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"Sound and safe": The effect of ambient sound on the perceived safety of public spaces

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ABSTRACT

The amount of crime to which individuals are exposed on a daily basis is growing, resulting in increased anxiety about being alone in some public places. Fear of crime usually results in avoidance of places that are perceived to be unsafe, and such avoidance can have negative financial consequences. What can be done to reduce fear in relatively safe public places that are nevertheless perceived as being unsafe? In this paper, we explore the effect of auditory input (type of ambient sound) on perceived social presence and one's feeling-of-safety in public spaces such as car parks and metro stations. In one field study and four laboratory studies, we demonstrate that different ambient sounds convey social presence to a different degree. When perceived social presence is higher and positive, the feeling-of-safety is also higher. Additionally, we show that an increase in perceived safety has a positive effect on consumers' satisfaction with the public area and even raises their willingness to purchase a monthly membership card for the public area. Furthermore, the effect of ambient sound on such consumer responses is serially mediated by perceived social presence and feeling-of-safety.

1. Introduction

People are frequently exposed to crimes in their daily lives. According to the Eurostat data[1] of the European Commission, the numbers of reported crime incidences in 2010 are 5,933,278 for Germany, 4,150,097 for England, 2,621,000 for Italy, and 2,297,484 for Spain. These numbers suggest the occurrence of thousands of crime incidences per day in several countries. In addition to hearing about some of these crimes on news programs, people encounter fictitious crimes in books, movies, and television series. After such exposure to real and unreal crime, people are fearful when they are alone in public places. In fact, many public spaces such as car parks, metro stations, railway platforms, airport tunnels, and bus stops are considered "anxiogenic" (Loukaitou-Sideris, 2006).

Fear of crime leads to psychological stress and usually results in avoidance of places that are perceived to be unsafe. Such a habit of avoidance negatively affects commercial and leisure activities, road use, and social interaction (Warr, 2000). For example, if people do not feel safe at the underground car park of a mall, they may have a tendency not to go to that mall, causing a revenue loss. The same applies to private parking areas, where people pay to park. Hence, a misperception about the safety of a place has negative financial consequences. An effective way to avoid such misperception and increase perceived safety in such places is to manipulate some environmental cues.

In this paper, we focus on one factor that can influence perceived safety in public areas and that is also easy to incorporate into a public place, namely, "ambient sound." We believe that incorporating specific ambient sounds will create a sense of social presence and hence be effective in regulating people's fear. Warr (1990) shows that the presence of a companion increases one's feeling-of-safety. Accordingly, if a sound creates a positive sense of presence, it should also increase perceived safety. Additionally, we would like to note that incorporating ambient sound in a physical space is a subtle manipulation that does not make the possibility of crime more salient; on the other hand, other preventive actions (e.g., increasing the amount of security cameras, and security guards) lead to an increase in the self-declared levels of worry about crimes, because these preventive actions remind consumers about crimes (Ekblom, Law, & Sutton, 1996).

We show that sound or auditory input can play a large role in people's feeling-of-safety that is later translated into consumer satisfaction and purchase intentions. In one field study (conducted in an underground car park in Paris) and four laboratory studies (one in Paris, one in a midwestern city in the United States, and two in Istanbul), we demonstrate that ambient sounds influence perceived social presence and the feeling-of-safety in a public place. Additionally, we provide evidence that perceived social presence and the feeling-of-safety mediate the

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[1] http://epp.eurostat.ec.europa.eu/statistics_explained/index.php?title=File:Crimes_recorded_by_the_police_Total_crime,_2004-2010_new.png&filetimestamp=20130731134759.

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effect of ambient sounds on consumers' satisfaction with their experience in the public area and on their willingness to purchase a membership card for that area.

To the best of our knowledge, this study is the first to systematically investigate the connection between auditory input, social presence, safety perception, and the aforementioned consumer responses. We show that sounds influence specific emotions such as social presence and perceived safety, even when individuals know that these sounds are broadcasted through a music system. Our results have many implications for the design of such public spaces as parking areas of shopping malls, concert halls, metro stations, and movie theaters. Additionally, although some research in marketing has focused on ambient music in stores, only a few studies demonstrate the effect of ambient sound in other spaces.

2. Literature review and conceptual development

How can sound allay anxiety about the environment? In this section, we review literatures on fear derived from specific environmental cues, and on the effect of sound on emotions and social presence.

2.1. Fear from environmental cues

Some environmental cues (e.g., darkness, silence) lead to the anticipation of possible threats and hence cause fear (Russell, 1979; Warr, 1990). People commonly report their fear of being subject to a crime when they are in dark, quiet, and desolate places (Vrij & Winkel, 1991; Warr, 1990). For example, LaGrange, Ferraro, and Supancic (1992) suggest that environmental features of neighborhoods, such as broken windows and abandoned buildings, produce fear, regardless of the actual crime rates in those areas.

