



## Awareness of crime prevention effects associated with a wall removal project in Seoul

Byungsuk Kim & Jina Park

To cite this article: Byungsuk Kim & Jina Park (2020) Awareness of crime prevention effects associated with a wall removal project in Seoul, Journal of Asian Architecture and Building Engineering, 19:3, 264-272, DOI: [10.1080/13467581.2020.1726762](https://doi.org/10.1080/13467581.2020.1726762)

To link to this article: <https://doi.org/10.1080/13467581.2020.1726762>



© 2020 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group on behalf of the Architectural Institute of Japan, Architectural Institute of Korea and Architectural Society of China.



Published online: 21 Feb 2020.



Submit your article to this journal [↗](#)



Article views: 901



View related articles [↗](#)



View Crossmark data [↗](#)

# Awareness of crime prevention effects associated with a wall removal project in Seoul

Byungsuk Kim and Jina Park

Department of Urban Planning, Hanyang University, Seoul, Republic of Korea

## ABSTRACT

This study investigated Groups' awareness of how wall removal affects crime prevention. Group 1 comprised of burglars, Group 2 of non-residents who have not removed walls, and Group 3 of residents who have removed walls and are living in wall removal project areas. First, we examine differences in awareness between Groups 1 and 2 regarding ease of crime in relation to the presence or absence of a wall. Second, we examined the awareness levels of Groups 1 and 2 in relation to important factors considered by intruders when committing a burglary. Finally, we examined how wall removal reduces the fear of crime in Groups 2 and 3. Group 1 believed a house with a wall was an easier target for crime, but Group 2, comprised of residents who did not perform wall removal, had contrary opinions. Group 2 believed that wall removal did not reduce the fear of crime, unlike Group 3. These results indicate that Group 2 has negative perceptions of wall removal in the context of crime prevention, which stems from the common belief that a wall will protect a house from outside threats. Therefore, changes in mindset are needed to create safe environments in detached housing areas.

## ARTICLE HISTORY

Received 17 September 2019  
Accepted 18 January 2020

## KEYWORDS

Wall removal; CPTED;  
detached housing area;  
burglary; natural surveillance

## 1. Introduction

Crime is inevitable in cities, and people recognize crime as one of the biggest problems associated with living in a city (Brantingham and Brantingham, 1993). Instances of crime have been increasing in Korea, especially property damage via burglary. The number of burglaries increased from 77,980 in 2003 to 91,093 in 2012 (2013 White Paper on Crime in Korea, 2013). A variety of strategies, such as crime prevention through environmental design (CPTED), are being implemented to prevent such crimes. Natural surveillance, one of the strategies included in CPTED, allows pedestrians and residents to naturally observe their surroundings through the design of the environment. Following this idea, wall removal is becoming increasingly popular in detached housing areas in Korea to secure clear views, which naturally improves surveillance. Kim and Park (2014) discovered that burglars tend to target houses with walls, and Choi (2006) revealed that surveillance is one of the most important factors when burglars choose targets. These outcomes support the hypothesis that natural surveillance enhancement is effective for preventing crime.

There are many ways to prevent crimes in detached housing areas: enhancing patrols, installing security cameras and lights, and having double locks. If surveillance was enhanced by wall removal, it would increase the effectiveness of crime prevention. However, the residents must be willing to remove walls. Most

residents are unfamiliar with the evidence and disagree with the idea of wall removal because they feel that it would actually encourage problems such as burglary and invasion of privacy. Such awareness might be influenced by the portrayal of walls as protective barriers against the outside world. To leverage wall removal for crime prevention, it is necessary to change residents' mindsets. Therefore, it is important to determine residents' attitudes about the importance of walls in crime prevention and to survey the opinions of burglars regarding the role of walls in choosing targets.

In this paper, we argue that there are differences in awareness of the effects of wall removal between burglars (Group 1) and non-residents who have not removed walls (Group 2). We also determine whether wall removal reduces the fear of crime by assessing the opinions of residents (Group 3) who removed walls. Based on this investigation, we acknowledge that residents' mindsets about wall removal must be changed to facilitate crime prevention.

## 2. Literature review

### 2.1. Wall removal in Korea

Due to rapid urbanization, the number of cars in Korea has increased dramatically. However, detached housing areas have insufficient space to meet the demand for parking. Because of this, streets that should have been

used as pathways and places for communication have been turned into parking lots. Lacking spaces for communication and struggling to find parking spaces, residents of detached housing communities come into conflict with each other. The Seoul Metropolitan Government designed the Green Parking Project to address such problems and to improve living conditions. This project aims to secure parking spaces by removing walls and opening access to front yards. However, these changes only apply to residents who have signed up to remove the walls around their houses. Roughly 2,700 households per year participated in this project from 2004 to 2011, while there are roughly 462,071 detached houses in Seoul (Seoul Metropolitan Government). This illustrates the low participation rate in wall removal initiatives (4.75%), despite the fact that wall removal could greatly improve living conditions.

