

1 Article

2 Effects of Commercial Activities by Type on Social 3 Bonding and Place Attachment in Neighborhoods

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9 **Abstract:** Place attachment is an emotion that people experience in connection to a specific place
10 and it is needed to maintain sustainable neighborhood community. The emotion is affected by
11 various factors, such as experience, function, environment, and satisfaction. This study focuses on
12 commercial structures, which are one feature that characterize the physical environments of
13 neighborhoods. The aim of this study is to determine the effects of commercial activities in different
14 commercial environments on social bonding and place attachment in residents. Two sites were
15 selected for analysis due to their different commercial environments, and path analysis was used to
16 examine the relationships among factors. The results indicate that the type of commercial
17 environment had effects on commercial activities, including shopping frequency, and that
18 commercial activities affected social bonding and place attachment in residents. Also, commercial
19 activities had indirect effects on place attachment through social bonding between residents. These
20 results suggest that the commercial environment is an important element affecting the community
21 and place attachment of residents in neighborhoods.

22 **Keywords:** place attachment; commercial type; commercial activities; social bonding, physical
23 activities
24

25 1. Introduction

26 In light of the emotions, intimacy, and happiness that people feel in connection to their
27 neighborhoods, there is more than functional and physical meaning to neighborhoods. The emotional
28 ties of residents to the area in which they live can be defined as place attachment to a neighborhood.
29 Analysis of such has been extensively addressed in looking at the emotional experiences of people
30 and people's ties to places in terms of various factors of function and satisfaction [1-4]. Place
31 attachment is a concept similar to residential satisfaction in terms of cognition about a physical
32 environment, with one important distinction. If residential satisfaction is a functional evaluation of a
33 place of residence from the viewpoint of the people living there, then place attachment is an
34 emotional evaluation of the place of residence. In order to foster a salubrious neighborhood, it is
35 necessary to consider not only the functional aspects of a place, but also the psychological and
36 emotional demands of human beings. In this context, place attachment can be an important criterion
37 of residential environment evaluation [5]. Because place attachment is formed when a person is
38 psychologically connected to a specific place, it can be a source of relief for residents amid the rapid
39 changes of modern urban environments.

40 Place attachment can be formed by various factors. In the work of Lewicka [6], which analyzed
41 the studies of place attachment within the past 40 years, various variables including socio-
42 demographic, social, and physical predictors are identified in place attachment. Many of the previous
43 studies related to place attachment in neighborhoods have been conducted in terms of the influence
44 of physical environment characteristics on place attachment in local residents [7-11]. This is because
45 place attachment is basically an emotional bond that a person has with a place. On the other hand,
46 some studies [4,7,9] have analyzed the influence of social bonds on place attachment, focusing on the

47 social ties of residents of a neighborhood. Additional other studies [7,12,13] have investigated the
48 influence of people's personal characteristics on place attachment.

49 Overall, research results show that physical environment characteristics such as place, personal
50 characteristics of individual residents, and characteristics of social relationships between residents
51 influence the formation of place attachment among locals. Based on these results, the focus of this
52 study is the relationships among these various physical environment characteristics and place
53 attachment. Beyond the influence of place attachment on individual variables, it is necessary to clarify
54 the mechanism of the relationship of structural influence among the features of physical
55 environments, the personal characteristics of residents, and social bonding. In order to establish the
56 relationship between place attachment and its influencing variables, it is necessary to understand the
57 interaction between people and place—as well as between people and people—in the physical
58 features of neighborhoods. In this study, we focus on “activities” as a key parameter in our
59 understanding of the relationships between the variables affecting place attachment.

60 From the perspective of environmental psychology, human activities arise in the context of an
61 environment. Many studies have demonstrated the relationships between physical environment and
62 people's activities [14-17]. If the neighborhood environment affects people's activities, and if the
63 activities affect the level of place attachment, then it is possible to discuss which characteristics of a
64 neighborhood environment ultimately promote place attachment. If the unique physical
65 environment of a neighborhood increases the amount and types of activities pursued by its
66 residents—thereby positively impacting place attachment—then physical environment
67 characteristics stand to provide urban design implications for a salubrious neighborhood.