Extant literature demonstrates that fear reveals itself through behavior (e.g., distress cries, freezing, and defecation) and sometimes leads to avoidance of fearful experience (Russell, 1979). According to survey data in the United States, the most common reaction to the fear of crime is spatial avoidance, in other words, staying away from places that are perceived to be unsafe (Warr, 1994). These places quickly turn into "no-go" areas (Stafford, Chandola, & Marmot, 2007). People take different routes when they travel and become more attentive about when to leave their houses (Warr, 1994).

People's reluctance to go to specific areas results in customer and revenue loss for those places. For example, if people do not feel safe at the underground car park of an apartment that they are considering buying, this negative experience may affect their preference and purchasing decision for the apartment. Or if they feel uncomfortable leaving their car in a private parking lot, they will not use that specific lot again. They may even talk to others about their fearful experience, creating negative word of mouth for the place. Hence, the management of such places must increase the perceived safety in their facilities.

Pain (2000) suggests that manipulating the physical environment dramatically influences perceived safety. For example, studies show that an ambient cue such as lighting increases perceived safety in public places — greater light enhances perceived safety (Herbert & Davidson, 1995; Painter, 1996; Ramsey & Newton, 1991). In this paper, we focus on another ambient cue, sound, and pay attention to the effect of the type (rather than magnitude) of the ambient sound on perceived safety.

2.2. Sound, music, and emotions

Music is one environmental cue with demonstrated effects on individuals' mood, perceptions, and behaviors (Yorkston, 2010). Within a retail context, research has shown that ambient music affects product choice (Areni & Kim, 1993), time spent (Yalch & Spangenberg, 2000), sales (Mattila & Wirtz, 2001; Milliman, 1982, 1986), pace of shopping (Milliman, 1986), perception of shopping time (Chebat, Gelinas-Chebat, & Filiatrault, 1993), and perception of store (Hui, Dube, & Chebat, 1997). For example, Yalch and Spangenberg (2000) show that more familiar background music (vs. less familiar) decreases consumers' actual duration of shopping time in a department store. Conversely, when consumers are given a restricted time to shop, more familiar background music increases their perception regarding the duration of the shopping time. Yalch and Spangenberg (2000) suggest that consumers devote more attention to unfamiliar music and hence are distracted, causing them to remember their activities less. When they remember less, duration appears to be shorter. Areni and Kim (1993) show that classical music played in a wine shop results in consumers choosing more expensive wines. Their results support the notion that a fit between music and context improves persuasion (MacInnis & Park, 1991). Additionally, Milliman (1982) demonstrates that people move more slowly with slower music in a retail environment and hence spend more time there and purchase more. Milliman (1986) also tests the effect of musical tempo in a restaurant and demonstrates that diners eat more quickly when fast music is playing.

Outside the retail context, Vinovich (1975) plays a video that has fixed information and manipulates the music played along with it. He shows that different types of music create different moods and then lead to different interpretations of the same video. As such, the music is seen as relevant information for the cognitive interpretation of the ambiguous video drama. In an advertising context, Park and Young (1986) demonstrate the effect of music on consumers' attitudes toward the brand, focusing on consumers' involvement levels with the advertisement. Their results suggest that for consumers with high involvement with an advertisement, music works as a distraction and lowers the scores for attitudes toward the brand. However, for consumers with low involvement with the advertisement, likeable music (vs. no music) increases positive attitudes toward the brand. Meyers-Levy and Zhu (2010) demonstrate that consumers may perceive an advertisement's background music to have different meanings ("referential meaning," i.e., semantic meaning that music may bring to mind, and "embodied meaning," i.e., hedonic meaning that arises from the level of stimulation triggered by the music's structural characteristics, such as the energy level) dependent on their gender and need for cognition. Thus, perceived meaning influences consumers' perceptions regarding the advertised product. Zhu and Meyers-Levy (2005) also suggest that more cognitive resources are needed to make use of the referential (vs. embodied) meaning of music. Moreover, Tansik and Routhieaux (1999) demonstrate that music reduces pre-surgical anxiety. They find that music reduces cortisol levels in the saliva of patients (cortisol being an important hormone in the body, secreted by the adrenal glands, and an indicator of stress). However, this reduction in anxiety levels is not correlated with better evaluations of the hospital's services. That is, the effect of music on patients' anxiety levels is not reflected in consumer evaluations. The authors' results are in line with Park and Young's (1986) findings that within a high-involvement context, the effect of music on consumer responses is attenuated. Cooke, Chaboyer, Schluter, and Hiratos (2005) also provide evidence regarding the calming effect of music on pre-operative anxiety. Taking into consideration the effect of music on people's perceptions and anxiety levels, we believe that music will also be effective in manipulating perceived safety in public areas.

Interestingly, prior research on the effect of music on emotions, including that in the aforementioned studies, has focused mainly on instrumental music. However, other research on auditory input (not music) shows that vocal sounds, whether they come from humans or animals, can also affect individuals' emotional states. We discuss this research next.

2.3. Sound and social presence

Biocca, Harms, and Burgoon (2003) define social presence as "the sense of being together with another." Social presence may be perceived either in the real presence of humans and animals or with their