Criminal Spots on the Way Home from School
A Case Study of Middle Schools in the Gangseo District

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Abstract
The purpose of this paper was to determine criminal spots on the way home from school for middle-school students. The Gangseo district, where most school violence occurs in Seoul, was investigated. Through a cognitive map analysis, the findings of this paper are as follows: first, the frequency of where fear of crime was felt was greater than that of actual crime, and the fear of crime did not closely reflect crime occurrence. Second, females had more fear of crime spots than males. Third, students feel fear mostly for reasons related to human factors rather than to space factors; among the human factors, 'peers' represented the most frequent reason. Fourth, mixed-use building regions were the most commonly cited criminal regions, as were school regions, despite the fact that they were small areas. Narrow paths and landmarks where people congregate were cited as criminal spots. Planned spaces for relaxation could also lead to fear related to the fact that these places are seen as common bully peer congregation spots. In addition, places associated with territoriality were commonly cited as criminal spots.

Keywords: school crime; way home from school; cognitive map; environmental planning

1. Introduction
1.1 Background
As school crime becomes serious, social concerns, especially parental concerns have increased. In a survey of Seoul citizens, it was found that the first priority of an education policy was 'School Safety (31.8%)' (Seoul Metropolitan Government, 2010). Other studies document that areas near high schools have more crime than other residential areas (Gouvis Roman, 2002; Roncek and Faggiani, 1985). However, schools have not received much scholarly attention as it relates to crime. Most studies related to crime and schools focus on the school itself and not its neighboring areas. However, several studies have found that more crime occurs on routes students take to school rather than within the school itself (Choi et al., 2009; Garofalo et al., 1987; Hong, 2008). In addition, more crime occurs after school rather than during school (Hong, 2008). Recently, the Seoul Metropolitan Government implemented a system known as the 'Walking School Bus'. This is a system in which adults take students home in the manner of a school bus. This is partly a result of the high interest in school crime, but it is an exhausting and limited system that relies on human resources. Among the students, middle-school students are vulnerable to school violence given the incongruity between their levels of emotional maturity and their physical growth. The number of violent incidents per 100 students in middle schools (13-15 years) was higher than that for those in elementary schools (7-12 years) and high schools (16-18 years) (Seoul Metropolitan Office of Education, 2010). In addition, research shows that junior high schools (11-14 years) had worse crime problems than senior high schools (Wilcox et al., 2005). Therefore, for a safe school environment, it is necessary to systematically study the route students take home from school, especially for those in middle school.

1.2 Objectives
This research seeks to understand the environmental characteristics that provoke both the fear of crime and crime on the way home from school. Through an analysis of cognitive maps, this paper utilizes from general to space-specific analyses of the following areas: 1) the relationship between the frequency of where fear of crime is felt and actual crime that occurs by gender and home-school patterns 2) the regions and environmental elements of all criminal spots, and 3) the criminal 'hot spots' themselves.
Most of the surrounding environment consists of mixed-use building regions.

Features of the surrounding environment consists of mixed-use bldg., and parks-grassy regions.

Many mixed-use buildings were found to be mixed-use with housing conversions. In addition, as middle-school students have difficulty in answering a text questionnaire, especially on an abstract and difficult subject such as fear of crime, and because they may have difficulty when looking at a complex map, this study attempted to have students draw a cognitive map. Cognitive maps are a type of mental processing composed of a series of psychological transformations. Therefore, a cognitive map of a commute to school can provide information about the attributes of the phenomena in the students' metaphorical spatial environments.