68 Among various activities that occur in a neighborhood, this study focuses on commercial
69 activities. Commercial activities are basic, essential activities in people's daily lives. Depending on
70 the type of commercial facility, however, the style of activities can be very different. Various types
71 and characteristics of commercial facilities are identified based on their location, usage, and
72 surroundings, but commercial facilities can be compared in two forms: street shops, which are located
73 on the side streets of residential environments, and mall-type shops, describing a configuration in
74 which shops are concentrated in specific buildings (in contrast to street shops). In terms of the
75 commercial environment of a neighborhood, this difference in commercial form can impact the
76 commercial activities of residents. As a result, the distinction can manifest as a difference in
77 neighborhood activities. In a neighborhood with small shops, small quantities of goods are frequently
78 purchased. In contrast, in a neighborhood with large marts, large amounts of goods are purchased
79 less frequently. Also, if an individual uses a car to purchase a large quantity of goods, then the
80 individual may have fewer opportunities for come into contact with her or his neighbors and less
81 interaction with the neighborhood environment than by walking on foot. Thus, these differences in
82 commercial activities may lead to differences in face-to-face opportunities among human beings. The
83 activities of the residents in a neighborhood can be a driving force for local initiatives such as local
84 revitalization and community spirit.

85 In this respect, commercial forms affect the physical activities of people and are therefore an
86 important subject of study in terms of social bonding among residents in a neighborhood and the
87 promotion of place attachment. Various physical elements of neighborhoods have been studied,
88 including walkability [17,18], street connectivity [19], land-use mix [15,16], pedestrian and traffic
89 safety [20], and recreation facilities and parks [16]. In contrast, however, few studies have focused on
90 the physical elements of commercial activities and commercial types—one of the basic activities of
91 people's daily lives. Indeed, there are no studies to analyze relationships among the influencing
92 factors of place attachment, such as the effects of commercial form on people's commercial activities
93 and the effects of commercial activities on social bonding and place attachment. Therefore, this study
94 investigates the effects of “activities” as a function of commercial form in relation to the physical
95 environment of a neighborhood, social bonding between residents, and place attachment.

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99 2. Previous studies

100 2.1 Place attachment

101 The concept of attachment can be applied to explain the relationship between human beings and
102 the environment (that is, our interest in a specific place or community), although the concept is
103 mainly described in terms of people's connection to other people, such as infants and parents or
104 family and friends. Recent research has focused on attachments and so-called place attachments in
105 terms of "friendliness to physical places" in contrast to the relationship networks between people
106 that are emphasized in sociological research. Place attachment can be understood in two dimensions:
107 place identity and place dependence [21]. Proshansky [22] defines place identity as "a complex
108 pattern of beliefs, values, feelings, expectations, and preferences relevant to the nature of the physical
109 world," which is a complex cognitive structure of a person at a specific place. Place dependence is a
110 functional relationship with a person's residence (or other specific area) and may be explained by
111 comparing one place with another according to individual needs. In this sense, place dependence is
112 defined in terms of whether a particular area or facility functions in accordance with a user's activities
113 [23].

114 Place attachment is a complex concept that describes the interaction of emotional or symbolic
115 relationships, emotions that are formed in a single physical environment, and human
116 interrelationships and feelings occurring in that particular place. In other words, place attachment
117 shows the ways in which a place is more than just a physical environment. Place attachment arises
118 not only from the place itself, but also from emotions due to consciousness, experience, psychological
119 reaction, symbolism, and other complex functions of cognition that people associate with the place
120 [24]. Thus, we can define place attachment as being caused by empirical experiences that occur when
121 people consistently interact with a specific place. From this point of view, if the residents in a
122 neighborhood engage in continuous visits and activities in a specific place, a positive relationship
123 may be found between people and place in the form of place attachment.
124

125 2.2 Place attachment in neighborhoods

126 Place attachment refers to an emotional factor between people and physical spaces. In this
127 context, research trends related to place attachment have examined personal, social, and regional
128 differences in place attachment, together with the factors affecting place attachment. Existing research
129 mainly deals with personal and social variables (such as race, age, and economic power), time
130 variables (such as duration of residence and satisfaction with the local environment), and spatial
131 characteristics. This multifactorial lens suggests the complexity of the feeling of place attachment.

132 It is generally accepted that levels of satisfaction with people's residential environments are
133 highly related to place attachment [7-11]. In order to maintain place attachment, certain
134 neighborhood environment standards must be achieved. In declining residential areas, the level of
135 attachment of people to their place of residence will decline, and relocation will be considered due to
136 deterioration of the quality of life [25]. Place attachment occurs mainly through neighborhood
137 environments and in bonding with neighbors. Neighborhood satisfaction, which is a passive, direct
138 experience—as opposed to social bonding with neighbors (which needs to be actively pursued during
139 settlement in a new local environment or following neighborhood redevelopment)—plays an
140 important role in the formation of place attachment [4]. In addition, place attachment has different
141 characteristics depending on the scale of a place, such as a city versus a smaller neighborhood [2,26].

