

# Sound Stimuli Perception of Dreamers

S2163004 Jeannette Shijie Ma

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For people with ordinary hearing ability, sound stimuli is an important influence of feeling and behaviour. Perception of sound keeps us aware of events from the environment. Auditory perception is dominant especially when the event is not visually perceived. A morning alarm is a good example of the situation when our eyes are closed. While we are sleeping, our brain is still actively processing odd sounds throughout the night.<sup>1</sup> When the sound intensity reaches certain level, our brains are alerted to wake up our bodies.<sup>2</sup> The thresholds of waking up sound are found stable and consistent in a laboratory environment.<sup>3</sup>

## Sound stimuli on dreams

While waking up can be easily observed by the researchers, the contextual perception of participants during the sleeping state can only be revealed in a more abstract way. Therefore, for contextual sound stimuli which represent certain object or environment, it has been more difficult to study their influences below the wake up threshold. Most of the time, this situation is investigated by asking for the memories from participants (i.e. dream recall). With this approach, certain sound stimuli are found to influence the dream content of the dreamers. Rahimi et. al. recorded the influence of traffic noises on the dreams of 13 male volunteers and found significant correlation between hearing the noise and having dreams related to traffic.<sup>4</sup> Although the result is already significant, researchers of this study pointed out the possible limitation of using less intense sound to avoid waking up the participants. The sound might had less effect to most of the participants only because it is not loud enough to catch participants' attention. Also, the dream recall of participants might not be complete.

## Sound stimuli on lucid dreams

The result of these researches raised our curiosity to ask: what will happen if participants are awake during their dreaming? Can they still be waken up by a loud sound stimuli? How does environmental sound interact with their dream? Answers to these questions have been clued by several researches on lucid dreaming. As a special case, lucid dreaming is explained as dreaming with consciousness. People experienced with lucid dream describe it as "knowing that I am dreaming". This phenomenon is often compared with sleep paralysis where subjects experience nightmares in a lucid context. The experience of "hearing sound" is frequently reported from both lucid dreaming and sleep paralysis cases.<sup>5</sup> In most of the related reports, those sound perceptions were documented as auditory hallucination, assuming there were no real auditory stimuli present in the sleeping environment. However, Appel & Pipa (2017) summarised an experiment applying auditory stimuli to lucid dreamers. The participants were asked to perform specific task (eye movement) based on perceived auditory stimuli during their lucid dreaming. The result confirmed possibility for lucid dreamers to react to different auditory stimuli consciously during lucid dreaming.<sup>6</sup> Due to limited subject number, this research can only be regarded as a case study. Another study focusing on induction of lucid dreams utilised auditory stimuli together with other stimuli (e.g. light). Result shows the sound stimuli can be integrated into the dream and recognised by the dreamer.<sup>7</sup> The results of these researches confirmed possible awareness of

real environmental sound in lucid dreaming, and good performance of subjects recalling their dream contents.

### **For further studies**

Dream recall error is one of the most difficult parts in general dreaming perception studies. The recall of lucid dreaming can be much more reliable than ordinary dreaming.<sup>8</sup> Therefore, if the traffic noise research<sup>4</sup> could be implemented on lucid dreamers, there might be less limitation concerns and clearer results. Current researches on auditory stimulus during lucid dreaming only used sounds without much context (e.g. sine waves). Further researches on the context of sound stimuli on dreams (e.g. bird sound, traffic noises) are encouraged on lucid dreamers to investigate the possible integration or distortion of these context into dream content. When the possible influence patterns are better understood, there could be better sound treatments developed for nightmare syndromes like sleep paralysis.

### **References**

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