To determine the exact criminal spots, a photographic map was also provided. The students marked on it what they drew (Table 3.). To increase the reliability of the survey, the authors provided a survey scenario. Forty minutes of class time was spent on this. The procedure was as follows: 1) for 10 minutes, the survey researchers provided a definition of crime. As studies indicate that severe crimes are relatively rare in schools whereas minor victimizations are common (Garofalo et al., 1987), the range of crime was extended to school violence. In the findings of a previous study (Hong, 2008), crime included violent crimes (robbery, assault, threats), property crimes (theft, fraud, pick-pocketing), sexual incidents (rape-attempted and/or completed, sexual molestation, sexual harassment), and peer violence (assault, gang assault, bullying, emotional bullying), as well as witnessing

were conducted from December of 2010 to February of 2011. The first field survey involved a 357-item cognitive map questionnaire. The second survey was a site survey of the criminal spots. This study considered gender differences, considering that differences between the genders were noted in previous studies (Dubow et al., 1979). Students in their second or third year of middle school were surveyed, considering that they had up to this point approximately 400 and 600 school-home experiences, respectively. (There are about 200 school days per year) (Table 2.).

### Table 1. Surrounding Environments and Types of School

| Type | Features of the surrounding environment |
|------|----------------------------------------|
| A    | Most of the surrounding environment consists of apartment and large commercial bldg. regions. |
| B    | More than 70% of the surrounding environment consists of apartment regions. |
| C    | Most of the surrounding environment consists of apartment, mixed-use bldg., and parks-grassy regions. |
| D    | More than 60% of the surrounding environment consists of mixed-use bldg. regions. |
| E    | Most of the surrounding environment consists of apartment and mixed-use bldg. regions. |
| F    | Most of the surrounding environment consists of apartment and parks-grassy regions. |

### Table 2. Sample Size and Distribution

|          | 2nd Graders (14 y) | 3rd Graders (15 y) | Total |
|----------|--------------------|--------------------|-------|
| Males    | 97 (27.2%)         | 89 (24.9%)         | 186 (52.1%) |
| Females  | 93 (26.1%)         | 78 (21.8%)         | 171 (47.9%) |
| Total    | 190 (53.2%)        | 167 (46.8%)        | 357 (100.0%) |

### Table 3. Cognitive Map and Analysis

| Cognitive Map | Mark on the Map |
|---------------|-----------------|
|                | Two types of fear of crime: 'Landmarks (commercial facilities)' in 'mixed-use building regions' in 'many bullies' reason and 'landmarks (green resting places)' in mixed-use building regions' in 'many bully peers' reason. |
and indirect contact with these crimes. The researchers explained that minor issues could be important information. 2) For five minutes, the students closed their eyes and imagined their way home from school and imagined where they might feel a fear of crime or where any of the crimes listed may have occurred. 3) A sequential type of sketch sample and the method to mark a photographic map were provided to students. 4) For 20 minutes, students sketched their way home from school, marking the criminal spots. 5) For five minutes, students then marked the spots they had sketched using the photographic map.

To analyze the cognitive map, the criminal spots drawn by students were used. The spots are where students felt fear of crime or where they encountered crime. They were coded into four categories: the regions where they occurred, the environmental elements as defined by Lynch (1960), the reason for the fear of crime, and the type of crime.

3. Results

3.1 Crime by gender and Home-School Patterns

Through an analysis of a cognitive map, this paper counted all of the criminal spots and divided them into places where crime was feared and places where crime actually occurred. Similar to previous studies (Dubow et al., 1979; Maxfield, 1987), the patterns of fear of crime did not closely reflect the occurrence of crime. In addition, similar to previous studies (Skogan and Maxfield, 1981), the frequency of where fear of crime was felt was 11.8 times higher than the occurrence of crime. As compared by gender, females had more fear of crime spots than males (p < .01). A similar result was also found that fear levels by gender groupings are inversely related to their victimization rates (Dubow et al., 1979). Those most fearful – elderly women – have the lowest victimization rates, whereas those least fearful – young men – have the highest victimization rates. Comparing in terms of the time required for the school-home trip, those with a trip of less than 15 minutes had less fear of crime compared to those whose trip was 15 minutes or more (p < .05). Regarding the trip time, the authors analyzed every minute (there were from 2 to 120 minutes in the answers to the open questions), but there were no differences except at 15 minutes. There were also no differences in the occurrence of crime and no differences between those who were alone and those who were not. In addition, there were no differences between those who walked and those who rode; although students felt safe when they rode, among all of the 60 criminal spots denoted by students who rode, 51 (85.0%) criminal spots were located between the school and the bus station or subway station (Table 4.). The students gave 330 individual reasons as to why they felt a fear of crime. Two hundred and six