142 In the physical environment of a neighborhood, place attachment changes according to the
143 personal and social characteristics of the people directly experiencing place attachment. There are
144 differences depending on whether people reside in a home of their own, on race [7], and on whether
145 people are indigenous or immigrants [12]. If there is a link between residents and a neighborhood
146 wherein place attachment is formed, positive effects are noted in the neighborhood environment.
147 Home ownership, race parity, and indigenous people inspire a sense of belonging to an area. In this
148 respect, bonding with neighbors is an important factor in place attachment. When this bond is strong,

149 place attachment is positively affected [4,7,9]. On the contrary, if there is a low level of solidarity
150 among residents and people move frequently, the formation of place attachment can be difficult [3].
151 To increase social bonding between neighbors, contact with neighbors and time spent together must
152 increase. In other words, the accumulation of experience in the neighborhood is important, and
153 experience is generally proportional to time. A variable that represents this relationship in the context
154 of neighborhoods is duration of residence. Many studies have shown that residence period has an
155 impact on place attachment [7,9,27,28].

156 In order to foster strong social bonding and place attachment among residents, residents should
157 be active in their neighborhood, and the neighborhood environment should reflect their desires.
158 Various features of the walking activities. Walking also positively affects resident bonding [29], and
159 walking-friendly neighborhood conditions can improve people's sense of community [30,31]. This
160 correlation explains the importance of a neighborhood's physical environment relative to the amount
161 and types of activities that occur therein in the context of place attachment. Accordingly, this study
162 aims to investigate the effects of commercial activities on social bonding by neighborhood
163 commercial types, together with the impact on place attachment.

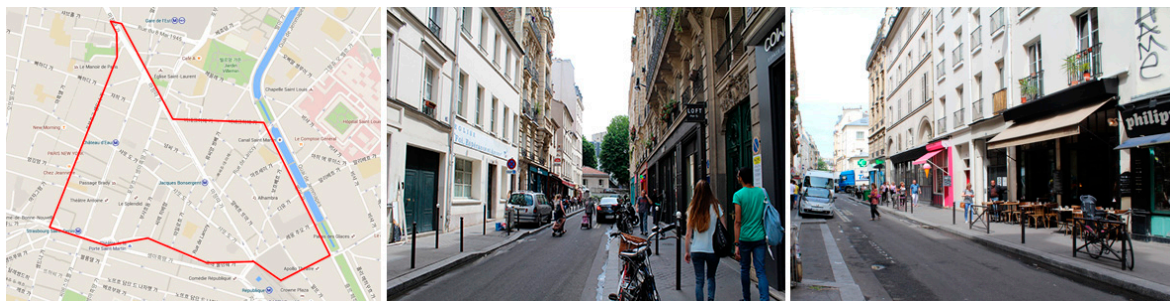
164 3. Methods

165 3.1 Study Areas

166 Neighborhoods characterized by different types of commercial structures were selected in order
167 to analyze the relationship between social bonding and place attachment according to commercial
168 types. The distinction is between commercial types of street shops or a shopping mall. First, Lancy
169 in Paris, France, was selected to represent the street shops type. The whole area is characterized by
170 medium-rise buildings with an average of six to seven floors. On the first floors of buildings, various
171 small shops including commercial, service, and manufacturing shops are located along the street. The
172 upper parts of the buildings are composed of residential living spaces. Lancy is included in a
173 grouping of 11 regions that comprise the business district of Vital'Quartier, initiated in 2004 by the
174 Société d'Economie Mixé d'Aménagement de l'Est de Paris (SEMAEST) as part of the commercial
175 revitalization project in Paris. It can be seen as a discrete area of residential and commercial
176 enterprise.

177 Secondly, La Défense was chosen to represent the shopping mall type of commercial area
178 (designated in comparison to the street shops type). La Défense is a representative new town in
179 France, and has two large shopping malls (i.e., CNIT and Quaten Temps). In Paris, entrances to large
180 shopping malls do not accord with property regulations. Thus, unlike the street shops seen in Paris,
181 large, mall-type commercial facilities are used by residents of La Défense for various shopping
182 activities.

