

The APDT CHRONICLE

Spring 2013 *of the Dog*



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The Midnight Snack: Helping Kiyo Cope With "Things That Go Bump in the Night" in a High-Rise Apartment Living Situation

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Around the world today, there is a steady increase in the number of high-rise residential buildings. This is an inevitable development in modern cities as a response by municipalities to meet the needs of rapid urban growth and alleviate acute housing shortages. It is therefore not surprising that dog owners may need professional advice to help their pets cope with high-rise living.

The noise environment in an urban apartment is one area that can be challenging for a dog, particularly at night. In Singapore, where this study was made, 80 percent of the population lives in high-rise apartments. In the course of our behavior modification classes, we have encountered several dogs living in high-rise apartments who display such noise sensitivity. This article is an attempt to dissect the characteristics of high-rise noise, and with the use of a case study, suggest strategies that owners can use to help their dogs sleep soundly, even for those who may not be especially noise-sensitive.

Understanding how noise affects dogs is not an easy task, as it is complex and multi-dimensional. We could start by trying to understand the types of noise in the environment and what makes a noise annoying to a dog. This analysis could then be used to plan multi-pronged mitigating strategies, and tested for effectiveness in a case study.

Case Study

Our case study involved our pet, a neutered male Golden Retriever, Kiyo, who lives with us in Singapore. Since his adoption in 2008 (from a shelter) when he was one-and-a-half years old, Kiyo has lived in a quiet, suburban single-storied corner-terraced house with a garden and yard around three sides. In 2011, when he was four years old, he was moved temporarily to our five-room apartment in a large high-rise public housing estate for three months.

The apartment is on the seventh level of a nine-story building at the end of a corridor with one immediate neighbor on the same level. Its front façade faces a road with a bus stop directly below the unit, while the kitchen

and bedrooms face an open-air car park. The apartment is surrounded by other apartment buildings on three sides and a public clinic across the road on the remaining side. The building is near a food establishment and a kindergarten, both located at the ground levels of neighboring buildings, as well as a market, shop units and the precinct waste disposal bin center across the road.

The apartment building in which Kiyo lived temporarily.



View of corridor from within apartment unit.



Padlock on apartment gate – the sound of it being locked/unlocked appears similar to that from neighboring apartment unit



Open-air carpark behind apartment building.



Street view of apartment building.

Apartment Noises

The noises heard in Kiyo's apartment are typical of an urban high-rise housing estate. In general, the noises can be divided into the following types¹:

(A) Background noise: This is also known as ambient environmental noise, noise pollution or interference. It is a relatively continual and low-level type of noise, and may be divided by its source into:

1. Large systemic noises from cruising road traffic and trains, which would be the dominant “noise pollution” source in the majority of cities.
2. Mechanical noise from devices such as refrigerators, air conditioning, power supplies and motors.
3. Bioacoustic noise from birds and other animals in the environment.

(B) Occasional sounds: These, in contrast to background noise, do not occur continually but in shorter bouts and irregularly, making them more sudden and unpredictable. They are typically of a higher loudness, different pitch, and/or greater complexity compared to ambient noise. This makes them stand out against the background, and therefore more likely to be noticed by the dog. Occasional sounds include:

1. Neighbor noise, i.e., distant noises made by the residents of the high-rise that are associated with their daily lives, such as talking, walking, watching television, preparing food, vacuuming, etc.
2. Localized community noise emanating from amenities near the apartment, e.g., food establishments, children’s playgrounds, schools and childcare centers.
3. Weather noise such as rain, thunder and wind.
4. Intermittent loud sounds such as from waste disposal trucks, grass cutters, sirens, car horns, accelerating motorcycles, barking dogs, shouts, home repairs and renovations, road works, etc.
5. Close-proximity sounds from immediate neighbors, especially those next door and in the unit above. These sounds, due to their proximity, are particularly high in terms of loudness and immediacy. They include the dropping of items on the floor in the unit above, loud music, etc. In our Singapore context, many high-rise apartment units have a padlocked metal gate outside the front door. Thus when neighbors enter or leave their homes, the sound sequence of unlocking the padlock and front door may sound similar to a dog.

Though noises are not necessarily associated solely with high-rise living, they are accentuated in apartments because of the following factors:

- The high population density in an urban high-rise estate increases the intensity and frequency of the disturbances.