| Reason for Fear of Crime | f (%) |
|--------------------------|------|
| Human factors            |      |
| Many bully peers         | 99 (30.0%) |
| Many bullies             | 56 (17.0%) |
| Few people               | 48 (14.5%) |
| No security guard        | 3 (0.9%) |
| Total                    | 206 (62.4%) |
| Space factors            |      |
| Darkness                 | 67 (20.3%) |
| Scary atmosphere         | 21 (6.4%) |
| Traffic danger           | 19 (5.8%) |
| Many trees               | 7 (2.1%) |
| Total                    | 114 (34.5%) |
| Others                   | 10 (3.0%) |
| Total                    | 330 (100.0%) |

Table 5. Reason for Fear of Crime (Including Duplicate)

| Type of Crime | f (%) |
|---------------|------|
| Property      | 14 (50.0%) |
| Encounter a molester | 8 (28.6%) |
| Violence      | 6 (21.4%) |
| Total         | 28 (100.0%) |

Table 6. Type of Crime

| Gender | Fear of Crime | N | Mean | Std. Deviation | df | t |
|--------|---------------|---|------|----------------|----|---|
| Male   | 186           | .77 | .914 |                 | 355 | -3.126** |
| Female | 171           | 1.09 | .981 |                 |    |   |

* p < .05, **p < .01, ***p < .001
(62.4%) of the reasons were related to human factors and 114 (34.5%) were related to space factors. The reasons related to people were usually divided into the two categories of 'many people' and 'few people'. The 'many people' reasons were further divided into two categories. 'Bully peers' included 'seniors', 'poor youth', 'male students', and 'scary students' on the cognitive map. 'Bullies' were a human factor for which an age was not expressed. This category included 'scary men', 'strange people', and 'bullies' on the cognitive map. The reason 'No security guard' was at the same spot of the specific location. The spot in this case is a permanent-lease apartment district in which low-income people and/or disabled people live. To reduce guard expenses, there were only three guards for the entire apartment complex (spot E2 in Table 11.; there would be about 15 guards in a similar area if not a permanent-lease apartment). The main reasons in order were, 'Many bully peers' at 99 (30.0%), 'Darkness' at 67 (20.3%), 'Many bullies' at 56 (17.0%), and 'Few people' at 48 (14.5%). The space factor 'Darkness' was also a reason for fear in other research (Hamsa et al., 2009).

The type of crime did not vary. The order was as follows: 'Property' at 14 (50.0%), 'Encounter a molester' at 8 (28.6%), and 'Violence' at 6 (21.4%). The answer 'Encounter a molester' appeared only for females (Table 6.). These results are similar to other research, which found that severe crimes are relatively rare in schools whereas minor victimizations are common (Garofalo et al., 1987).

### 3.2 Criminal Regions

As an analysis of the regional and environmental elements, this research limited the home-school area to 500m from the boundary of the school. Because 337 spots (94.1% among all 358 criminal spots) were inside the 500m boundary, and the authors could not precisely determine the spots on the map outside the 500m boundaries. Criminal spots differed according to the region. The top-ranked fear-of-crime areas were the mixed-use building regions, at 123 (39.8%). The top-ranked fear of crime was 'Many bully peers' at 99 (30.0%), 'Darkness' at 67 (20.3%), 'Many bullies' at 56 (17.0%), and 'Few people' at 48 (14.5%). The space factor 'Darkness' was also a reason for fear in other research (Hamsa et al., 2009).