To understand the reasons for the low participation rate, it is necessary to understand the value of walls in Korean life. Walls have played important roles in Korean houses throughout history. Traditional Korean houses are built following an open form, and floor space is minimized to allow for bedrooms. Because many daily activities such as laundry, cooking, washing, and housework were traditionally performed in the front yard, within the walls (Figure 1), it is considered essential to have a wall to form a boundary around one's household and protect privacy. However, in modern Korea, the front yard more often functions as a hallway or a pathway from the front gate to the inside of the house.

The basic function of the wall is to set the boundaries of the house. It also has the ability to defend buildings and occupants and protect privacy. Other functions include street space formation, climate control, space division, moving line, and landscape formation. Walls traditionally have two main functions: a symbolic

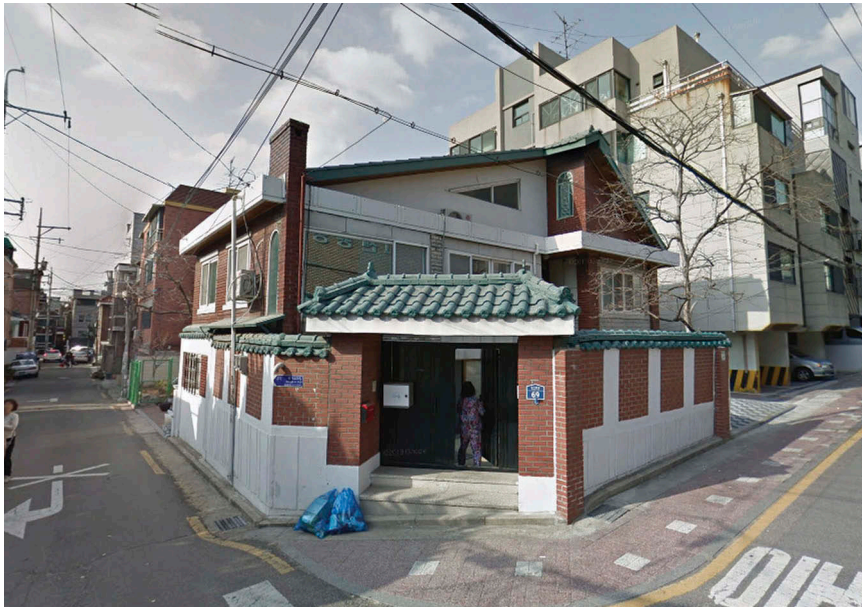
function, to divide territory, and an actual function, to protect privacy. Today, the actual function of the wall has decreased, and the wall retains only the symbolic function of the territoriality (Figure 2). However, Koreans see walls as barriers that enhance privacy and protect from outside dangers. For this reason, homes without exterior walls seem strange, and residents are reluctant to participate in wall removal programs.

## 2.2. Wall removal in relation to crime prevention

Other than establishing a boundary and protecting privacy, a wall also functions as a defensive measure. However, the walls in a Korean residence are only about 1.5–2 m in height, which minimally impairs the line of sight and can easily be traversed. Walls at this height create a space that is somewhere between being open and closed off, so the perception of such walls as a defensive measure is mostly psychological (Lee 1997). Taylor and Nee (1988) revealed that 71% of burglars prefer to trespass by jumping over a wall. It is also noteworthy that houses with walls can arouse criminal desires because, once inside the wall, burglars can easily observe the area outside the wall without being seen by neighbors. Sorensen (2003) confirmed that burglars avoid targets that are readily observed by neighbors and/or passers-by. Places with high walls/fences, low lighting at night, and thick trees or shrubbery provide concealment opportunities, particularly when such obstacles are close to points of access such as windows and doors (Weisel 2002). Therefore, homeowners should consider crime prevention strategies before the occurrence of a crime, and it is necessary to increase the difficulty of committing a crime by increasing the risk of detection and ensuring that committing a crime is not profitable.



Figure 1. Traditional Korean house.



**Figure 2.** Modern Korean house (source: google.co.kr/maps/).

Crime prevention through environment design (CPTED) is a method used to decrease the risk of crime by altering the living environment. The early theory of CPTED comes from Jane Jacobs who presented, in her book *The Death and Life of Great American Cities* (1961), a solution to urban crime through environmental design. In 1971, C. Ray Jeffery coined the term CPTED in a book of the same title, thus popularizing the term. The most multifactorial strategy of CPTED includes control of access, natural surveillance, and territoriality. Numerous studies of CPTED have indicated the validity of the effects associated with CPTED. Marzbali et al. (2016) validated a third-order CPTED scale through the partial least squares approach in a residential environment. The results of exploratory and confirmatory factor analyses established a 28-item, eight-factor measure nested within the four main dimensions of CPTED, and that this scale is valid and reliable. Sohn (2016) assessed the relationship between the built environment and residential crime by applying the principles of CPTED at the neighborhood level and showed that the proportion of residential area, the average number of building stories, street density, intersection density, and bus stop density were significantly related to residential crime when the model controlled for median household income, population density, and distance of the neighborhood from the closest police station. In general, the characteristics of burglarized houses were public territorial qualities such as openness and unoccupied appearance. In contrast, non-burglarized houses had salient secondary or primary territorial characteristics such as territorial markers communicating privacy and individuality. Greater visual contact with neighboring houses was a characteristic of non-burglarized houses.

