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**How residents cope with neighbour noise: The role of
attitude towards the neighbours**

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How residents in multi-family housing cope with neighbour noise: The role of attitude towards the neighbours

Abstract

Aims: Residents in multi-family housing are considerably exposed to neighbour noise, which can lead to neighbour disputes and even criminal violence. This paper discusses a study that investigated how residents' attitudes towards noisy neighbours develop and the role such attitudes then play in their reactions to neighbour noise. **Methods:** In-depth interviews were carried out with 57 residents in multi-family housing in South Korea. The data were collected and analysed using grounded theory. Concepts and categories were identified through open coding and axial coding, respectively. **Results:** Residents' attitudes towards the neighbours (i.e. noise source) were grouped into friends, enemies, and strangers/acquaintances. Each attitude formation was influenced by the individual's past experience/history, the attitude shown by the neighbours, and the predictability/certainty of noise exposure. Different attitudes towards the neighbours resulted in different cognitive and behavioural copings. **Conclusion:** The findings support current understanding of the relationship between attitudinal variables and community noise reactions. Since neighbour noise issue involves interpersonal relationship between neighbours, the findings extend the scope of existing understanding. The paper suggests that further investigation into coping strategies would have practical implementations for reducing conflict arising from neighbour disputes.

Keywords: Neighbours; Noise; Affect; Attitude; Cognitive coping; Behavioural coping; Grounded Theory

1. Introduction

Noise is an environmental stressor that has been shown to have adverse impacts on human well-being (Bell, Fisher, Baum, & Greene, 1990; Bronzaft, 2002). It can cause not just auditory health problems such as hearing impairment but also various non-auditory health risks, for example sleep disturbance. Neighbour noise is a significant environmental noise source that affects human well-being (Berglund & Lindvall, 1995), particularly in multi-family housing (Jeon, Hong, Kim, & Lee, 2015). This type of housing accounts for over 60 % of all housing units in South Korea (Statistics Korea, 2017), which explains why neighbour noise is considered to be a huge social issue that leads to neighbour disputes and conflicts (Floor Noise Management Centre, 2018) and has even been linked to four murder cases involving neighbours in South Korea in 2013 (Park, 2015). Given that multi-family housing buildings are on the increase in urban areas all over the world (Office for National Statistics, 2017), this is likely to become a widespread concern. However, no attempt has been made to understand attitudes towards neighbour noise. To fill the gap, this paper presents a study that investigated attitudes towards neighbour noise by focusing on the inter-relationships between attitude towards 'the' neighbours (i.e. noise source), different conditions, and coping strategies.

Environmental noise exposure is associated with a variety of physiological and psychological impacts. For example, Carter and Beh (1989) found that intermittent noise exposure significantly increased diastolic and mean blood pressure. They also reported that heart rate increased significantly in those who received unpredictable noise bursts. Further, exposure to environmental noise has significant links to psychological health problems such as annoyance, anxiety, or depression. Particularly, annoyance is one of the major non-auditory effects of noise. Unwanted intensity, frequency, intermittency, or excessive loudness can make sounds to be perceived as noise and as annoying (Cohen & Weinstein, 1981).

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3 Much research has been conducted on the impact of traffic noise. For example, Öhrström
4 (1995) reported that an increase in the number of road traffic noise events at night decreased
5 sleep quality significantly. He also found that exposure to road traffic noise had significant
6 impacts on body movements, the number of awakenings, and perceived tiredness next day
7 regardless of how many noise events were presented. In another laboratory study (Kurra,
8 Morimoto, & Maekawa, 1999), subjective annoyance was evaluated to different transportation
9 noise stimuli including road, railway, and aircraft traffic noises. The results showed that
10 annoyance closely related to the noise level more than the source type. Through cross-sectional
11 research, Beutel et al. (2016) determined the association of noise annoyance with anxiety and
12 depression. They found that depression and anxiety increased with the degree of overall noise
13 annoyance. Of different noise sources, aircraft noise annoyance showed prominent impact on
14 a large percentage of population.