The type of crime did not vary. The order was as follows: 'Property' at 14 (50.0%), 'Encounter a molester' at 8 (28.6%), and 'Violence' at 6 (21.4%). The answer 'Encounter a molester' appeared only for females (Table 6.). These results are similar to other research, which found that severe crimes are relatively rare in schools whereas minor victimizations are common (Garofalo et al., 1987).
Table 9. Fear of Crime by Regions and Environmental Elements

| Regions               | Environmental Elements | Total |
|-----------------------|------------------------|-------|
|                       | Paths                  | Districts | Nodes | Landmarks |       |
| Apartment regions     | 18 (5.8%)              | 17 (5.5%) | 3 (1.0%) | 77 (24.9%) | 115 (37.2%) |
| Mixed-use bldg. regions | 76 (24.6%)             | 5 (1.6%) | 9 (2.9%) | 33 (10.7%) | 123 (39.8%) |
| Park-grassy regions   | 70 (3.2%)              | 11 (3.6%) | 0 (0.0%) | 1 (3%)     | 22 (7.1%)   |
| School regions        | 38 (12.3%)             | 3 (1.0%) | 0 (0.0%) | 8 (2.6%)   | 49 (15.9%)   |
| Total                 | 142 (46.0%)            | 36 (11.7%) | 12 (3.9%) | 119 (38.5%) | 309 (100.0%) |

Table 10. Crime by Regions and Environmental Elements

| Regions     | Environmental Elements | Total |
|-------------|------------------------|-------|
|             | Paths                  | Districts | Nodes | Landmarks |       |
| Apartment regions | 0 (0.0%)              | 0 (0.0%) | 1 (3.6%) | 4 (14.3%) | 5 (17.9%)   |
| Mixed-use bldg. regions | 4 (14.3%)             | 0 (0.0%) | 0 (0.0%) | 5 (17.9%) | 9 (32.1%)   |
| Park-grassy regions    | 0 (0.0%)              | 4 (14.3%) | 0 (0.0%) | 0 (0.0%) | 4 (14.3%)   |
| School regions        | 6 (21.4%)              | 0 (0.0%) | 0 (0.0%) | 4 (14.3%) | 10 (35.7%)   |
| Total                 | 10 (35.7%)             | 4 (14.3%) | 1 (3.6%) | 13 (46.4%) | 28 (100.0%) |

ranked crime-occurrence areas were the school regions, at 10 (35.7%). Highest in terms of the frequency of where fear of crime was felt per 10,000m² were also mixed-use building regions, at 0.75, and crime-occurrence areas per 10,000m² were also school regions, at 0.13 (Table 7.). The school regions had high counts of fear of crime and crime per unit of area. This shows that although school regions may be small in terms of area, they are crucial criminal spots. The reasons for fear of crime in school regions were relatively high in terms of human factor; ‘many bully peers’ at 36 (70.6% among all 51 reasons for fear of crime in school regions), and ‘many bullies’ at 6 (11.8%). Therefore, in school regions, 82.4% of the reason for the fear of crime could be attributed to human factors. (Considering all reasons, 62.4% were attributable to human factors, as shown in Table 5.). Large commercial building regions, on the other hand, showed no criminal spots. An analysis of the cognitive map determined that the routes students take do not pass through these regions, mainly because they are close to others. This is in contrast to the high incidence of criminal spots in mixed-use building regions, which have relatively small commercial buildings.

3.3 Criminal Environmental Elements

This paper divided the environmental elements in the cognitive map into paths, edges, districts, nodes, and landmarks according to the classical theory of Lynch (1960). There were two edges, collectively referred to here as ‘the back of the school’, but they included paths as these spots were those in which people move.

