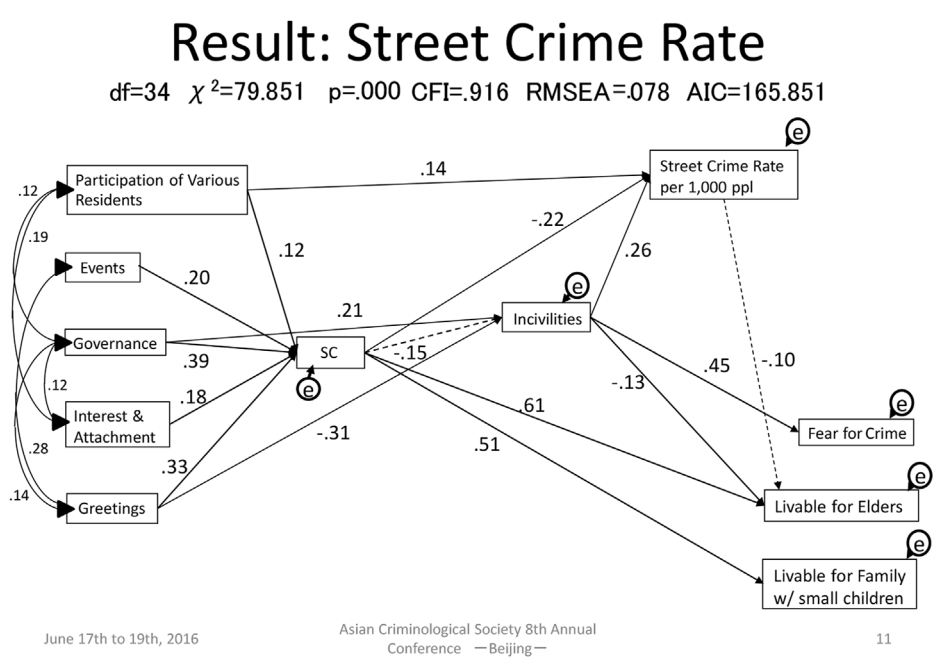

Fig. 10. Street crime.

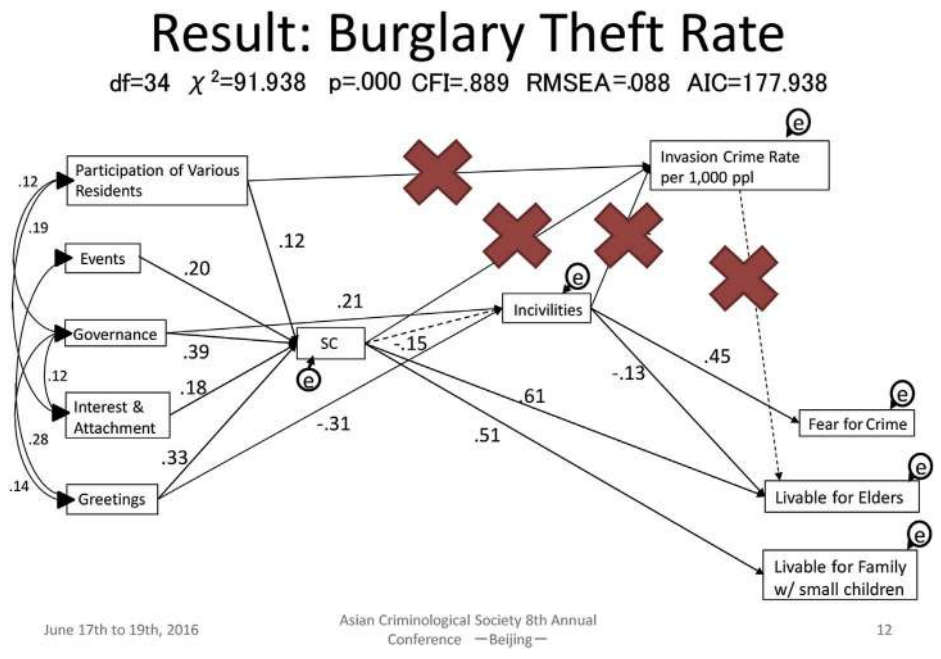

Fig. 11. Burglary crime.

Conflicts of interest

The authors declare that they have no conflict of interest.

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Fig. 12. Leaflet of Social Capital by Kobe city (URL: http://www.city.kobe.lg.jp/ward/activate/support/manual/aisatsu.html).

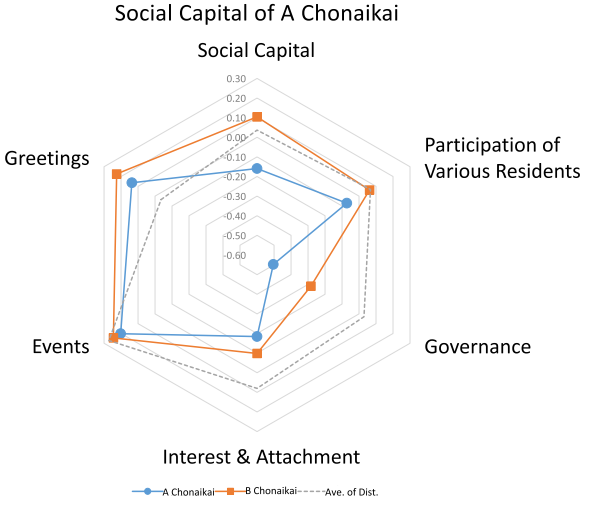

Fig. 13. Community chart.

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