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16 While transportation noise is widely recognised as having adverse health effects, less
17 attention has been paid to the impact of neighbour noise, despite being a major source of
18 annoyance and emotional responses in an urban environment (Stansfeld, Haines, & Brown,
19 2000). Neighbour noise has been connected with increased health risks in cardio-vascular
20 system, movement apparatus, depression, and migraine (Maschke & Niemann, 2007). In
21 laboratory studies, the noise of neighbours' footsteps evoked psycho-physiological responses
22 such as changes in heart rate and respiration rate (Park & Lee, 2017; Park, Lee, & Jeong, 2018b).
23 Neighbour noise has been particularly linked with emotional responses. For example,
24 Grimwood (1993) found that residents were likely to experience intense negative emotion
25 towards the neighbours associated with the noise exposure. Stokoe and Hepburn (2005)
26 interviewed residents who had experienced neighbour disputes and found that participants
27 perceived the neighbours as unreasonable, irrational, unaccountable, and distressing. A recent
28 study reported that even the noise of neighbours' footsteps significantly evokes negative
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3 emotions, such as anger (Park, Lee, & Jeong, 2018a) and Felson and Steadman (1983) have
4 argued that anger resulting from neighbour disputes has the potential to lead to criminal
5 violence.
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10 Attitudes towards noise sources have long been known to be one of the important factors
11 that moderate subjective responses to various environmental noises (Guski, 1999; Kroesen,
12 Molin, & van Wee, 2008; Pedersen & Persson Waye, 2007). This is also the case for neighbour
13 noise reactions. Subjective reactions caused by neighbour noise are moderated by one's attitude
14 towards the neighbours who make the noise (Park, Lee, & Yang, 2016a). Park et al. (2016a)
15 developed a conceptual model and explained how residents in multi-family housing perceived
16 and reacted to noise from their upstairs neighbours. The model illustrated that annoyance and
17 disturbance caused by neighbour noise were influenced by several intervening conditions
18 including attitudes to the neighbours. However, attitudinal factors in neighbour noise issue
19 should be regarded differently from other environmental noises. This is because people can
20 develop direct and interpersonal relationships with the noise source, namely, the neighbours
21 who make the noise. It is still unclear how or what to measure when it comes to measuring
22 people's attitudes towards their neighbours who induce neighbour noise. Park, Lee, Yang, and
23 Kim (2016b) attempted to measure attitudes towards neighbours by asking participants how
24 they perceived they were close to their neighbours. The study collected the data using
25 questionnaire surveys and analysed them with structural equation modelling. The results
26 showed that the perceived closeness with neighbours did not have any statistically significant
27 impact on coping, but it had a moderation effect on the relationship between annoyance and
28 coping. Given that other studies on traffic noise (e.g. Kroesen et al., 2008; Pennig & Schady,
29 2014) have discovered direct associations between attitudinal factors and coping, there is a
30 need for further investigation into whether measuring one's perceived closeness with
31 neighbours well represent one's attitude towards the neighbours.
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3 Moreover, there is another difference between neighbour noise and other environmental
4 noises in the phase of coping and individuals' expectations after this phase. Most
5 environmental noise sources are man-made products (e.g. aircraft) so people make complaints
6 to those who operate the sources (e.g. airports). Moreover, people are well aware that the noise
7 exposure will not stop instantly even after a complaint has been made. In contrast, residents
8 can contact the neighbours directly and make a complaint and expect that the noise will stop
9 or be reduced shortly after doing so. In other words, relative to exposure to neighbour noise,
10 people take direct coping behaviours more frequently and expect there to be problem resolution,
11 compared to other environmental noises. Thus, the characteristics of neighbour noise issue are
12 distinct from other noises which lead to the needs for research into attitudes and coping.
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26 Levy-Leboyer and Naturel (1991) assessed annoyance responses to neighbour noise as
27 well as other community noises. They reported that residents perceived the most annoyance
28 when the noise was regarded as not normal, possible to avoid, happening during the night, and
29 loud. Unacceptable noise made by a person described negatively and an exceptional noise of
30 unknown origin was reported as disturbing noises. Moreover, the individual's reactions to the
31 noise were not likely to be linked to the level of annoyance experienced, but rather to the degree
32 of control which the victim felt they had of the situation and to the motives attributed to the
33 person making the noise. This emphasises the important impact of various factors on the
34 residents' noise reaction (Levy-Leboyer & Naturel, 1991). This is in line with Park et al. (2016a)
35 which suggested that subjective reactions to neighbour noise are affected by various factors
36 such as attitudes, past experience of noise exposure, noise sensitivity, and acoustic factors (e.g.
37 noise level).
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54 Through in-depth interviews with residents in multi-family housing, the study reported in
55 this paper addressed the following research questions: (1) How do residents react to neighbour
56 noise differently? (2) How does their attitude towards the neighbours (i.e. noise source)
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3 influence their reactions? (3) How are their attitudes formed, developed, and changed by
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5 various conditions?
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10 **2. Methods**

11 12 13 2.1. Data collection and analysis

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16 Data collection and analysis were based on the grounded theory method in that data were
17 collected, synthesised, and conceptualised simultaneously (Glaser & Strauss, 1967). The
18 authors coded the interview transcripts manually line by line using each interviewee's own
19 words and immediate expressions. In the first stage of data analysis (i.e. open coding), the
20 authors developed the codes into conceptualised ideas – concepts. Memos and the raw data
21 (e.g. transcripts) were constantly compared to the emerging concepts. Since the data collection
22 and analysis phases were carried out simultaneously, the emerging analyses not only shaped
23 the idea but also were refined by further data collection (Charmaz, 2006). In the second stage
24 of data analysis (i.e. axial coding), the authors grouped the concepts with descriptive labels –
25 categories. The focus of axial coding is to create a model that details the specific conditions
26 that give rise to a phenomenon's occurrence (Brown, Stevens, Troiano, & Schneider, 2002). In
27 this stage of axial coding, the authors linked the categories at the level of properties and
28 dimensions in a coding paradigm. The coding paradigm involved conditions, actions and
29 interactions, and consequences (Brown et al., 2002). The study identified various 'conditions',
30 a wide range of factors that influence the phenomenon or create a set of circumstances in which
31 the individual responds through actions and interactions (Corbin & Strauss, 2008).
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54 2.2. Procedure

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56 Duration of the interviews ranged from 1.5 to 3 hours. New interviews were conducted
57 until the authors were confident that saturation had been attained and no more ideas were
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3 emerging (Corbin & Strauss, 2008). The interviewer began each interview by asking the
4 following question to the interviewee: “Can you tell me about your experience of being
5 exposed to neighbour noise?” This un-leading and open-ended question allowed interviewees
6 to say what they had to and wanted to say; interviewees expressed their personal experiences,
7 thoughts and feelings using their own terms and in their own way (Kvale, 1996; Morrow, 2005).
8 Interview questions were altered as the interview went along, based on what the interviewees
9 said, so the open coding on each interview guided the next data collection and analysis.

10
11 Interviews were carried out with a total of 57 residents living in multi-family residential
12 buildings in South Korea. Only those who did not have any hearing disability and those who
13 had experience of hearing noise from their neighbours were invited to take part in the study.
14 Before obtaining informed consent, the interviewer explained the purpose of the study,
15 answered interviewees’ questions, and asked permission to audio-record the interview.
16 Interviews were audio-recorded, transcribed verbatim, translated into English, and then
17 checked for data accuracy. Interviewees were assured of complete anonymity and were given
18 pseudonyms.

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2.3. Participants

As Table 1 shows, the interviewees’ ages ranged from 24 to 65 years old ($M = 39.4$; $SD = 7.5$). Twenty-six of them were males. Twenty-nine interviewees had lived with one or more children in their homes. More than half of them had made noise complaints regarding their current neighbours’ noise. Each interviewee’s information can be found in Supporting Information.

Table 1

3. Results and discussion

3.1. When the neighbour noise is heard

The diagram in Figure 1 explains the experience of neighbour noise exposure. It was constructed based on the paradigm model of grounded theory (Glaser & Strauss, 1967). As this research particularly focused on the inter-relationships between three constructs (intervening condition, contextual condition, and action/interaction), these are marked with the thicker borders in Figure 1. The relationships between the constructs were developed based on the stress theory (Lazarus & Folkman, 1984) and Park et al.'s (2016a) conceptual model on subjective responses to neighbour noise.