Paths are the channels along which the observer customarily moves. Districts are the medium-to-large sections of the city, conceived of as having a two-dimensional characteristic. Considering the scale of the school-home boundaries, large parks, large grassy areas and the school area are considered as districts. Nodes are strategic meeting points along paths. Landmarks are singular objects that serve as general public reference points. In this paper, playgrounds, commercial facilities, green resting places, gates, bus stops, subway stations, and parking lots are considered as landmarks.

The frequency where fear of crime was felt was different according to their environmental elements. The top-ranked spot was paths at 142 (46.0% among all 309 fear-of-crime areas), and the second was landmarks at 119 (38.5%). The frequency of where crime occurred also differed depending on the environmental elements. The top-ranked spot was landmarks at 13 (46.4% among all 28 crimes), and the second was paths at 10 (35.7%) (Table 8.).

Regarding paths, criminal spots were noted at narrow one- or two-lane roads (about 3-8m wide) at 129 (84.9% among all 152 criminal spots of paths). Reasons behind the fear of crime on paths were mainly space factors; darkness at 44 (30.3% among all 145 reasons behind the fear of crime on paths), scary atmosphere at 17 (11.7%), traffic at 12 (8.3%), and many trees at 3 (2.1%). Hence, on paths, 52.4% of the reason for the fear was a space factor (considering all reasons, 34.5% was a space factor, as shown in Table 5.). In districts, the main fear of crime spots in order was parks-grassy districts at 16 (40.0%) followed by apartment districts at 15 (37.5%). Especially in parks-grassy districts, all crimes occurred among the districts. At the nodes, as with the paths, on the narrow two-by-two lanes criminal spots were most noted at 10 (76.9%). In terms of landmarks, the order of the criminal spots was playgrounds at 35 (26.5%), commercial facilities at 33 (25.0%), green resting places at 25 (18.9%), gates at 12 (9.1%), bus stops and subway stations at 10 (7.6%), and parking lots at 10 (7.6%). Top-ranked places – playgrounds, commercial facilities, green resting places, gates, and bus stops and subway stations – are places where people often come or where they gather. The reasons given for fear of crime at landmarks were mainly human factors: many bully peers at 53 (44.2% among all 120 reasons behind fear of crime at landmarks), many bullies at 32 (26.7%), and few people at 23 (19.2%). Thus, for landmarks, 90.0% of the reasons for fear of crime were linked to human factors, (considering all reasons, 62.4% were human factors, as shown in Table 5.).
### Table 11. Location and Analysis of Criminal Hot Spots