183



184
185 **Figure 1.** Lancy

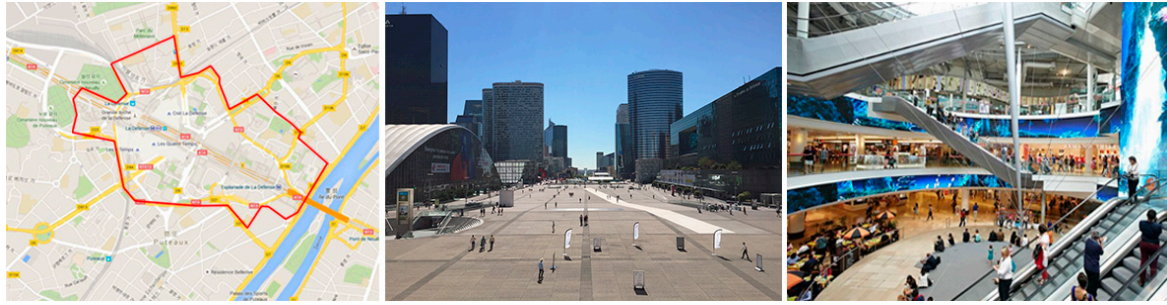


Figure 2. La Défense

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188 3.2 Variable Settings

189 First, the two commercial types were changed to dummy variables (street: 1, mall: 0) to
190 determine the effects of the commercial types. The weekly shopping frequency of residents
191 depending on the commercial type was measured to represent levels of commercial activities (1 to 5
192 points). Aspects of social bonding were established as variables to determine whether bonding
193 among residents affects place attachment, and the items were related to levels of closeness among
194 neighbors. Place attachment variables were measured using place identity (measured by a
195 fundamental question about the extent to which residents feel attached to their neighborhood) and
196 place dependence, which is a functional necessity.

197 By definition, place attachment is affected by levels of attachment in residents to a specific place.
198 Accordingly, neighborhood environments and place attachment have been the main subjects of
199 previous research. In this study, the following variables were set as environmental factors in order to
200 scrutinize environmental factors through an analytical lens. First, parameters of “satisfaction with
201 commercial infrastructure” and “satisfaction with commercial quality” were set in terms of
202 commercial environment satisfaction. Two variables were set to determine whether the physical
203 features of commercial environments influence place attachment or whether qualitative factors of
204 shops have effects on place attachment. In addition, the variable of “satisfaction with neighborhood
205 facilities” was set in order to confirm the effects of neighborhood environments in the findings of
206 previous research on place attachment.

207 3.3 Questionnaires and Data Collection

208 Questionnaires consisted of items about place attachment, social bonding, commercial
209 satisfaction, and resident satisfaction with neighborhood facilities. The items related to place
210 attachment and social bonding were reconstructed based on previous studies [9,11,32]. The items on
211 commercial satisfaction and neighborhood satisfaction were constructed based on the activities and
212 direct experiences of the residents in the neighborhoods. Complete questionnaires included five
213 items on place identity, five items on place dependency, five items on social bonding, eight items on
214 commercial satisfaction, and six items on neighborhood satisfaction. All of the above items were
215 measured on a five-point scale.

216 A total of 164 questionnaires were collected. The questionnaires were conducted from June 26
217 to June 27, 2015, in Lancry, Paris, and six people were surveyed from 10am to 7pm. Of the total
218 questionnaires, 94 were collected from residents of Lancry. On June 30, 2015, the same surveyor
219 conducted the questionnaire among La Défense residents, collecting a total of 70 surveys. In Lancry,
220 the questionnaire was conducted among local residents passing through the streets where the shops
221 are located. Because the large shopping mall in La Défense is a destination commercial center, local
222 residents in addition to people coming from distant areas to shop were potentially involved in the
223 survey. Thus, the survey was conducted in residential areas and squares or parks in the greater La
224 Défense area, rather than in the shopping mall itself. For accuracy of communication, the
225 questionnaire was a non-English version conducted in French. The collected questionnaires were
226 coded using SPSS 21 statistical software.

227

Table 1. Questionnaire items

Factors	Items		
Place attachment	Place identity	This neighborhood is important in my life. I say that I live in this neighborhood when I introduce myself. If someone asks me about this neighborhood, I can answer the questions.	
	Place dependence	I am proud to live in this neighborhood. This neighborhood is special to me. This neighborhood is suitable to my line of work.	
		Social bonding	This neighborhood is better to live in than other neighborhoods I do many activities around this neighborhood. Leaving this neighborhood causes me to feel sad. I would live in this neighborhood even if I had the chance to move to other areas. I know the residents of my neighborhood well. I have friendly neighbors to talk to. I have many friends in the neighborhood. I attend neighborhood gatherings often. I attend the event of neighborhood often.
			Satisfaction with commerce
	Shopping frequency		
	Satisfaction with neighborhood facilities	Green space, public and cultural facilities, public transportation, education services, safety, pedestrian environment	
		Commercial type	Street shops-type neighborhood: Lancry Mall type-neighborhood: La Défense