As Figure 1 illustrates, causal conditions result in the central phenomenon (annoyance and disturbance). The phenomenon then leads to action/interaction strategies (coping). Coping includes cognitive and behavioural strategies (Habarth, Graham-Bermann, & Bermann, 2009); cognitive coping is an indirect strategy, whereas behavioural coping is a direct problem-solving behaviour (Folkman & Lazarus, 1988). The phenomenon and the action/interaction have reciprocal relationships with intervening and contextual conditions. Attitude towards the neighbours who make the noise is one of the intervening conditions (Park et al., 2016a). Consequence follows the action/interaction; consequence may change mainly based on which coping strategies are taken.

Figure 1

3.2. How residents feel about 'the' neighbours

Every person has different neighbours but living in multi-family housing means there will be neighbours upstairs, downstairs and next door. The interviews focused on the noise from

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3 certain neighbours whom the interviewees wanted to talk about and had therefore developed
4 attitudes towards. The interviewees were free to talk about their particular neighbours (current
5 or previous) whom they had perceived as neighbour noise source.
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10 The interviewees had developed a wide range of affect towards 'the' neighbours (i.e. noise
11 source), depending on their experience and relationship with the neighbours, which might be
12 positive or negative. In addition, the affect varied in terms of its intensity. Therefore, attitude
13 towards the neighbours may be explained by the affect towards the neighbours and its intensity.
14 Sample quotes from the interviewees (Table 2) show positive and negative affect with varying
15 intensity. Interviewee #7 expressed a strong positive affect by saying that she was lucky to
16 have such "*good friends*". Interviewee #34 also expressed positive affect towards her
17 neighbours, but less intense when compared to Interviewee #7. She said that she did "*not know*
18 *much about*" her neighbours, indicating a weak relationship with them. Interviewee #44's
19 positive affect can be positioned between that of Interviewee #7 and Interviewee #34 in terms
20 of intensity. On the other hand, Interviewee #46 expressed strong negative views about her
21 neighbours. She did "*not want to see*" her neighbours anymore and hoped that they would
22 move out. She shared her thoughts about the neighbours in an angry voice throughout the
23 interview. Interviewee #32 also expressed negative affect towards the neighbours, but with less
24 intensity compared to Interviewee #46.
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Table 2

51 The diagram in Figure 2 was constructed based on the interviewees' affect towards the
52 neighbours and its intensity. It illustrates that residents may consider the neighbours (i.e. noise
53 source) as an enemy, friend, or stranger/acquaintance, depending on the strength of the positive
54 or negative affect towards them. The affect towards the neighbours can be located between
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3 negative and positive, while the intensity ranges from weak to strong. Neighbours can be
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5 strangers/acquaintances if the intensity of the affect is not strong. Strangers/acquaintances can
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7 be felt as negative, positive, or somewhere in between based on various conditions. The
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9 neighbours can be seen as an enemy if the residents feel a negative affect with strong intensity.
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11 On the other hand, residents can see the neighbours as friends when the affect is strongly
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13 positive.
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19 Figure 2

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23 3.3. How conditions influence attitude
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26 *“I am very sensitive to noise...I can't concentrate if somebody starts*
27 *talking or whispering to someone at the library...but I'm fine with the*
28 *people upstairs. I can hear their footsteps but it doesn't bother me...I think*
29 *I'm okay with low-frequency noises.” (#1)*
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34 In the process of studying, conceptualising, and understanding the relationship between
35 coping and attitude, various conditions emerged. The attitude towards one's neighbours could
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37 be formed by the influences of various conditions. For example, as the quote above shows,
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39 Interviewee #1 mainly talked about noise sensitivity and the type of noise source. He said he
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41 was “very sensitive to noise” but he was “fine” with his current upstairs neighbours because he
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43 was “okay with low-frequency noises”. Different interviewees reported different conditions,
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45 all of which had significant impacts on their attitudes towards their neighbours. Many of the
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47 conditions found in this study were in accordance with existing studies with regards to
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49 subjective responses to noise (e.g. Guski, 1999; Laszlo, McRobie, Stansfeld, & Hansell, 2012;
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51 Lercher, 1996; Stallen, 1999).
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3 Figure 1 presented the paradigm of how people respond to neighbour noise. Of several
4 conditions, three of them were particularly significant and are therefore emphasised in this
5 section: past experience/history, attitude shown by neighbours and lastly,
6 predictability/certainty of noise exposure. Table 3 shows concepts of the three conditions. For
7 readers who may be interested in other conditions, Supporting Information provides additional
8 interview quotes which implied them.
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19 Table 3
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23 3.3.1. Past experience/history
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26 *“I had bad experiences [with previous neighbours] when I lived in my*
27 *previous house...I called the police one night...I was really, really*
28 *angry...I had already called the management office so many times...The*
29 *relationship [between the neighbours and me] got worse since then...So*
30 *I didn't want to talk to them [the current neighbours] when they moved*
31 *in. Who knows? They could be the same [with previous neighbours]. But*
32 *they [the current neighbours] seem okay, [they are] quite friendly.” (#15)*
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40 Previous studies have suggested that attitude is a separate entity from emotion, cognition,
41 and behaviour (Breckler, 1984; Crites Jr, Fabrigar, & Petty, 1994). Emotion and cognition refer
42 to the feelings (positive or negative) and belief that the individual hold towards an object.
43 Behaviour indicates the overt actions and responses to the object (Fabrigar, MacDonald, &
44 Wegener, 2005). Attitude is a general evaluative summary of the information derived from the
45 emotion, cognition, and behaviour (e.g., Breckler, 1984). When Interviewee #15 was living in
46 his previous house, he experienced anger due to the continuous noise from his previous
47 neighbours (emotion) and called the police (behaviour). This experience made him believe that
48 other neighbours would be the same (i.e. cognition). Thus, Interviewee #15 showed a negative
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3 attitude towards the current neighbours at first based on the information derived from his past
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5 emotion, cognition, and behaviour.
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9 *“I don’t mind it. They [children upstairs] are just kids and it’s very*
10 *difficult to control them, I know that. My children did the same, kids just*
11 *run all the time.” (#56)*
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15 Interviewee #56 also developed her attitude towards her neighbours based on her personal
16 history. The experience of living with children in the past had made her understanding of the
17 children’s noise from upstairs (*“My children did the same, kids just run all the time”*). This
18 quote also supports the previous finding that those living with children are likely to be more
19 empathetic to children’s noise when it is coming from their neighbours (Park et al., 2016a).
20 Given that children’s footstep noise is one of the most common noise sources in multi-family
21 residential buildings (Park, Lee, & Lee, 2017), residents living with children or those who have
22 previously lived with children may also be more empathetic to other noises from their
23 neighbours. This is because shared experience develops an individuals’ empathy (Hodges, Kiel,
24 Kramer, Veach, & Villanueva, 2010).
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39 *“I’ve asked the [management] office quite a few times to ask them*
40 *[neighbours] to be quiet. She [management officer] said they would [stop*
41 *making noise]...I ended up calling them [neighbours] last night as they*
42 *didn’t stop [making noise]...I think I’ll be very upset if I have to ask them*
43 *to be quiet again. I’ll have to wait and see.” (#40)*
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49 Individuals’ attitudes are consistently formed and developed based on their belief in
50 relation to their memory (Ajzen & Fishbein, 2000). The above quote implies that the negative
51 attitude towards the neighbours developed gradually, as Interviewee #40 had repeatedly
52 complained about the noise. In particular, she had heard the noise even after the management
53 office contacted her neighbours. This example could be explained using the expectation-
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3 disconfirmation approach (Oliver, 1977). According to the expectation-disconfirmation theory
4 (EDT), a positive disconfirmation occurs when the outcome is perceived to be better than
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6 expected. On the other hand, a negative disconfirmation occurs when the outcome is perceived
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8 to be worse than expected. As shown in the quote above, Interviewee #40 showed a negative
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10 disconfirmation because the actions of the neighbours did not meet her expectations and goal,
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12 which is referred to as an outcome that is personally significant (Lazarus, 1991). In addition,
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14 the accumulated experiences of negative disconfirmation might have changed her behaviour
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16 (*"I ended up calling them"*). She could contact the neighbours directly in the future rather than
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18 doing the same as before (an indirect complaint). Her past experience also led her to develop
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20 the emotion of anger (*"I think I'll be very upset if I have to ask them to be quiet again."*)
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22 because anger is evoked when goals are blocked (Lewis, 1993).
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29 3.3.2. Attitude shown by the neighbours