| Regions       | Environmental Elements | # F_CRI | Reason for Fear of Crime (freq) | # CRI | Type of Crime (freq) |
|---------------|------------------------|--------|---------------------------------|-------|----------------------|
| A1 REG_PAR    | ELE_DIS                | 4      | F_CRI_DAR(3), SCA(1)            | 0     | -                    |
| A2 REG_APA    | ELE_LAN                | 3      | F_CRI_PEE(2), BUL(1)            | 0     | -                    |
| A3 REG_APA    | ELE_LAN                | 3      | F_CRI_PEE(3)                    | 0     | -                    |
| A4 REG_APA    | ELE_GRE                | 3      | F_CRI_PEE(1), BUL(1), TRE(1)    | 0     | -                    |
| A5 REG_APA    | ELE_PAR                | 4      | F_CRI_PEE(2), BUL(2)            | 0     | -                    |
| A6 REG_APA    | ELE_LAN                | 4      | F_CRI_PEE(3), BUL(1)            | 1     | CRI_MOL(1)           |
| A7 REG_MIX    | ELE_LAN                | 5      | F_CRI_PEE(3), BUL(1), DAR(1)    | 0     | -                    |
| A8 REG_APA    | ELE_LAN                | 3      | F_CRI_PEE(2), BUL(1)            | 0     | -                    |
| A9 REG_SCH    | ELE_LAN                | 3      | F_CRI_PEE(3)                    | 1     | CRI_PRO(1)           |
| B1 REG_MIX    | ELE_NODE               | 2      | F_CRI_TEA(2)                    | 1     | CRI_PRO(1)           |
| B2 REG_SCH    | ELE_PAR                | 8      | F_CRI_PEE(4), TF(2), DAR(2)     | 0     | -                    |
| B3 REG_SCH    | ELE_PAR                | 3      | F_CRI_PEE(2), DAR(1)            | 1     | CRI_PRO(1)           |
| C1 REG_SCH    | ELE_PAR                | 3      | F_CRI_PEE(2), DAR(1)            | 0     | -                    |
| C2 REG_SCH    | ELE_NODE               | 4      | F_CRI_PEE(2), TRA(2)            | 0     | -                    |
| C3 REG_SCH    | ELE_PAR                | 3      | F_CRI_FEW(2), DAR(1)            | 0     | -                    |
| C4 REG_SCH    | ELE_DIS                | 3      | F_CRI_PEE(3)                    | 0     | -                    |
| C5 REG_MIX    | ELE_NODE               | 3      | F_CRI_PEE(2), BUL(1)            | 0     | -                    |
| C6 REG_APA    | ELE_PAR                | 4      | F_CRI_SCA(2), BUL(2)            | 0     | -                    |
| C7 REG_SCH    | ELE_DIS                | 4      | F_CRI_PEE(4)                    | 0     | -                    |
| D1 REG_SCH    | ELE_PAR                | 5      | F_CRI_PEE(3), DAR(2)            | 0     | -                    |
| D2 REG_MIX    | ELE_LAN                | 12     | F_CRI_PEE(8), TRA(2), DAR(2)    | 2     | CRI_PRO(2)           |
| D3 REG_MIX    | ELE_PAR                | 6      | F_CRI_PEE(2), DAR(2), TRA(2)    | 0     | -                    |
| D4 REG_MIX    | ELE_LAN                | 6      | F_CRI_PEE(4), DAR(2)            | 1     | CRI_PRO(1)           |
| E1 REG_PAR    | ELE_DIS                | 3      | F_CRI_DAR(2), BUL(1)            | 1     | CRI_MOL(1)           |
| E2 REG_APA    | ELE_DIS                | 7      | F_CRI_GUA(3), SCA(2), BUL(2)    | 1     | CRI_MOL(1)           |
| E3 REG_APA    | ELE_LAN                | 6      | F_CRI_PEE(3), DAR(2), BUL(1)    | 0     | -                    |
| E4 REG_APA    | ELE_LAN                | 5      | F_CRI_PEE(2), DAR(2), BUL(1)    | 1     | CRI_VIO(1)           |
| E5 REG_APA    | ELE_LAN                | 3      | F_CRI_PEE(2), DAR(1)            | 0     | -                    |
| F1 REG_PAR    | ELE_DIS                | 4      | F_CRI_BUL(2), DAR(2)            | 2     | CRI_VIO(2)           |
| F2 REG_SCH    | ELE_PAR                | 6      | F_CRI_PEE(1), FEW(1), DAR(1)    | 0     | -                    |
| F3 REG_SCH    | ELE_PAR                | 3      | F_CRI_PEE(2), DAR(1)            | 0     | -                    |
| F4 REG_APA    | ELE_LAN                | 4      | F_CRI_PEE(2), BUL(1), TRE(1)    | 1     | CRI_PRO(1)           |
| F5 REG_APA    | ELE_LAN                | 2      | F_CRI_PEE(1), BUL(1)            | 1     | CRI_PRO(1)           |

- **REG_APA**: Apartment regions
- **REG_MIX**: Mixed-use bldg. regions
- **REG_LAR**: Large commercial bldg. regions
- **REG_PAR**: Park-grassy regions
- **REG_SCH**: School regions
- **ELE_PAT**: Paths
- **ELE_DIS**: Districts
- **ELE_NODE**: Nodes
- **ELE_LAN**: Landmarks