Note. Place identity and place dependence items, as well as social bonding items, are in a designated order (e.g., identity 1, identity 2); Commercial type: Street shops = 1, Mall = 0

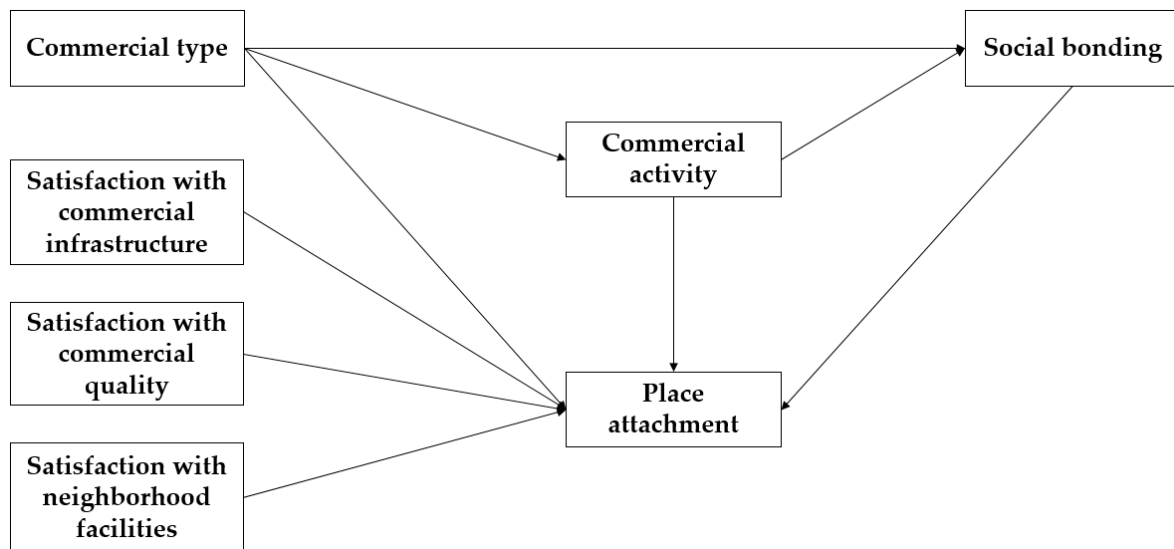
230 3.4 Research Design

231 This study focuses on the influence of commercial environment features on place attachment in
232 residents of a neighborhood. To accomplish this, we performed the following two-step model
233 setting process.

234 First, the commercial environment of a neighborhood will affect place attachment in residents.
235 This assumes that the basic types of commercial structures in a neighborhood (e.g., street shops and
236 mall types), satisfaction with commercial infrastructure, and commercial quality are directly related
237 to place attachment. Second, the relationships among commercial activities, social bonding between
238 residents, and place attachment in different neighborhoods with different commercial types will be
239 different. The activities of people are influenced by the physical environment, and neighborhoods
240 characterized by different commercial types—such as street shops or mall types—are likely to affect
241 the commercial activities and levels of social bonding in an area.

242 As shown in Fig. 3, the model of this study is designed by combining the above two steps.
 243 First, factors related to the commercial environment (commercial types, infrastructure, and quality)
 244 will affect place attachment. Second, different commercial types affect the commercial activities and
 245 levels of social bonding and thereby have indirect effects on social bonding through commercial
 246 activities. Finally, commercial activities have direct effects on social bonding and place attachment,
 247 with indirect effects on place attachment through social bonding.

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Figure 3. Research model

252 3.5 Data Analysis using Path Analysis

253 Based on the collected survey data, the following analysis process is conducted to confirm the
 254 purpose of this study. First, factor analysis is conducted based on questionnaire items to derive
 255 analysis factors. Second, correlation analysis is performed to analyze the correlation between factors
 256 and to remove factors with high relevance. Finally, analysis of the research model shown in Fig. 3 is
 257 conducted through path analysis using the Amos program.

258 Path analysis is a technique for explaining the causal relationships between variables in a non-
 259 experimental situation. The validity of the causal relationships between variables is examined using
 260 the collected data. The effects of any one variable on another variable are called direct effects, while
 261 the effects of one variable on one (or more) variable(s) by way of other variable(s) are called indirect
 262 effect. The purpose of this study is to analyze direct and indirect effects of commercial environment
 263 features and commercial activities on social bonding and place attachment using path analysis based
 264 on collected data.