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32 At the end of the quote from Interviewee #15 in the previous section, the interviewee
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34 changed his attitude due to the attitude shown by his neighbours (*"...they seem okay, [they are]*
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36 *quite friendly."*). This implies that his positive attitude towards his neighbours was formed
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38 because they were *"quite friendly"*. This section particularly discusses the impact of the
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40 attitude of the neighbours by assuming that it has a significant reciprocal inter-relationship with
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42 the interviewees' attitude towards the neighbours.
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47 *"I'll always remember the date and time, it was October 21st two years*
48 *ago, it was 1:15 am. I went upstairs, knocked on the door and rang the*
49 *bell several times until she opened the door. I told her they had been very*
50 *noisy for many hours and that it was too late. However, she stopped me*
51 *talking and shouted at me, saying that I didn't know how to get along with*
52 *neighbours in this type of housing. I came back [home] and called the*
53 *police...They have been noisy so many times and I have put up with them*
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3 *for so long. The management office had contacted them several times*
4 *before but they never changed...We don't see each other even in the same*
5 *lift. I don't want to see them. I really hope they'll move out...I haven't*
6 *seen anyone like them before.” (#46)*
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11 As shown in the quote above, Interviewee #46 had built a negative attitude towards her
12 neighbours. The negative attitude was formed by the chronic noise exposure (“*so many times*”),
13 by putting up with them “*for so long*”, by having made noise complaints “*several times*”, and
14 experiencing the goal blockage (“*they never changed*”). In addition, the attitude shown by her
15 neighbours late at night would have had a significant impact on her attitude formation. Her
16 neighbour “*stopped*” her talking and shouted at her, saying that she “*didn't know how to get*
17 *along with neighbours*”. The behaviours shown by the neighbour involved negative emotional
18 expressions. In particular, the anger expressions from the neighbour would have had an impact
19 on the interviewee's emotion, cognition, and behaviour (van Kleef, van Doorn, Heerdink, &
20 Koning, 2011). First, Interviewee #46 developed anger and hatred (emotion) towards the
21 neighbours. These emotions were easily identified from the of her voice during the interview,
22 especially when she talked about her experience, on the day of the incident. Second, it was
23 found that she believed that the neighbours were wrong. Fritz (1958) proposed the attribution
24 theory, consisting of internal and external attributions. Internal attribution directs the cause of
25 a certain behaviour or incident towards something within the individual (e.g. personality of the
26 person), whereas external attribution directs to something external (e.g. situational factor).
27 Interviewee #46 blamed the neighbours by adopting internal attribution (e.g. “*I haven't seen*
28 *anyone like them before*”). Lastly, the anger expression of the neighbour led her to call the
29 police (i.e. behaviour) and the perceived emotion and cognition resulted in certain patterns of
30 behaviour (e.g. not making any eye-contacts with them).
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3 *“Who can spit at a smiley face? ... They brought some fruit when they first*
4 *moved in and apologised as they have children ... they have brought cakes,*
5 *juice, fruit since then ... I’ve told them that they do not need to do so [bring*
6 *something] several times but they keep bringing something and keep*
7 *apologising every time I see them in the lift ... I know they are good people,*
8 *but I think I’m quite sensitive ... Sometimes, when I’m tired, I’m annoyed*
9 *by the noise of kids running, but I just can’t tell them. I feel sorry.” (#49)*
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16 Interviewee #49 could not make any complaint to the neighbours, even though she had
17 been annoyed by the noise of the children upstairs running. She had chosen internal attribution,
18 directing it towards herself (*“I know they are good people, but I think I’m quite sensitive”*).
19 This was mainly because of her neighbours’ attitude. The neighbours had been apologetic since
20 they first moved in. Their apologetic attitudes were expressed by their behaviour. The
21 neighbours kept *“bringing something”* to her and *“apologising”* every time she met them in
22 the lift. The neighbours’ attitude of being apologetic and the consistency of this attitude
23 influenced her attitude formation. The neighbours’ attitude made her reluctant to *“spit at a*
24 *smiley face”* and so she adopted internal attribution regarding her annoyance. The quote above
25 shows that there was another condition, priority, which could also have had an impact on her
26 attitude. Interviewee #49 might have chosen to adopt internal attribution because her priority
27 to maintain the positive relationship with the neighbours (*“good people”*) was greater than
28 reducing her annoyance.
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46 3.3.3. Predictability/certainty of noise exposure