**# F_CRI**: Frequency of Fear of Crime
**# CRI**: Frequency of Crime
**LAN_PLA**: Playgrounds
**LAN_COM**: Commercial facilities
**LAN_GRE**: Green resting places
**LAN_GAT**: Gates
**LAN_BUS**: Bus stops, subway stations
**LAN_PAR**: Parking lots
**LAN_GAT**: Gates
**LAN_GAT**: Gates
**LAN_GAT**: Gates
**LAN_GAT**: Gates

- **F_CRI_BUL**: Many bullies
- **F_CRI_GUA**: No security guard
- **F_CRI_DAR**: Darkness
- **F_CRI_SCA**: Scary atmosphere
- **F_CRI_TRA**: Traffic danger
- **F_CRI_MOL**: Encounter the molester
- **F_CRI_PRO**: Violence
- **F_CRI_VIO**: Violence
- **F_CRI_VIO**: Violence
- **F_CRI_VIO**: Violence
- **F_CRI_VIO**: Violence
- **F_CRI_VIO**: Violence
- **F_CRI_OTH**: Others

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3.4 Criminal Regions and Environmental Elements

When considering both regional and environmental elements related to spots in which fear of crime arose, the findings showed an order of landmarks in apartment regions at 77 (24.9%), paths in mixed-use building regions at 76 (24.6%), paths in school regions at 38 (12.3%) and landmarks in mixed-use building regions at 33 (10.7%). The spots where crime occurred were paths in school regions at 6 (21.4%), landmarks in mixed-use building regions at 5 (17.9%), landmarks in apartment regions at 4 (14.3%), paths in mixed-use building regions at 4 (14.3%), districts in park-grassy regions at 4 (14.3%), and landmarks in school regions at 4 (14.3%). Ironically, 80.2% among all criminal spots of landmarks in apartment regions – playgrounds at 29 (35.8% among all 81 criminal spots of landmarks in apartment regions), commercial facilities at 19 (23.4%), and green resting places at 17 (21.0%) – were planned spaces for the convenience and relaxation of people. There are issues regarding vegetation associated with a lower crime rate (Kuo and Sullivan, 2001) or a higher crime rate (Nasar and Fisher, 1993). The former line of study proposes that vegetation can inhibit crime through the following two mechanisms: by increasing surveillance and by mitigating mental fatigue. However, in this study, many students linked vegetation areas to criminal spots, and there actually were crimes at those spots. The reasons are linked to the causes behind the fear of crime and the type of crime in these areas. The most fearful factor that threatened the students was 'peers', and most of the crimes occurred when they were 'within peers'. Thus, a comfortable vegetated resting area can be a nest for bully peers, and this could be the greatest threat for younger students.

3.5 Criminal Hot Spots

Many criminal spots were reported repeatedly in some locations. Criminal spots marked more than three times were analyzed (Table 11.). Photos of the most commonly mentioned spots are presented (Table 12.).

| A6 | B3 | C3 |
|----|----|----|
| ![Green resting places in the apartment regions](image1.png) | ![Narrow paths around the school regions](image2.png) | ![Narrow paths in the mixed-use building regions](image3.png) |
| ![Commercial facilities in the mixed-use building regions](image4.png) | ![Playgrounds](image5.png) | ![Grand parks in the park and grassy regions](image6.png) |

Regarding the main criminal hot spots, the order was landmarks in apartment regions at 11 (32.4% among all 24 criminal hot spots), followed by paths in school regions at 6 (17.6%). While paths in mixed-use regions are high-ranked criminal spots, as they are scattered in terms of location, there were not many hot spots.

The hot spots were different than those in an earlier CPTED study (Crime Prevention through Environmental Design, Jeffrey, 1971). Newman (1972) presented 'Territoriality' and 'Natural Surveillance' as CPTED principles. Although the spots A2, A3, A4, A5, A6, A7, A8, C4, C7, D4, E1, E2, E3, F1, F4, and F5 were associated with territoriality, territoriality caused bully peers or bullies to congregate. This fact made students feel fear. Regarding these points, 51 (79.7% among all 64 reasons related to noted criminal hot spots; considering all reasons, 47.0% was a many-people factor, as shown in Table 5.) of the reasons for fear of crime were many-people factors.