- Sound travels upwards from street level and enters apartments through the windows. This phenomenon is said to be particularly prominent for units between the second and eleventh floors².
- The particular orientation, configuration and layout of an apartment may increase disturbance levels due to noise bouncing back and forth between buildings and into the apartment.
- Conduction through the solid structures of the building results in internally transmitted neighbor noise moving across walls, floors and ceilings in all directions.
- When windows are left open for natural ventilation and thermal comfort, ambient noise levels become very high, as sounds come in through a balcony or windows and reflect off the ceiling.

The Case of Kiyo

Whether a sound is annoying or not to a dog depends on the following factors:

(A) Sound-related factors:

1. Physical characteristics of the sounds: type of sound, noise level, duration of exposure, peak level, frequency spectrum of the sound, number of noise events. Dogs can hear sounds four times more distant than humans. They are also sensitive to wider frequencies than us (40-60,000 Hz compared to 20-20,000 Hz), and can locate the source of a sound in about six hundredths of a second. Dogs can contrast between similar sounds that are indistinguishable to humans³.
2. Time of day when exposure occurs. A sound that may be masked by background noise during the day may be more audible at night.

(B) Dog-related factors: including physiological, psychological and social factors that affect the perception of the noise by the dog, such as previous exposure to the noise source. To illustrate the last point, Kiyo had not been exposed to sounds in an apartment, having spent most of his life in a suburban house. During the first night he slept over in our apartment, he was startled by the flushing of our toilet cistern at 3:00 a.m., something he would not have reacted to in his house setting. This was the first indication to us that we needed to get him accustomed to apartment noises if he was to stay for any extended period in a high-rise environment.

Kiyo sleeps at the foot of our bed, near the bedroom door. His reactions to the various noises in the neighborhood were as follows:

1. He seemed comfortable with all types of background noise.

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2. For occasional sounds, he did not react to distant neighbor noise, localized community noise and weather noise.
3. Intermittent loud sounds might sometimes draw his attention during the day but he would bark at them only very occasionally when they happened to interrupt his daytime naps. He would always stop voluntarily after two to three barks, as trained.
4. The same intermittent sounds in the middle of the night, however, when the background and distant sounds had died down, would initially wake him and cause him to investigate and/or bark at a higher intensity. Particularly noteworthy regular disturbances included:

a. Loud talking and laughing from people gathered in the public areas on the ground floor directly under Kiyō's apartment, which was heard from around midnight to 2:00 a.m. on weekends

b. The consequent starting and revving of the motorcycles of the same people when they dispersed after 2:00 a.m.

c. The activities of the waste disposal truck at the bin center each night at about 3:30 a.m.

d. Activities of people distributing newspapers, and of stallholders setting up their market stalls at around 5:30 a.m.

5. Close-proximity sounds from the immediate neighbor were the most challenging, including the unlocking of their gate and door when they returned to or left their unit.

6. Regardless of the direction of the source of the sounds, Kiyō's reaction to these disturbances would typically be (a) wake from sleep, bark and look towards the front door; or (b) wake, stare, move towards the front door while giving a series of barks.

Our guess to explain the difference in Kiyō's behavior towards noises in our apartment and suburban house is that sounds reaching him in the apartment seemed to him to be directionless. Sounds travelling by conduction through the walls, floors and ceiling may seem to originate from nowhere. Sound waves travel through the air, bounce off surrounding buildings, enter the windows, reflect off the apartment walls, floors and ceilings, and further obscure the original direction of their source. For a dog, it may all seem to come from the front door, which is the sole entry to and exit from the apartment. It could be that the directionless and seemingly "disembodied" sounds arriving from no apparent source are what disturb the dog. This effect was particularly obvious in the still of the night when it was mostly quiet, causing Kiyō to be startled, wake up and start barking. Initially, we adopted the technique of redirecting the barking

and/or reinforcing an auto-watch cue, as an alternative behavior. However, we found that this technique, while it interrupted the barking, made him more alert towards subsequent noises.