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50 *“They are quite nice people. I am totally fine with them ... they always*
51 *come down and tell us in advance if something’s happening, like a family*
52 *gathering or a party with friends ... [neighbours have people around] once*
53 *every month or two.” (#44)*
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3 The quote above also emphasises how neighbours' attitudes contribute to the development
4 of attitude. The positive attitude of Interviewee #44 would have been influenced by his
5 neighbours' attitude and behaviour. This is because the neighbours had (1) always (2) come
6 downstairs and (3) told him about the noisy events in advance. However, in addition to the
7 attitude of the neighbour, the predictability of the noise event also influenced the interviewee's
8 attitude. The interviewee could "*always*" predict the time and type of noise event. Thus, a
9 predictable noise from the neighbour was less annoying than noise from an unknown origin
10 (Levy-Leboyer & Naturel, 1991). In addition, the noise exposure was not frequent since the
11 noise events occurred "*once in a month or, every two months*". Accordingly, for Interviewee
12 #44, the adaptive effort was not frequently required and there was a low risk of cognitive
13 fatigue.

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Other previous studies have also reported that unpredictable stressors evoke negative mood
states and a high level of arousal (Berkowitz, 1969; Poulton, 1978). Compared to predictable
stressors, unpredictable stressors are more threatening. Thus, unpredictable stressors require a
greater degree of adaptation which involves a greater amount of adaptive effort in turn (Glass
& Singer, 1972). Moreover, as individuals monitor the potentially threatening stressors in order
to evaluate their adaptive significance and to decide on appropriate coping responses,
prolonged exposure to such stressors may result in cognitive fatigue (Cohen & Spacapan, 1978).

3.4. How attitude results in coping

It was found that the most commonly adopted coping strategy was making a complaint.
More than half of the interviewees had made complaints about their neighbours' noises. Details
of the complaints made by each interviewee are listed in Supporting Information. Specifically,
there were various ways of making complaints about a neighbour noise and there were different
degrees of complaints. Some residents had made complaints to management offices or to local

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3 authorities (indirect complaint), whereas others had complained directly to the neighbours by
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5 visiting the neighbours' house or hitting the ceiling in order to make a retaliatory noise. Those
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7 who had not made any noise complaints used other coping strategies. For example, they tried
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9 to find something to distract them from the noise exposure such as watching TV or going out
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11 for a walk. However, there were still some who had not undertaken any action and merely put
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13 up with the noise exposure. People's attitudes guide and motivate their thoughts and behaviour
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15 (Eaton, Majka, & Visser, 2008). The residents' different attitude towards the neighbours guided
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17 and motivated them towards choosing different coping strategies, including cognitive and
18
19 behavioural copings. Table 4 summarises the different coping strategies along with different
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21 attitudes. There are three major coping strategies (cognitive, avoidant, and vigilant coping)
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23 associated with the different types of complaint and action details. Furthermore, three different
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25 attitudes in Figure 2 were added to this table in order to show the impact of attitude on copings.
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33 Table 4

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37 *"I went upstairs on the day I was moving in. I brought some cake. They*
38 *asked me to come in and we spent about an hour talking, having tea and*
39 *the cake I brought...I'm lucky to have such good friends as my*
40 *neighbours...I can understand [the noise exposure]. Everyone makes*
41 *noise in their everyday life."* (#7)
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47 *"They are very social, we became friends not so long after they moved*
48 *in...I just call them and say 'hey, can you please be quiet?'"* (#24)
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51 Those who regarded the neighbours as friends tended to take no action, but they were
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53 understanding and empathetic (cognitive coping). Empathy is an attempt at understanding the
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55 subjective experiences of another person without prejudice (Wispé, 1986). This attitude leads
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57 individuals to build or maintain a positive relationship with others (Zaki & Ochsner, 2016).
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3 Therefore, one of their priorities may be to build or maintain positive relationships with the
4 neighbours. Interviewee #7 “*brought some cake*” to her neighbours on the day that she moved
5 in. Her action implies that her priority was to build a good relationship with her neighbours. In
6 addition, the neighbours’ response and behaviour (“*They asked me to come in*”) also
7 contributed to building a constructive relationship. This case again confirms the impact of the
8 positive attitude of the neighbours. Residents can still be annoyed by noise from the neighbours
9 who are regarded as a ‘friend’. However, as shown in the quote of Interviewee #24, the reaction
10 will be different compared to the reaction to noise from neighbours whom they have a negative
11 relationship (e.g. ‘enemy’). The tone of the complaint would be in a friendly way and noise
12 complaints between friends can be understood as ‘asking for a favour’ rather than ‘making a
13 complaint’.

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“I’ve done everything...Anything I can do to solve this problem...I’ve called the centre [Floor Noise Management Centre] and they said they could come and measure the noise levels and see if the levels exceed that in the regulation...that means they [upstairs neighbours] should make noise when the people from the centre come. How can I predict they [upstairs neighbours] will make noise? I have no idea when they are going to make noise, that’s why I get crazy...It seems the centre is for those who have problems between neighbours to mediate the disputes.”
(#51)

Those who consider the neighbours as strangers/acquaintances will take on a wide range of coping strategies. If they have a positive affect towards the neighbours, then they are likely to use cognitive and avoidant coping strategies. Cognitive coping includes empathy and repression; those who have empathy with the neighbours are actively and pleasantly understanding the neighbours, while people who have repression tend to be passively understanding and put up with the noise without taking action. Avoidant coping strategies