Natural surveillance was an important factor in criminal hot spots. A1, B2, B3, C1, C6, D1, D3, F2, and F3 had poor natural surveillance conditions. Except for A1, all points were on a path, and six spots were on paths in school regions. The paths in the school regions were at the boundary of the school, because, except for students, people generally do not pass through them often. Therefore, despite the fact that they are a main route for students between school and home, they can be threatening places. On the other hand, spots A2, A3, A4, A5, A6, A7, A8, A9, B1, B4, D2, D4, E2, E3, E4, E5, F4, and F5 have good conditions in terms of natural surveillance. They are spots where people converge or where many people pass. Although the natural surveillance is good, students are afraid of the mere fact that people are grouping in these places. At these points, 55 (70.5% among all 78 reasons of noted criminal hot spots; considering all reasons, 47.0% was a many-people factor, as shown in Table 5.) of the
reasons behind fear of crime are many-people factors. At the 'hottest spot', D2, there is a small eatery where bully students meet. Many students pointed it out as a very scary spot. Considering that this point is located on nodes in front of the school gate, it has very good conditions for natural surveillance.

4. Discussion

The purpose of this paper was to find criminal spots on the way home from school for middle-school students. Through an analysis of a cognitive map, this paper studied the main issues listed below.

First, the fear of crime and actual crime show differences. The fear of crime does not closely reflect crime occurrence. The frequency of where a fear of crime was felt was higher than the occurrence of crime. There is similar research that shows that although actual crime rates have been decreasing, fear of crime is increasing and is more widespread than actual crime. Considering that the consequences of fear of crime are just as real as those of actual crime (Taylor, 1988), this could negatively affect the quality of students' lives, causing reduced academic achievement, the seeking of unnecessary security measures, and the removal of themselves from social activities.

Second, compared by gender, females have more fear of crime spots than males. This result is similar to those in previous studies (Dubow et al., 1979). Regarding the school-home trip time, trips of less than 15 minutes were linked to a lower fear of crime than those of 15 minutes or more. However, there were no differences between students who walked and those who rode. This fact is mitigated by the fact that although students feel safe while they ride, many criminal spots were noted between the school and the bus station or subway station. In addition, there were no differences between those who went alone and those who did not.

Third, the reasons why students feel fear is related more to human factors than space factors; among the human factors, 'peers' were the most frequent reason, as crime severity resulting from peer interactions was noted in a previous study (Kautt and Roncek, 2007). In particular, for landmarks the reasons for fear of crime were typically linked to human factors, and for paths more reasons for fear were space-related factors. The type of crime did not vary. Moreover, similar to the findings of a previous study (Garofalo et al., 1987), severe crimes were relatively rare.

Fourth, mixed-use building regions were the most commonly cited criminal regions. In addition, school regions are small in area but were crucial criminal spots. Large commercial building regions were not mentioned as criminal spots, as students do not pass through these regions.

Fifth, considering environmental elements, narrow paths and landmarks where people can congregate were cited as criminal spots. Although many studies linked lower crime and vegetation as factors of natural surveillance and mental stability, in this study, a vegetated rest area was a condition that caused students to conceive of this type of area as a criminal space. This led to fear related to the fact that these places are good for bully peer congregation.

Sixth, considering the CPTED principles territoriality and natural surveillance, criminal hot spots in this study showed different characteristics regarding territoriality. This may be a cause for the creation of criminal spots, as they provide a place to congregate. In Addition, for teenagers, some divided views arose regarding the role of natural surveillance.

It is hoped that this study of criminal spots on the way home from school for middle-school students will serve as an important guideline for these students as well as for school officials, parents, and environmental planners.

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