Montoya, Junger, and Ongena (2016) studied day- and night-time residential burglaries and found that burglaries during the daytime are related to access control and territoriality. Specifically, having a front garden was associated with lower daytime burglary. Visibility into the back garden and evidence indicating the presence of a dog (i.e., surveillance) decreased the night-time burglary risk. Finally, offender availability was associated with large increases in burglary risk. These findings suggest that territoriality and natural surveillance are important for crime prevention. This result of visibility factor also supports the efficacy of such strategies of CPTED. In contrast, Peeters and Beken (2017) found that the importance of surveillance was less significant in the city because there are so many people in urban environments that it is very difficult to identify outsiders.

Many previous studies have included comprehensive analyses focusing on environmental factors considered by burglars when planning to commit a crime. Bennett and Wright (1984) found that burglars prefer places where neighbors cannot see them, easy access to a gate, and the presence of many valuables to steal. Cromwell, Olson, and Avary (1991) conducted interviews with 30 burglars and revealed that they are influenced by features such as security alarms and door locks when selecting a target. Park (2006) discovered that burglars perform thorough inspections of the physical environment, including elements such as security cameras, before choosing a target. The general consensus is that burglars prefer empty houses (Coupe and Blake 2006; Cromwell, Olson, and Avary 1991; Nee and Taylor 2000; Maguire and Bennett 1982; Wright and Decker 1996), which they identify by studying lights, movements in the house, and cars parked outside (Snook, Dhimi, and Kavanagh 2011). Houses that



have not been burglarized and that are located near robbed houses typically have fences and signs prohibiting public access or trespassing. Such houses tend to be located in areas that are easily visible to neighbors (Clare, Fernandez, and Morgan 2009). Difficult access to entry has also been shown to be effective for crime prevention. Burglars tend to avoid houses with barriers to entry such as complicated locks installed on windows or doors when there are other houses with easier entry access (Bennett and Wright 1984; Cromwell, Olson, and Avary 1991; Maguire and Bennett 1982; Nee and Taylor 2000). Burglars choose easy targets because it shortens the time required to commit crime and lowers the risk of getting caught. In Korea, burglars consider the risk of being caught an important factor when choosing a target (Lee and Kang 2009; Kim 2010). Crimes can also be prevented in part by changing the environmental design of houses, such as increasing window size (Park and Shin 2006).

Walls are important elements of houses. However, walls can also cause fear. If the outer wall of a building is high and borders a narrow alley, for example, it can cause fear of extreme closure (Oh and Song 2013). Wall removal is a CPTED strategy that maximizes the use of natural surveillance through the design of the physical environment and influencing the activity of people, while taking into consideration that burglars do not want to draw attention to themselves. Surveillance is maximized through enhanced patrols and placement of security cameras and lights (Lim 2009). From this perspective, wall removal can increase ease of surveillance by removing physical barriers that interfere with sight. This acts as a threat to burglars by increasing their likelihood of being detected.

Since wall removal projects were first applied in Korea, several studies have examined the relationship between wall removal and crime rate. Based on the opinions of residents who have participated in wall removal projects, research has focused on wall removal and crime prevention (Kim 2008; Kim, Kim, and Hwang 2011; Shin and Kim 2012; Kim and Park 2013). Kim and Park (2014) interviewed burglars and examined the relationships between ease of committing crime and presence or absence of a wall and found that burglars with less criminal experience and those committing premeditated crimes prefer houses without outer walls.

A study assessing the number of crimes in a wall removal project area was previously conducted (Jung 2009). In that study, 338 individual wall removal projects and 256 alley projects were analyzed to determine the number of crimes according to number of walls removed. There were 93 criminal cases when there were fewer than 5 wall removals, corresponding to 63.7% of total residential burglaries. There were 34 crimes on a block with four to ten wall removal projects (34.22%). As wall removal increases, crime density

tends to decrease. The results of a resident awareness survey involving crime prevention initiatives such as wall removal showed that residents felt the town was safe (55%) and were interested in town safety (67%) (Hong and Bin 2017).

These studies support the hypotheses that crime can be prevented by wall removal, and that burglars consider environmental factors such as the presence of a wall when identifying targets. However, it is not known if people in Group 2 of non-residents who have not removed walls are aware of the effects of wall removal. Therefore, in this study, we assessed the awareness of Group 2 compared to Groups 1 comprised of burglars and 3 of residents who have removed walls and are currently living in wall removal project areas.