265

266 4. Results

267 4.1 Demographics and Factor Analysis

268 The demographic characteristics of the subjects were as follows. Of 164 total subjects, 87 were
 269 males and 77 were females. In terms of age distribution, the highest proportion of the sample was
 270 people in their 30s (24.4%), followed by those in their 20s (23.8%), and those in their 40s (14.6%). The
 271 highest proportion of the sample claimed a residence period of 4-10 years in a neighborhood (31.7%),

272 followed by 1-3 years (21.3%). In addition, 47% of the residents had lived for longer than 10 years in
 273 the neighborhood. Distribution according to site was 57.3% in Lancry and 42.7% in La Défense.
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Table 2. Demographics

Factors		Lancry N (%)	La Défense N (%)	Total N (%)
Sex	Males	51 (54.3)	36 (51.4)	87 (53)
	Females	43 (45.7)	34 (48.6)	77 (47)
	Total	94 (100)	70 (100)	164 (100)
Age	10s	7 (7.4)	15 (21.4)	22 (13.4)
	20s	23 (24.5)	16 (22.9)	39 (23.8)
	30s	20 (21.3)	20 (28.6)	40 (24.4)
	40s	17 (18.1)	7 (10.0)	24 (14.6)
	50s	16 (17.0)	4 (5.7)	20 (12.2)
	60s and over	11 (11.7)	8 (11.4)	19 (11.6)
	Total	94 (100)	70 (100)	164 (100)
Residence period	1-3 years	23 (24.5)	12 (17.1)	35 (21.3)
	4-10 years	26 (27.7)	26 (37.1)	52 (31.7)
	11-15 years	13 (13.8)	16 (22.9)	29 (17.7)
	16-20 years	16 (17.0)	10 (14.3)	26 (15.9)
	21 years	16 (17.0)	6 (8.6)	22 (13.4)
	Total	94 (100)	70 (100)	164 (100)

276 Factor analysis was performed twice. The first group included items related to commerce and
 277 neighborhood facilities, and the second group included items related to place attachment. The final
 278 factors are “satisfaction with commercial infrastructure” (SCI), “satisfaction with commercial
 279 quality” (SCQ), “satisfaction with ‘neighborhood facilities” (SNF), “place attachment” (PA), “social
 280 bonding” (SB) (see Table 3), and “commercial activities” (CA).

281 Table 4 shows that the averages for the factors are different according to the site. For SNF, the
 282 value for La Défense (3.55) was higher than the value for Lancry (3.14). However, for the other factors
 283 of PA (Lancry: 3.52; La Défense: 3.04), SB (Lancry: 2.98; La Défense: 2.75), SCI (Lancry: 3.65; La
 284 Défense: 3.42), SCQ (Lancry: 3.44; La Défense: 3.23), CA (Lancry: 2.80; La Défense: 2.31), and residence
 285 period (Lancry: 13.38; La Défense: 10.54), the values for Lancry were higher than the values for La
 286 Défense. Especially, CA in Lancry (2.80) was higher than in La Défense (2.31), which means that CA
 287 can vary depending on the commercial presence.

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Table 3. Factor analysis

	Factors	Factor loading	Cronbach's α
Satisfaction with commercial infrastructure	Necessary shops	.840	.758
	Number of shops	.691	
	Distance to go to shops	.683	
	Types of shops	.676	
Satisfaction with commercial quality	Type and quality of products	.814	.618
	Price of products	.689	
	Service of shops	.654	
Satisfaction with neighborhood facilities	Green space	.853	.658
	Public and cultural facilities	.760	
	Pedestrian environment	.654	
	Place identity 5	.797	
	Place dependence 2	.765	
	Place identity 4	.764	
	Place identity 1	.758	
	Place dependence 3	.745	
	Place dependence 4	.713	
	Place identity 3	.663	
Duration of residence	Place identity 2	.660	.891
	Place dependence 5	.594	
	Community 3	.845	
	Community 2	.797	
	Community 1	.757	
Social bonding	Community 4	.626	.778