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3 include several actions which may not be recognised by the neighbours. For example, some
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5 people choose to go out and have a walk or turn on the TV/radio which can be used to distract
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7 themselves from the noise. Others take noise-cancelling actions such as using earplugs. They
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9 may or may not contact the management office (indirect complaint) or the neighbours
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11 themselves but in a polite way. The coping strategies transform into being more direct and
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13 unfriendly as the attitude becomes more negative. As noted earlier, the changes in the affect
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15 are influenced by different conditions (e.g. past experience/history of noise exposure). Table 4
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17 shows that residents who regard the neighbours as strangers/acquaintances with a negative
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19 affect are likely to choose actions to cope with the noise. For instance, Interviewee #51 tried
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21 many things, covering not only cognitive strategies but also most of the behavioural coping
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23 strategies. Since his main goal was to solve the noise problem, he had done “anything” he
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25 could to solve the problem.
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33 *“They made me crazy. They never stop...I think I can understand why*
34 *those people on TV killed their neighbours. I’m not saying I want to do*
35 *something to harm them [upstairs neighbours] but I’m just saying that I*
36 *know how they [people on the news who committed the crime to their*
37 *neighbours] might have felt...There are many holes in my ceiling as I’ve*
38 *hit my ceiling with a golf club. I know it’s destroying my house...I can’t*
39 *put up with them. I’m 100 percent sure they make noise*
40 *intentionally...jumping with shoes, heels! Have you seen anybody*
41 *wearing shoes in their house...It’s a headache...I think of what I should*
42 *do with them every day...I’ve installed three loudspeakers on my ceiling.*
43 *They work quite well...I turn them [the speakers] on if they [neighbours]*
44 *are noisy at night.” (#35)*
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54 For neighbours who are regarded as enemies, people are likely to choose more vigilant
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56 coping strategies. They may not choose coping strategies that are not recognised by the
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58 neighbours because their coping behaviours aim to express their anger and threaten the
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3 neighbours (e.g. retaliatory actions). Their tone and gestures of complaints become more
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5 aggressive as the affect gets more negative. Individuals perceive anger when they judge
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7 attacking as a viable option to restore the unfavourable situation (Lazarus, 1991). Anger is
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9 associated with a desire to change the situation and an aggressive tendency against the person
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11 who is seen of as responsible for the goal blockage (van Kleef, de Dreu, & Manstead, 2010).
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13 Interviewee #35 had hit his ceiling with a golf club and played noise via three loudspeakers as
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15 retaliatory actions. He also said that he could “*understand why those people on TV killed their*
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17 *neighbours*”. His negative attitude towards his neighbours and his retaliatory actions can be
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19 partially explained by the attitude shown by his neighbours. He believed that the neighbours
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21 had made intentional noise because he had heard jumping noises with shoes on, which is
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23 unlikely in Korea. The inappropriate attitude of the neighbours would have deepened his
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25 negative attitude, and consequently resulted in more revengeful behavioural coping strategies.
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31 **4. Conclusion**

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34 Attitude towards environment noise has been known to influence subjective noise
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36 responses (e.g. Pedersen & Persson Waye, 2007). In agreement with Diener, Larsen, Levine,
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38 and Emmons (1985), the study found that different attitudes towards the neighbours were
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40 formed by each resident’s perception of the neighbours. Residents’ perceived affect towards
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42 the neighbours (positive or negative) and its intensity (ranging from weak to strong) influence
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44 their attitude towards the neighbours. The attitudes towards the neighbours were then classified
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46 into stranger/acquaintance, friend, and enemy. Among the various conditions affecting the
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48 attitude, this paper particularly highlighted the following conditions: past experience/history,
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50 attitude shown by the neighbours, and predictability/certainty of noise exposure. The paper
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52 then discussed how different attitudes may result in different coping strategies. In line with
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54 previous reports (Park et al., 2016a; Park et al., 2016b), the coping strategies consisted of
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3 cognitive coping and behavioural coping. Cognitive coping included repression and empathy,
4 while behavioural coping included avoidant copings (e.g. using earplugs) and vigilant copings
5 (e.g. making a retaliatory noise). The findings of this study supported what has been understood
6 in the existing environmental noise research context in terms of the association between
7 attitudes and copings (e.g. Guski, Wichmann, Rohrmann, & Finke, 1978; Hume, Terranova, &
8 Thomas, 2002). This study confirmed the previous environmental noise research (e.g. Kroesen
9 et al., 2008), demonstrating the close relationship between the attitudinal variables and coping.
10 Moreover, the utilisation of assessing one's affect and its intensity yielded further insight into
11 measuring attitude towards neighbour noise.
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24 Practical recommendations can be made based on the significant conditions found to
25 influence one's attitude. First, the study found that attitude shown by the neighbours developed
26 one's attitude. In other words, one is likely to develop a negative attitude towards his/her
27 neighbours if the neighbours show a negative attitude first. In addition, the neighbours'
28 negative attitude is likely to be exposed if he/she makes direct noise complaints face-to-face.
29 Making complaints in such ways may worsen the problem (e.g. Interviewee #15). This suggests
30 that reducing the chances of showing each other's negative attitudes is safer and is more likely
31 to prevent the escalation of conflict. It may be more effective, therefore, for a management
32 officer to deal with noise complaints in the first instance. Second, it is recommended that
33 residents give notice to their neighbours in advance regarding upcoming noise events, thereby
34 reducing the uncertainty that their neighbours may experience. They can predict the noise,
35 require less adaptive effort, and experience less cognitive fatigue. This predictability would
36 help them be unlikely to develop negative attitudes.
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54 Another practical implication of this research may be found in the formation of attitudes.
55 Housing management or policymakers may consider implementing opportunities in which
56 residents can build positive affect towards one another and thereby develop positive attitudes
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3 towards them. All neighbours are strangers to each other at first; they have not yet developed
4 any positive or negative affect towards each other. It has been known that a sense of community
5 increases social interaction between neighbours (Farrell, Aubry, & Coulombe, 2004; Kim &
6 Kaplan, 2004; Unger & Wandersman, 1985). In addition, a sense of community increases social
7 ties and supportive acts between neighbours (Henry, Gorman-Smith, Schoeny, & Tolan, 2014;
8 Rollwagen, 2016; Skjæveland, Gärling, & Mæland, 1996). Thus, a greater sense of community
9 and more interaction between neighbours may influence residents to build positive affect
10 towards each other and to perceive their neighbours as friends. Therefore, increased public
11 spaces in the area can promote residents to see each other more frequently and naturally. In
12 addition, community events and activities would also help residents to build a sense of
13 community which thereby may reduce potential risks in neighbour disputes. Future research
14 could evaluate the association between a sense of community and the potential risk of
15 neighbour disputes.