### 3. Methods

#### 3.1. Participants and survey

Three groups of subjects were studied in this research. Group 1 included burglars who were serving sentences in prison. Group 2 was comprised of non-residents who have not removed walls and were unfamiliar with wall removal. We assessed the awareness of crime prevention due to wall removal in these two groups. This is to compare the positive and negative perceptions of crime prevention effectiveness of wall removal between two groups. Group 3 is made up of residents who participated in wall removal projects. Questionnaires (Table 1) were created to survey the groups that included evaluations of environmental factors associated with houses and wall removal. Additional questions related to wall removal and fear of crime were also included to compare the levels of awareness in Groups 2 and 3. Groups 1 and 2 were surveyed using questions regarding demographic characteristics (which used a nominal scale) and environmental factors associated with houses and wall removal (Likert-type five-point scale, 1 = disagree completely; 5 = agree completely).

Groups 1 and 2 answered questions regarding the importance of factors related to wall removal when committing a crime. CPTED presents crime prevention techniques through natural surveillance and physical access control by humans. And looking at the previous studies on the burglary of South Korea, burglars consider surveillance, accessibility, risk and profitability (Choi 2006; Kim 2010; Kim, Kim, and Kim 2010). In consideration of CPTED's point of view and the situation of burglars, suitable factors: "Height of the wall", "Ease of flight after crime", "Hiding spots", "Surveillance by neighbors and pedestrians" were selected in detached houses. And also for questions regarding the ease of crime before and after wall removal, we showed respondents pictures of a single house and an alley, both with a wall and without a wall, and the respondents selected the picture in which they

**Table 1.** Survey questions.

Category	Questions			Measurement type
	Group 1	Group 2	Group 3	
Human characteristics	Crime experience, Age	Gender, Age	Gender, Age	-
Elements of a wall that influence ease of crime	Is the height of the wall important when committing a crime?			Five-point scale (1 = disagree completely; 5 = agree completely)
	Is the ease of flight afterward important when committing a crime?		-	
	Are hiding spots important when committing a crime?			
	Is surveillance by neighbors and pedestrians important when committing a crime?			
Wall removal	Please select the location in which it is easier to commit a crime			Selecting
	Single house	House with a wall	House without a wall	
	Houses in an alley	Alley with walls	Alley without walls	
Fear of crime	-	Do you think the wall removal effective for reducing the fear of crime?	Fear of crime was decreased after wall removal	Five-point scale

believed a crime was more easily committed. These questions were prepared to try to think in the position of the burglar to find what is different thinking of trespassing on the house between the burglar and normal people. For the question related to wall removal and fear of crime, we asked Group 3 if their “fear of crime was decreased after wall removal?” and asked Group 2 if “wall removal is effective to reduce the fear of crime?” using a five-point scale. The question for group 2 is to find out the effect of people who do not live in the house on the reduction of crime fears of wall removal. But the question for group 3 is whether people living in houses with walls removed would have reduced the fear of crime. The two questions have different nuances. However, these questions items were constructed in reality as closely as possible in order to find out the effect of the wall removal felt by the residents and to compare the perceptions of the general public.

To identify respondents for Group 1 (burglars), we contacted 24 prisons and five detention centers. However, we were only able to survey prisoners incarcerated for burglary in two of the prisons and none from the detention centers, as these inmates had not yet been found guilty. The survey was administered by prison officers from July to August 2013, and 152 questionnaires were returned. The survey of residents who had participated in wall removal projects was conducted directly by the authors from July to August 2012 and from January to February 2013 in Hong-eun-3-dong Seodaemun-gu, Seoul, Korea. In this neighborhood, a total of 72 houses had undergone wall removal. A researcher personally visited residents to conduct the survey. A total of 58 questionnaires was returned by 72 houses. Group 2 was randomly selected through an online survey to survey the general public. The survey of Group 2 was conducted from February to March 2015 and 130 questionnaires were collected using Google online survey that was distributed on

Korean Social Media. There is a time gap among the data of the groups. Because the survey for burglars was rejected from prisons, this study uses the alternative data of Group 1 and 3 from the authors’ previous research and new survey data for Group 2.

### 3.2. Analysis

To study awareness of the crime prevention benefits of wall removal, we performed three analyses. First, we performed a cross tabulation analysis by comparing the opinions of Groups 1 and 2 regarding the ease of crime in houses with or without walls. Second, we used t-tests to examine the awareness of the two groups with regard to wall-related environmental factors when committing crimes. Last, we used t-tests to assess the awareness of Groups 2 and 3 with regard to the effectiveness of wall removal to reduce fear of crime.