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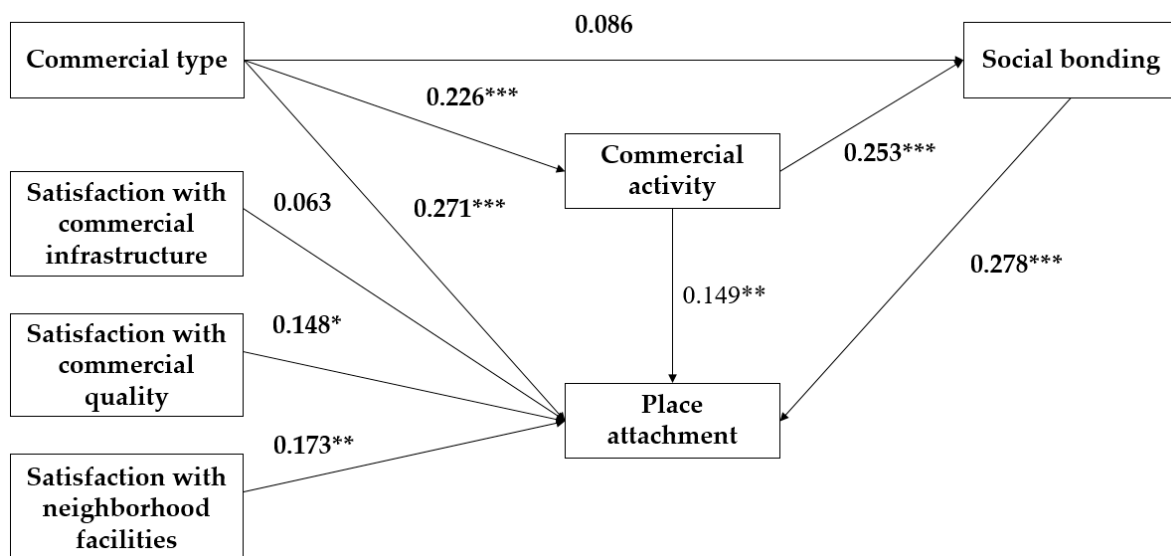
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Table 4. Average value of factors

Factors	Site	N	Avg.	S.D.	S.E.
Satisfaction with commercial infrastructure	Lancry	94	3.65	.63087	.06507
	La Défense	70	3.42	.76084	.09094
Satisfaction with commercial quality	Lancry	94	3.44	.58294	.06013
	La Défense	70	3.23	.57972	.06929
Satisfaction with neighborhood facilities	Lancry	94	3.14	.76911	.07933
	La Défense	70	3.55	.69710	.08332
Social bonding	Lancry	94	2.98	.75956	.07834
	La Défense	70	2.75	.83839	.10021
Place attachment	Lancry	94	3.52	.67531	.06965
	La Défense	70	3.04	.69590	.08318
Commercial activities	Lancry	94	2.80	1.08039	.11143
	La Défense	70	2.31	1.02918	.12301
Duration of residence	Lancry	94	13.38	11.51913	1.18811
	La Défense	70	10.54	7.25456	.86709

295 *4.3 Path Analysis and Indirect Effects*

296 Path analysis was used to examine the effects of factors. The model ($p = .501$, $CMIN/df = 5.342$,
 297 $RMR = .020$, $RMSEA = .000$, $GFI = .991$, $NFI = .968$, $NFI = .968$, $CFI = 1.000$) in Fig. 4 shows the results.
 298 Commercial type had a positive effect on CA ($\beta = .226$, $p < .01$) and PA ($\beta = .271$, $p < .01$) but did not
 299 have a relationship with SB. Commercial activities (CA) had a significant relationship with SB ($\beta =$
 300 $.253$, $p < .01$) and PA ($\beta = .149$, $p < .05$), and SB positively affected PA ($\beta = .278$, $p < .01$). Additionally,
 301 SCQ ($\beta = .148$, $p < .01$) and SNF ($\beta = .173$, $p < .05$) had effects on PA, and SCI did not have a significant
 302 relationship with PA.
 303

304
305**Figure 4.** Path analysis

306 Table 5 shows the indirect effects of CT through CA on PA and SB and of CT through SB on PA.
 307 Analysis was conducted with two-tailed significance in Amos. First, the value of the indirect effect of
 308 the path of CT → CA → SB was .057 ($p < .01$), which was significant. Also, the value of the indirect
 309 effect of CT → CA → PA was .074 ($p < .05$). Lastly, the value of the indirect effect in the path of CT →
 310 SB → PA was .70 ($p < .01$), which was statistically significant.

311
 312

Table 5. Analysis of indirect effects

	Direct effects	Indirect effects	Total effects
CT → CA → SB	.086	.057***	.144
CT → CA → PA	.271	.074**	.345
CA → SB → PA	.149	.070***	.220

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

313

314 5. Discussion

315 Previous studies have mainly focused on satisfaction of residents with a specific place in terms
 316 of the relationship between neighborhood environment and PA. In contrast, this study finds that CT,
 317 which is the physical form of certain distinguishing characteristics in a neighborhood, affects the
 318 activities of people and thus positively affects SB and PA. Place attachment (PA) refers to the
 319 emotions that a person has in connection to a specific place and his or her experience of activities
 320 therein. Accordingly, it was necessary to discuss not only people's primary satisfaction with the
 321 physical space, but also whether the characteristics of the physical environment led to certain types
 322 of human activity, thereby affecting level of PA. Therefore, this study analyzed the CT and CA, as
 323 well as SCI and SCQ as influencing factors of place attachment. The results are as follows.