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33 Previous studies have tried to understand how attitudinal factors in neighbour noise issue
34 should be evaluated. Park et al. (2016b) used three question items to measure how much
35 residents felt close to their neighbours and Park et al. (2018b) used six question items to ask
36 residents how they thought of their neighbours and how their relationships with the neighbours
37 were. The studies have acknowledged that the question items were not appropriate or enough
38 to evaluate the attitudinal factor. For quantitative research in general, Burns (2000) pointed out
39 that it is difficult to explore all the variables due to the complexity of human experience. Also,
40 it is difficult for quantitative research to consider how each person interprets own experiences,
41 constructs own meanings, and acts on these. The utilisation of the qualitative research method
42 in the present study could supplement the limitations that the previous studies have had. This
43 study explored not only how residents develop their attitudes towards the neighbours but also
44 how various variables associated with each other. By doing so, the study was able to approach
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3 the issue as a whole, not as separate variables (Burns, 2000). Besides, the study allowed the
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5 interviewees to talk about their experiences, thoughts, and feelings freely. In line with what
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7 Sherman and Webb (1988) described the term 'qualitative', the study concerned with residents'
8
9 experience as they were lived, felt, or undergone. Furthermore, the utilisation of the grounded
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11 theory method helped the authors to repeat the process of data collection and analysis until new
12
13 data stopped emerging (Corbin & Strauss, 2008). It was also of use to identify the concepts and
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15 the links among them, as well as to develop the conceptual framework in a paradigm model
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17 (Brown et al., 2002). In agreement with Wolcott (1980), the grounded theory approach was an
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19 appropriate way to study such issues on human behaviour on a sensitive topic. Wolcott (1980)
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21 also proposed that this approach is helpful to study human behaviours in different cultural
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23 contexts. Since this study focused on South Korean contexts, future research may study the
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25 issue in different cultural contexts so that the theoretical framework proposed in the present
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27 study may be further extended.
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33 Limitations of this study lead to research questions that could be explored in future
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35 research. First of all, one of this study's major arguments is that different attitudes towards the
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37 neighbours lead to different copings. However, as illustrated in Figure 1, there are several
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39 conditions impact one's coping. In addition to the conditions listed in Figure 1, socio-
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41 demographic characteristics of the neighbours may also have an impact on one's coping
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43 strategies. Eagly and Mladinic (1994) previously reported that some characteristics such as
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45 gender may lead to the development of prejudice and stereotype. This study did not investigate
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47 the neighbours' characteristics and whether there was any prejudice involved in forming one's
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49 attitude towards the neighbours. Thus, future research could examine how attitude and coping
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51 vary according to the neighbours' demographic qualities. Furthermore, it would guide more in-
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53 depth research on the role of prejudice in neighbour noise response. Second, the findings from
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55 this study may be extended in future research with consideration into how individuals manage
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3 their interpersonal conflicts. Existing studies have classified different styles of conflict
4 management into five styles on two dimensions of concern – for others or cooperativeness vs.
5 concern for the self or assertiveness (e.g. Rahim, 1986; Volkema & Bergmann, 1995). Future
6 research may adopt this idea to extend the understanding of neighbour disputes and individuals'
7 coping strategies. Lastly, this study presented the paradigm based on the transactional model
8 of stress as suggested by Lazarus and Folkman (1984). The model originally includes the
9 secondary appraisal. As a secondary appraisal, environmental noise studies have suggested that
10 perceived control has a significant impact on coping (e.g. Botteldooren et al., 2016; Lercher,
11 1996; van Kamp, 1990). Future research could investigate how to properly measure perceived
12 control related to neighbour noise, and how much perceived control influences the residents'
13 reaction to the noise. The assessments of perceived control are expected to extend the existing
14 understanding of the diverse responses to neighbour noise.

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Table 1. Demographic characteristics of the interviewees ($N = 57$).

		<i>N</i>	(%)
Age	20s	3	5.3
	30s	26	45.6
	40s	25	43.9
	50s	1	1.8
	60s	2	3.5
Gender	Male	26	45.6
	Female	31	54.4
Child(ren) at home	Yes	29	50.9
	No	28	49.1
House ownership	Owned	41	71.9
	Rented	16	28.1
Length of residency [year]	< 1	7	12.3
	1 ~ 2	11	19.3
	2 ~ 5	19	33.3
	5 ~ 10	10	17.5
	10 ~ 15	5	8.8
Noise complaint	Yes	31	54.4
	No	26	45.6

Table 2. Sample quotes from the interviewees showing their affect towards the neighbours.

No.	Quote	Affect	Intensity
7	<i>"I'm lucky to have such good friends as my neighbours."</i>		Strong
44	<i>"They are quite nice people. I am totally fine with them."</i>	Positive	~
34	<i>"I'm fine with them...I don't know much about them."</i>		Weak
46	<i>"I don't want to see them. I really hope they'll move out."</i>		Strong
50	<i>"He says they [neighbours] are very rude."</i>	Negative	~
32	<i>"I sometimes don't understand them."</i>		Weak

For Peer Review

Table 3. Concepts of the three conditions: past experience/history, attitude shown by the neighbours, and predictability/certainty.

Concept	Category
<ul style="list-style-type: none"> • Noisy neighbour(s) in previous house • Previous noisy neighbour(s) in current house • Have received noise complaints from downstairs neighbours • Have experienced problems with neighbours due to noise problems 	Past experience/history
<ul style="list-style-type: none"> • The neighbours' positive attitude towards myself • The neighbours' negative attitude towards myself 	Attitude shown by the neighbours
<ul style="list-style-type: none"> • Regular (predictable) noise events • Advance notice about noise events 	Predictability/certainty

For Peer Review

Table 4. Variations of the coping strategies undertaken by the residents with different attitudes towards the neighbours. Coping strategies that are highly likely to be taken on are marked with circles (○), those that may or may not be taken on are marked with triangles (△), and those unlikely to be taken on are marked with crosses (×).