## 4. Results

### 4.1. Demographics of participants

The 152 burglars in Group 1 were divided into the following age groups: 20–30 (11.2%), 31–40 (30.9%), 40–50 (26.3%), and over 51 (31.6%). The questionnaire for Group 1 did not include questions about gender because the prisons in which we can get permission to survey accommodate man prisoners. The experiences of the burglars were: first-time offenders (21.1%), two previous convictions (12.5%), three previous convictions (19.7%), and over four previous convictions (46.7%). Of the 130 people in Group 2, 50% were males and 50% were females, and their age groups were: 20s (45.4%), 30s (21.5%), 40s (14.6%), and over 50 (18.5%). There were 58 residents (male = 60.3% and female = 39.7%) who performed wall removals in Group 3. The age groups of the residents were: 20s (13.8%), 30s (3.4%), 40s (15.5%), 50s (31.0%), and over 60 (36.2%) (Table 2).

**Table 2.** Descriptive statistics.

		Group 1	Group 2	Group 3
Age (%)	20–30 (20s)	11.2	45.4	13.8
	31–40 (30s)	30.9	21.5	3.4
	41–50 (40s)	26.3	14.6	15.5
	Over 51 (over 50s)	31.6	18.5	67.2
Gender (%)	Male	100	50	60.3
	Female	-	50	39.7
Crime experience (%)	First-time offenders	21.1	-	-
	Two previous convictions	12.5		
	Three previous convictions	19.7		
	Over four previous convictions	46.7		

**4.2. Ease of crime in relation to the presence or absence of a wall**

The results of cross tabulation analysis were statistically significant. The awareness levels of Groups 1 and 2 with regard to the ease of crime in relation to the presence or absence of a wall were different. Table 3 shows eighty-three of the 152 burglars answered that a wall makes it easier to commit a crime. However, in Group 2, only 56 out of 130 respondents thought that way, and 74 answered that houses without walls would be easier targets. This result is reflected in the belief of Group 2 that a house with a wall is safer than a house without one. In other words, respondents in Group 2 think that it would be easier for a burglar to trespass when there is no wall. In Group 1, 83 answered that a house with a wall is an easier target, as the wall blocks surveillance from the outside and provides hiding spots.

Table 4 shows that eighty-eight of 152 burglars answered that a house with a wall is easier to burgle, and 64 burglars answered that it would be more difficult to commit a crime in an alley in which all walls facing the street had been removed. Sixty-six of 130

**Table 3.** Cross tabulation analysis in a scenario with a single house.

Wall removal in a single house		Category			$\chi^2(p)$
		Group 1	Group 2	Total	
Presence of wall	Frequency	83	56	139	0.054* (3.726)
	In category	54.6%	43.1%	49.3%	
Absence of wall	Frequency	69	74	143	
	In category	45.4%	56.9%	50.7%	
Total	Frequency	152	130	282	
	Total	100%	100%	100%	

\* $p < 0.1$ , \*\* $p < 0.05$

**Table 4.** Cross tabulation analysis in the alley scenario.

Wall removal for houses in an alley		Category			$\chi^2(p)$
		Group 1	Group 2	Total	
Presence of wall	Frequency	88	66	154	0.231 (1.435)
	In category	57.9%	50.8%	54.6%	
Absence of wall	Frequency	64	64	128	
	In category	42.1%	49.2%	45.4%	
Total	Frequency	152	130	282	
	Total	100%	100%	100%	

Note. \* $p < 0.1$ , \*\* $p < 0.05$

members of Group 2 chose the house with a wall as an easier target. This result was not statistically significant.

Although the result was not statistically significant, the answers in Group 2 were different for the two environments. In the case of a single house, 56 respondents thought that a wall made a crime easier to commit. However, this number increased to 66 when considering houses in an alley with all walls removed. This difference reflects the belief that increased visibility due to wall removal would play a greater role in an alley than in a single house, as the neighbors in nearby houses would be able to provide surveillance. Changing such environmental factors is effective in preventing crime, as such changes can increase surveillance. The answers of burglars were also different for the two environments, with 83 responding that a wall made committing a crime easier in the context of a single house and 88 responding similarly for houses in an alley. This indicates that wall removal in an alley was expected to be more effective than in a single house unit.

Tables 3 and 4 results showed that Group 1 and 2 have different points of view about the wall when committing a crime. The reasons for this are as follows: Group 2, a non-specialist in crime, has the preconceived notion that the physical environment as the wall can protect the house from outside risk. However, group 1, criminal experts, believes that walls can be an aid to crime by blocking people’s eyes and providing a place to hide their bodies. This difference may be due to their experience and disposition that burglars can commit crimes as safely as possible and prefer a safe environment from the risk (Lee and Kang 2009; Lee and Kim 2010; Kim 2010).

**4.3. Considering the environment when committing a crime**

CPTED presents crime prevention techniques through natural surveillance and physical access control by humans. And looking at the previous studies on the burglary of South Korea, burglars consider surveillance, accessibility, risk and profitability (Choi 2006; Kim 2010; Kim, Kim, and Kim 2010). In consideration of CPTED’s point of view and the situation of burglars, four suitable physical environmental factors were selected in detached houses.