324 First, the SCI of the neighborhood was not significant, but the SCQ was positively significant
 325 among residents. Satisfaction with commercial infrastructure (SCI) is composed of variables
 326 including the number of necessary stores (meaning the number of stores that sell items necessary for
 327 daily living), accessibility, number of stores, types of stores, and other variables, and the factor can
 328 be regarded as an indication of the physical environment of local commerce. The function of
 329 commercial facilities located in a neighborhood is to provide basic goods necessary for daily life. The
 330 two sites herein, Lancry and La Défense, have basic infrastructure for neighborhood commerce.
 331 Therefore, rather than the commercial infrastructure, the qualitative satisfaction of the goods offered
 332 by the shop, friendly service, and price influence the formation of place attachment.

333 Second, analysis of neighborhood CT by street shops and mall type supports our analysis of the
 334 study objective herein. It was confirmed that CT affects the CA of residents. This finding is confirmed
 335 in part through the higher value of CA of residents in the neighborhood with street shops than in the
 336 neighborhood with malls. From the standpoint of neighborhood design, this result shows that
 337 different types of commercial structures can produce different patterns of daily life in neighborhood
 338 residents. In a neighborhood with street shops, with a high shopping frequency, CT acts as a factor
 339 that to increase opportunities among residents to meet with one another relative to these
 340 opportunities in neighborhoods with other commercial features. Therefore, it is expected that SB will
 341 increase in neighborhoods with street shops as well as the promotion of local affection among
 342 residents. This expectation is supported by the finding that CA has a positive effect on SB. Increased
 343 levels of activity lead to the accumulation of neighborhood experiences with other residents, which
 344 leads to the formation of bonds between locals and place attachment.

345 Finally, the most important factor in this study is the "activities" element. The results show that
 346 increased SB of residents is due to the CA of residents, which depends on the CT of neighborhoods.
 347 While the CT does not directly affect SB, the factor is influenced by the parameters of CA. As a result
 348 of this study, we see that SB ultimately positively affects residents' PA to a neighborhood. The reason

349 why SB is important in PA is not only the feelings of attachment that people have to a specific place,
350 but also because the emotions felt by people identifying as members of a community through their
351 relationships with neighbors is a factor in the formation of PA. The results show that SB has the
352 greatest direct effect on PA ($\beta = 0.278$). Further, the mediating effects between CA and PA show the
353 importance of SB in PA.
354

355 6. Conclusion

356 The results of this study confirm that CT and CA among people in neighborhoods are
357 influencing factors in the SB and PA of local residents. Based on the results of the study, two measures
358 could be proposed as measures to increase place attachment in locals for sustainable neighborhood
359 environments. The accumulation of experiences in places and bonding among local people are the
360 methods whereby place attachment is formed. These are items that can be promoted based on the
361 activities of residents in a neighborhood. In particular, this study analyzes the daily activities of
362 residents in terms of their commercial activities, which provides implications for community and
363 neighborhood design with regard to commercial features. The commercial environments of
364 neighborhoods and the commercial activities occurring therein are basic activities in the daily lives
365 of people. Until now, the focus on commercial features in urban design and neighborhood
366 environments has been solely on physical quality and satisfaction. However, the results of the study
367 demonstrate that the commercial environment is not simply a place to facilitate purchase transactions
368 among residents. The commercial environment is an important factor that increases bonding among
369 the people in neighborhoods and strengthens the attachment of locals to their place.

370 In order to promote the commercial activities of residents in neighborhoods, it is necessary to
371 design neighborhoods that consist of small-scale stores rather than large-scale mall-type stores.
372 However, current commercial spaces are becoming larger than ever. As a result of the decline of
373 small-scale stores—a potential place for interaction and communication among locals—opportunities
374 for exchange activities among residents have decreased. In addition, when small-scale merchants are
375 replaced by large shopping malls, independent stores with diverse personalities tend to disappear.
376 Over time, the unique characteristics of each trade will be replaced by the uniformity of commercial
377 franchises. From the point of view of residents, favorite shops are disappearing, and there are fewer
378 places where they want to go. This can have a negative impact on the formation of place attachment,
379 as the appealing features of neighborhood local commerce are lost.

380 In order to create neighborhoods that people want to live in, place attachment via social bonding
381 should be strengthened, and urban design that increases the activities of residents in neighborhoods
382 should be reflected. From this point of view, this study suggests that small commercial spaces, such
383 as street shops, are more effective than large malls in enhancing local attachment.
384

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