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# **“Sound and Safe”: The Effect of Ambient Sound on Perceived Safety of Public Spaces**

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## **EXTENDED ABSTRACT:**

People are frequently exposed to crime in news programs, books, movies and television series. After such exposure, they often feel fearful of being alone in public places. Thus, many public spaces such as car parks, subway stations, and bus stops are considered “anxiogenic” (Loukaitou-Sideris, 2006). Such anxiety results in avoidance of places that are perceived as unsafe (Warr, 2000). For example, if people do not feel safe at the underground park of a mall, they may not go to that mall. However, such anxiety about public spaces may be mitigated by using appropriate environmental cues (Pain, 2000). In this research, we focus on “ambient sound” as one such environmental cue that can influence perceived safety in public areas. Much research has shown that music (as an ambient sound) can affect mood, perceptions and behaviors of individuals (Hui, Dube, and Chebat, 1997; Mattila and Wirtz, 2001; Yalch and Spangenberg, 1988). Music has also been shown to reduce anxiety (Tansik and Routhieaux 1999). The aforementioned research on the effect of music is mainly on instrumental music. However, vocal sounds can also impact individuals’ emotional states (Juslin and Laukka, 2003). Social presence literature suggests that vocal sounds are potent social cues that “enhance the illusion of interaction with a social entity” (Lombard and Ditton, 1997). The presence of others has a soothing effect under imminent threat and provides a sense of security (Mikulincer, Shaver, and Pereg, 2003). Interestingly, bird songs closely resemble human language. Both rely on specific arrangements of vocal elements in a sequence to communicate with others (Kuhl, 2003; Lipkind et al., 2013). Accordingly, we expect when individuals are exposed to vocal sounds (whether human or bird sounds), these sounds will create a sense of social presence and people will feel safer.

Building upon the “sound and emotion” and “sound and social presence” literatures, we propose that ambient sound which gives the impression of having a social presence will positively affect perceived safety. Additionally, vocal sounds (whether human or bird) will be more effective than instrumental sounds in reducing anxiety because they will convey a greater sense of social presence. Furthermore, perceived social presence will mediate the effect of ambient sound on perceived safety.

We test our hypotheses in three experiments – one in the field and two in a laboratory setting. In study 1, we test the effect of ambient sound (instrumental, animal vocal, control) on perceived safety in a real car park in a European metropolitan city (field study). We got permission from the management of the car park to broadcast ambient sounds in the stairwells of the car park (human vocal sounds were not approved). All people parking in this car park need to use the stairwells to exit the car park. People were exposed to the sound conditions, after they parked their cars, and before they were approached by the experimenters. We found a significant main effect of the sound conditions on perceived safety. Simple contrast tests showed that animal vocal sounds had a significant effect on increasing perceived safety versus instrumental sounds (and versus no sound).

In study 2, we repeated the field experiment in a laboratory environment where we created and used a video of an indoor car park. The video was recorded from the viewer's perspective with the intention to create an environment where participants could imagine that they were actually in the car park. Thus, the body of the participant was not visible and she could hear (her own) footsteps in the video. The same ambient sounds used in the field study were incorporated into this video. The results of the field study were replicated.

Study 3 was also a laboratory study to see how robust the results of the first two studies were, and also to see if perceived social presence mediates the effect of sound on perceived safety. Furthermore, we added human vocal sounds as a fourth ambient sound condition. We used the same video as in study 2, but changed the sounds. While we controlled for sound volume across the sound conditions in studies 1 and 2, in study 3, we also controlled for tempo and rhythm. The instrumental and human vocal sounds were selected to be different versions of the same music (the music was either played with only instruments, or was created by human voices alone).

We found a significant main effect of ambient sound on perceived safety. Simple contrasts demonstrated that both vocal sounds (human and animal) had a significantly higher effect on perceived safety compared to instrumental sound or no sound. Additionally, human vocal sounds had the highest effect on social presence, followed by animal vocal sound, instrumental sound and no sound. Simple contrasts demonstrated that human vocal and animal vocal sounds had similar effects on perceived social presence, and that both these vocal sounds increased perceived social presence more than the non-vocal sound (instrumental) or no sound. Furthermore, as proposed we found that perceived social presence mediated the effect of ambient sound on perceived safety.

To the best of our knowledge, this is the first study to systematically investigate the connection between auditory input, social presence and safety perception. Our results have important implications for managers of public areas that might be perceived as unsafe.