The height of the wall, ease of flight after crime, hiding spots, and surveillance by neighbors and pedestrians are environmental factors related to walls that are considered by burglars when choosing a target. In this study, we examined the levels of awareness in Groups 1 and 2 in relation to important factors considered by burglars when committing a burglary. We detected a gap between the average scores of the two groups (Table 5). Overall, Group 2 had a higher average score than Group 1 with regard to environmental factors. This difference can be explained by respondents thinking defensively, believing that

**Table 5.** Responses of Group 1 and Group 2 about the importance of a wall.

Category	Average		Standard deviation		<i>t</i>	<i>P</i>
	Group 1	Group 2	Group 1	Group 2		
Height of the wall	2.93	3.50	1.26	1.08	-3.993	0.000**
Ease of flight after crime	3.57	4.15	1.19	1.12	-4.142	0.000**
Hiding spots	3.25	3.19	1.16	1.18	0.412	0.681
Surveillance by neighbors and pedestrians	3.13	4.16	1.22	0.91	-8.112	0.000**

\**p* < 0.1, \*\**p* < 0.05

burglars would carefully consider environmental factors when committing a crime. However, the difference between the two groups in average scores regarding hiding spots was not significant. The average score of Group 2 was higher than 3.5 for all factors except hiding spots, which had a relatively low score of 3.19. Group 1 considered hiding spots to be the second most important factor, followed by ease of flight.

These results indicate that Group 1 considered hiding spots to be important, as they deter surveillance and prevent detection. From this perspective, a wall can be considered an attractive element to burglars. Group 2 tends to overlook the significance of hiding spots in the choice of a burglary target. Thus, these findings indicate that the general public downplays the importance of hiding spots and the provision of more favorable crime targets when considering the effects of a wall.

#### 4.4. Wall removal and reduction in fear of crime

We examined how wall removal reduces the fear of crime in Groups 2 and 3. Fear of crime can be influenced by age and gender among personal characteristics. Previous studies have found that male and female genders have a significant impact on fear of crime (Jo 2003; Lee 2010; Cho, Go, and Lee 2017). However, in the case of age, there are results that age has no effects on fear of crime (Lim and Lee 2011), has effects (Cho, Go, and Lee 2017), or only has effects in a group of women (Jo 2003). Gender between Group 2 and 3 showed a similar distribution, but in terms of age, Group 3 is a higher age group than Group 2. In the case of Group 2 and 3 samples of this study, regression analysis results for age and reducing fear of crime variables ( $\beta = -0.004$ ,  $P = 0.954$ ) were not significant. Therefore, the reduction of fear of crime by age is excluded.

The awareness levels of these two groups were analyzed using a t-test (Table 6). The average score of Group 2 was 2.75, which indicated that respondents in this group believed that wall removal did not reduce the fear of crime. However, in Group 3, residents who had removed walls, the average score was 3.44, indicating that this group thought of wall removal as an

**Table 6.** Responses of Group 2 and Group 3 with regard to reduction in fear of crime.

Category	Average		Standard deviation		<i>t</i>	<i>P</i>
	Group 2	Group 3	Group 2	Group 3		
Reducing the fear of crime	2.75	3.44	1.26	1.21	-3.519	0.001**

\**p* < 0.1, \*\**p* < 0.05

effective way to reduce the fear of crime. These results can be explained by the finding that people view walls as protective barriers against outside danger and therefore feel that wall removal will increase fear of crime. On the other hand, residents who had removed walls knew that the absence of a wall does not actually increase trespassing, and instead of that it increases surveillance and reduces the fear of crime since their houses can be observed by neighbors. It should also be noted that awareness of the effect of wall removal on crime prevention among the general public is different from actual findings regarding crime prevention.

## 5. Conclusion

In this study, levels of awareness of the effects of wall removal on crime prevention were analyzed to devise strategies to encourage wall removal. We found that the general public considers houses without walls to be easier targets, in contrast to the views of burglars, who preferred houses with walls. This difference can be explained by beliefs regarding the function of walls, with members of the general public viewing walls as protective barriers against outside danger and therefore feeling that it is dangerous not to have a wall. As a result, Group 2 believed that wall removal does not reduce fear of crime. However, Group 3, residents who had removed walls, believed that wall removal was an effective way to reduce fear of crime. The most important negative factor associated with wall removal was invasion of privacy. This negative stereotype hinders wall removal and lowers the likelihood of participation. Therefore, it is necessary to increase awareness of the benefits associated with wall removal among the general public.

Currently, wall removal is recommended to improve the residential environment in Korea. However, with the spread of CPTED, wall removal is also receiving increased attention as a crime prevention strategy. Thus, studies examining wall removal and crime prevention are increasing. Previous studies of burglary focused on factors that burglars consider when committing a crime, and studies about the effect of wall removal on crime prevention have focused on the fear of crime (Kim 2008; Kim, Kim, and Hwang 2011; Shin and Kim 2012; Kim and Park 2013). These studies demonstrated effects of wall removal on crime prevention. Despite the associations between wall removal,



improved residential environments, and crime prevention, the general public still has doubts about removing walls. In traditional Korean settings, most daily activities are conducted in the front yard. Thus, walls traditionally play a major role in protecting privacy, and people feel aversion to the removal of walls, despite changes in lifestyle in modern Korea.