"The Midnight Snack"

On the basis of these speculations, through trial and error, we found the following environmental management and behavior modification techniques to be effective:

(A) Environmental Management

1. Insulation: With the windows identified as a main entry point for sounds, we closed the windows and turned on the air conditioning during the night. This definitely cut down almost all of the background and distant noises. If air conditioning is not an option, only shutting the windows facing the most obvious sources of loud noises could be just as effective (for Kiyō, this meant the balcony window facing the bus stop, and the kitchen window facing the public areas and car park).
2. Positive sound environment: To mask the distractions of sudden noises, we played classical or new-age music at very low, almost imperceptible, levels in the background. The slow tempos, gentle modulations and regular patterns relaxed and calmed Kiyō. The news channel on television worked as well in providing the lulling effect, but the flickering images may be distracting. Sometimes, a pre-sleep gentle massage was worked in.
3. Night light: A night light placed near to the front door allowing Kiyō to see that there was nothing there may have been reassuring.

(B) Behavior Modification

We found that the environmental management techniques mitigated, but did not solve, the nocturnal disturbance problem. After all, management only attempts to lessen the effect of the disturbances but does not teach the dog to deal with the disturbances by removing any "perceived threat." This is where the Midnight Snack came in, where we used a counter-conditioning and desensitization technique. After a couple of nights of environmental management to get Kiyō used to sleeping in an apartment with minimal extraneous sounds, we started phasing out the management measures one step at a time and simultaneously introducing "The Midnight Snack." The aim of this was to gradually raise the threshold of natural extraneous sounds to get him used to them, and at the same time create a positive conditioned emotional response (+CER) with the Midnight Snack.



Kiyo demonstrating the "sleep" cue.



Kiyo sleeps soundly through noises



Kiyo, a 6-year old rescue Golden Retriever

The Midnight Snack was introduced via the following steps:

1. Each time Kiyo heard a sound, we would calmly and quietly get out of bed with a treat. We decided to deviate from standard counter-conditioning/desensitization protocol by not using a high-value treat, as our goal was to induce relaxation, rather than a "yippee!" response in Kiyo.
2. We would pre-empt any barking, call him back into the bedroom, and cue Kiyo for behaviors that he already knew well. In our case, we asked him to lie down, and with the "sleep" cue, adopt the position of putting his chin on the ground, between his front paws. The treat was delivered when he was in the "sleep" position. We then gradually extended the duration when he remained in "sleep" before delivering the treat.
3. The next stage was to deliver the treat only after Kiyo showed clear signs of muscle relaxation, and eventually we waited for him to sleepily close his eyes.

After successful implementation of the Midnight Snack we found that the environmental management techniques could be dispensed of; Kiyo had learned that night noises were normal, and he no longer reacted to them. From our trial with Kiyo, after two nights of behavior modification training, he progressively and noticeably became calmer in subsequent nights. From moving out of the bedroom to investigate noises, he remained in a down position but would look at us. He progressed to remaining in "sleep" position, with his chin between his front paws, and finally, after five nights, he would sleep through the disturbances. The entire sequence of environmental management and behavior modification took two weeks.

Ever since, even months after training, he was able to sleep soundly throughout the night in an apartment with only occasional treats in the middle of the night to reinforce the desirable behavior. In fact, most times, he did not even open his eyes when a treat was presented in front of his nose, and would simply gently eat his treat and sleep.

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Conclusion

When trainers need to advise dog owners living in high-rise apartments how to teach their dogs to sleep soundly through the night, they can prescribe the following modus operandi:

1. Create a quiet environment to start with by closing the windows and turning on the air conditioning, or shutting windows facing potential sources of occasional sounds at night.
2. Play background music with slow tempo, gentle modulations and regular patterns.
3. Leave a night light on.
4. Counter-condition and desensitize the dog through the night using the Midnight Snack to form a +CER.
5. Phase out management strategies if so desired and occasionally reinforce desirable restful and calm behavior during the night.

Note that for dogs who may be more noise-sensitive, prior work may be needed to shape useful cues such as “down” and “sleep,” as well as create a +CER to noises in general.

References and Resources

¹Adapted and expanded from: Alam, S.M., Lee, S.E., Tan, A.H.S. & Tan, S.T. (2010). An acoustic comfort model for dwellers in high-rise built environment in the tropics. *Proc. 20th International Congress on Acoustics, ICA 2010*. Sydney, Australia. pp. 1-9.



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