Coping strategy		Type of complaints	Action details		Friend	Stranger/Acquaintance			Enemy	
						Positive	Neutral	Negative		
Cognitive	No complaint		No action	Empathy	○				×	
				Repression						
Behavioural	Avoidant		Being self-distracted: going out, turning on the TV/radio		△	○	○		△	
			Noise cancelling actions: using earplugs							○
	Vigilant	Indirect complaints		Contacting the management office		×	△			
				Contacting the neighbours: visit, phone-call, letter		○				
		Direct complaints		Making official complaints: police, government authority		×		△		○
				Taking retaliatory behaviours: making revengeful noise, violent behaviour		×	×	×		

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5 **Figure captions**
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7 Figure 1. A paradigm model explaining the neighbour noise responses.
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10 Figure 2. Residents' attitudes towards the neighbours in terms of affect and its intensity.
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For Peer Review

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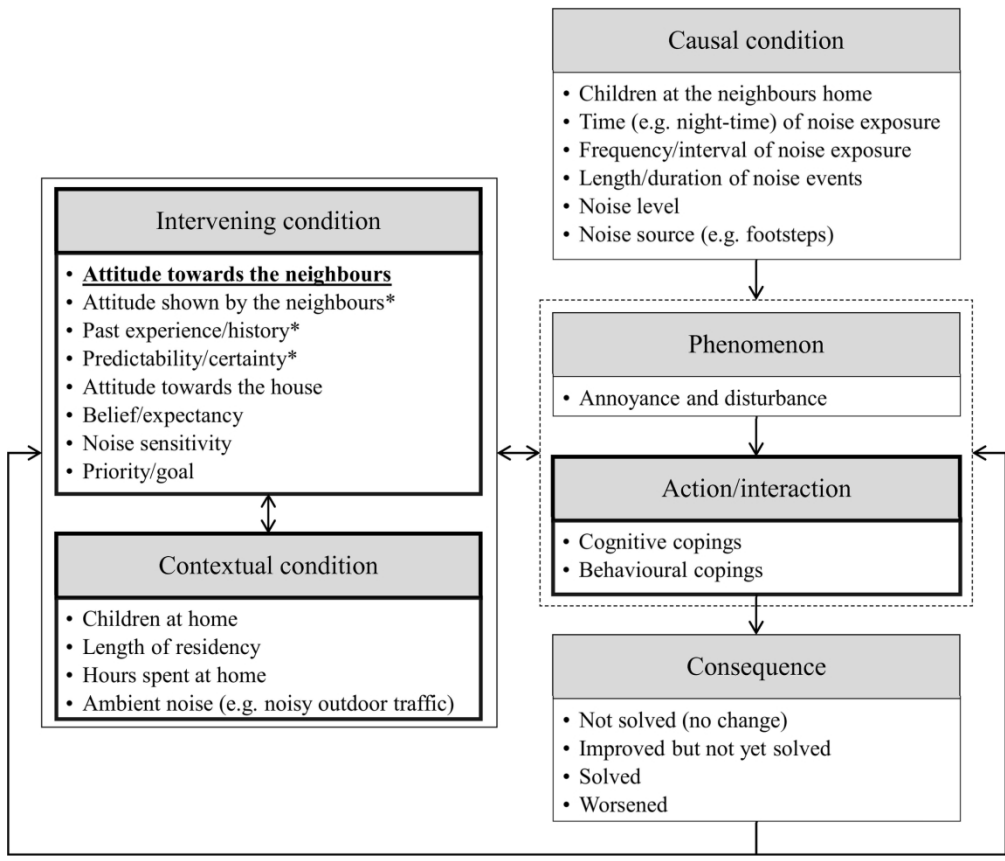


Figure 1

189x160mm (300 x 300 DPI)

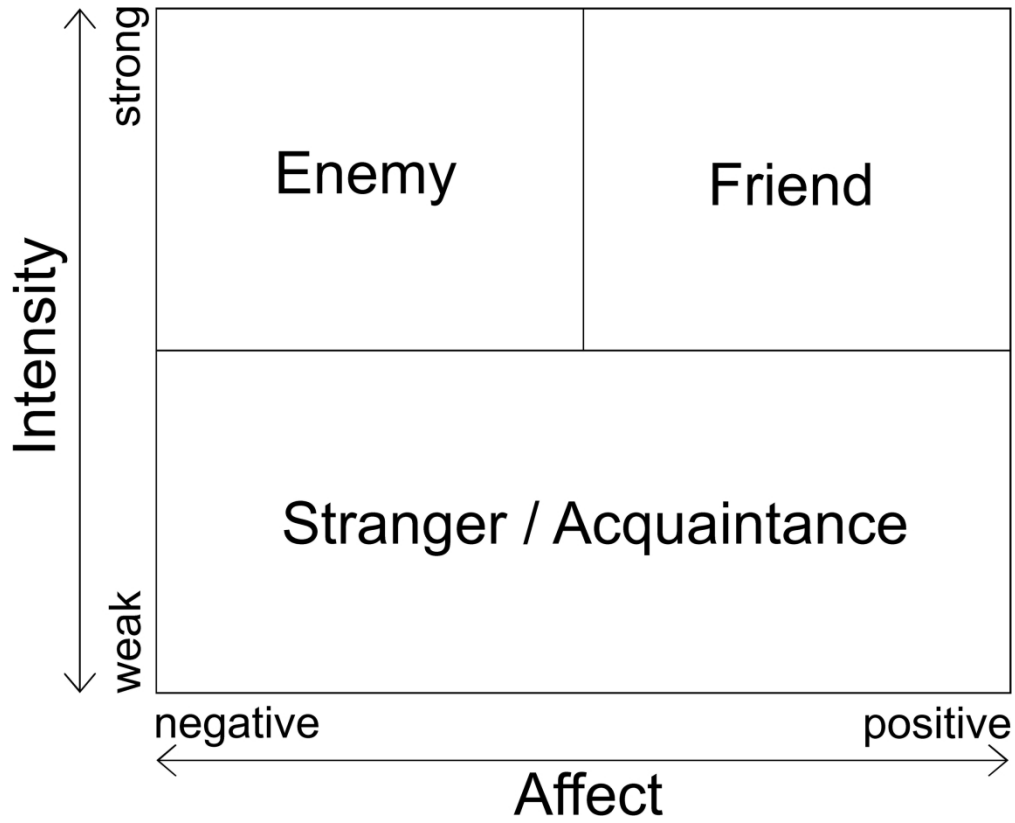


Figure 2

240x193mm (300 x 300 DPI)