This study aims to address resistance to wall removal. We examined and compared the awareness of effects of wall removal effect among burglars, non-residents who have removed walls, and residents who removed walls. We present evidence that mindsets regarding wall removal should be changed, unlike previous studies. Thus, we present the following proposal to raise awareness of the benefits of wall removal. First, the Seoul Metropolitan Government should include information about crime prevention in proposals for wall removal. Currently, wall removal is promoted as a way to improve the residential environment by supplying parking spaces. If the government promoted wall removal to prevent crime, people might see the issue in a different light, which could help to raise awareness that a house without a wall is still protected from crime. Second, the National Police Agency or government should create educational programs to familiarize people with CPTED. Such programs would demonstrate the importance of wall removal for crime prevention. Further studies should examine the effects of CPTED strategies in detached housing areas, as well as the effects of wall removal, using data about crime and invasion of privacy.

## Disclosure statement

No potential conflict of interest was reported by the authors.

## Funding

This work is supported by the Korea Agency for Infrastructure Technology Advancement (KAITA) grant funded by the Ministry of Land, Infrastructure and Transport (Grant 20CTAP-C152030-02). This research was supported by a grant (Grant 20CTAP-C152030-02) from Land, Infrastructure and Transportation R&D Program (Science Technology Promotion Research Project) funded by Ministry of Land, Infrastructure and Transport.

## Notes on contributors

**Byungsuk Kim** is a Postgraduate Student in Ph.D. at the Department of Urban Planning, Hanyang University. His research focuses on environmental psychology by urban design.

**Jina Park** is a Professor at the Department Urban Planning and Engineering, Hanyang University. Her research focuses on urban design, urban commercial space, commercial resilience, and commercial gentrification.

## References

- Bennett, T., and R. Wright. 1984. *Burglars on Burglary: Prevention and the Offender*. Aldershot: Gower.
- Brantingham, P. L., and P. J. Brantingham. 1993. "Nodes, Paths and Edges: Considerations on the Complexity of Crime and the Physical Environment." *Journal of Environmental Psychology* 13 (1): 3–28. doi:10.1016/S0272-4944(05)80212-9.
- Cho, S., M. Go, and D. Lee. 2017. "A Study on Explanatory Model for General Fear of Crime." *Journal of Korean Criminological Association* 11: 103–124.
- Choi, E. 2006. *Crime Prevention through Environmental Design*. Paju, Gyeonggi-do: Korean Studies Information.
- Clare, J., J. Fernandez, and F. Morgan. 2009. "Formal Evaluation of the Impact of Barriers and Connectors on Residential Burglars' Macro-level Offending Location Choices." *Australian & New Zealand Journal of Criminology* 42 (2): 139–158. doi:10.1375/acri.42.2.139.
- Coupe, T., and L. Blake. 2006. "Daylight and Darkness Targeting Strategies and the Risks of Being Seen at Residential Burglaries." *Criminology* 44 (2): 431–464. doi:10.1111/crim.2006.44.issue-2.
- Cromwell, P. F., J. N. Olson, and D. W. Avary. 1991. *Breaking and Entering: An Ethnographic Analysis of Burglary*. 8vols. Newbury Park, CA: Sage.
- Hong, S., and H. Bin. 2017. "A Study on the Correlation between the Wall Removal and Crime Prevention through Environmental Design considering Improvement of Residential Environment - Focusing on Sungdae Valley." *Journal of the Korean Society of Living Environmental System* 24 (6): 858–864. doi:10.21086/ksles.2017.12.24.6.858.
- Jane, J. 1961. *The Death and Life of Great American Cities*. New-York, NY: Vintage.
- Jo, E. 2003. "Sex Differences in the Fear of Crime." *Korean Psychological Journal of Culture and Social Issues* 9: 1–21.
- Jung, K. 2009. "A Study on the CPTED through Analysis on the Characteristics of Crime Occurrence -focused on the Cases in Guro-gu District, Seoul." *Police Science Review* 5: 113–181.
- Kim, B., and J. Park. 2013. "Effect of the Elements of Physical Variation after Wall Removal Project in Detached Houses on the Natural Surveillance and Fear of Crime." *Journal of the Urban Design Institute of Korea* 14: 119–130.
- Kim, B., and J. Park. 2014. "A Study on the Easiness of Crime according to the Presence or Absence of A Wall in the Detached Housing Area: Focusing on the Burglars." *Journal of the Korean Urban Management Association* 27: 51–69.
- Kim, D. 2010. "Research Survey on the Characteristics of Burglaries: Focused on How to Utilize Private Security." *Korean Security Science Review* 22: 15–35.
- Kim, D., Y. Kim, and S. Kim. 2010. "A Study on Target Selection of Burglars - Focused on Physical Environment Factors." *Journal of Korean Public Police and Security Studies* 7 (1): 209–233. doi:10.25023/kapsa.7.1.201005.209.
- Kim, S., J. Kim, and H. Hwang. 2011. "Analysis of Resident Consciousness regarding the Effectiveness of the Wall Removal Project for Prevention of Crime." *Journal of the Urban Design Institute of Korea* 12: 5–20.
- Kim, Y. 2008. "Effects on the Sense of Safety for Resident by the Wall Removal Project." Master Diss., Yeonsei University.
- Lee, J., and M. Kang. 2009. "A Study on Repeat Burglary Victimization." *Korean Association of Public Safety and Criminal Justice Review* 36: 197–224.
- Lee, K. 1997. "A Study on the Cognition Attitude of the Residences Related to the Main-Gates and Fences of Contemporary Urban Dwellings." *Journal of Urban Studies* 5: 115–122.

- Lee, S. 2010. "Study of Factors Affecting Fear of Crime among Populations: Focusing on Public and College Students." *Korean Criminal Psychology Review* 6: 165–188.
- Legal Research and Training Institute. 2013. *White Paper on Crime 2013*. Yongin, Gyeonggi-do: Legal Research and Training Institute
- Lim, J. 2009. *Crime Prevention*. Seoul: DAE YOUNG.
- Lim, J., and D. Lee. 2011. "A Study on Factors Having Effect on Pangyo Citizens' Fear of Crime - Focused on the Awareness of CPTED." *Korean Police Studies Review* 10: 175–196.
- Maguire, M., and T. Bennett. 1982. *Burglary in a Dwelling: The Offence, the Offender, and the Victim*. London: Heinemann.
- Marzbali, M. H., A. Abdullah, J. Ignatius, and M. J. M. Tilaki. 2016. "Examining the Effects of Crime Prevention through Environmental Design (CPTED) on Residential Burglary." *International Journal of Law, Crime and Justice* 46: 86–102. doi:10.1016/j.ijlcrj.2016.04.001.
- Montoya, L., M. Junger, and Y. Ongena. 2016. "The Relation between Residential Property and Its Surroundings and Day-and Night-time Residential Burglary." *Environment and Behavior* 48 (4): 515–549. doi:10.1177/0013916514551047.
- Nee, C., and M. Taylor. 2000. "Examining Burglars' Target Selection: Interview, Experiment or Ethnomethodology?" *Psychology, Crime and Law* 6 (1): 45–59. doi:10.1080/10683160008410831.
- Oh, K., and J. Song. 2013. "Physical Environmental Elements in Alleys Causing Fear of Crime for Women - Focused on the Redevelopment District." *Journal of Community Safety and Security by Environmental Design* 4: 32–57.
- Park, H. 2006. "Defensible Parking Facilities for High-rise Housing: A Study of South Korea." Doctoral Diss., University of Portsmouth.
- Park, S., and J. Shin. 2006. "A Study on the Correlation between 'Crime on the Road' and 'Visible Window Areas' in Residential Street." *Journal of the Architectural Institute of Korea Planning & Design* 22: 93–100.
- Peeters, M. P., and T. V. Beken. 2017. "The Relation of CPTED Characteristics to the Risk of Residential Burglary in and outside the City Center of Ghent." *Applied Geography* 86: 9. doi:10.1016/j.apgeog.2017.06.012.
- Shin, J., and S. Kim. 2012. "The Influence of Securing Natural Surveillance to Fear of Crimes by Creating Bond between Neighbors." *Korean Association of Public Safety and Criminal Justice Review* 48: 141–172.
- Snook, B., M. K. Dhami, and J. M. Kavanagh. 2011. "Simply Criminal: Predicting Burglars' Occupancy Decisions with a Simple Heuristic." *Law and Human Behavior* 35 (4): 316–326. doi:10.1007/s10979-010-9238-0.
- Sohn, D. W. 2016. "Residential Crimes and Neighbourhood Built Environment: Assessing the Effectiveness of Crime Prevention through Environmental Design (CPTED)." *Cities* 52: 86–93. doi:10.1016/j.cities.2015.11.023.
- Sorensen, D. W. M. 2003. *The Nature and Prevention of Residential Burglary: A Review of the International Literature with an Eye toward Prevention in Denmark*. Copenhagen: Justitsministeriet.
- Taylor, M., and C. Nee. 1988. "The Role of Cues in Simulated Residential Burglary-A Preliminary Investigation." *The British Journal of Criminology* 28 (3): 396–403. doi:10.1093/oxford-journals.bjc.a047736.
- Weisel, D. L. 2002. *Burglary of Single-family Houses*. Washington, DC: US Department of Justice, Office of Community Oriented Policing Services.
- Wright, R. T., and S. H. Decker. 1996. *Burglars on the Job: Streetlife and Residential Break-ins*. Lebanon: UPNE.