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# The Impact of Vehicle Fragrance on Driving Performance: What do we know?

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## Abstract

Previous studies have indicated that certain types of fragrance in the vehicle is effective in keeping the driver alert. This study was conducted to evaluate the effect of lavender or vanilla flavour fragrances toward the driving performance. Ten human subjects were tested in a driving simulator in three different conditions; driving with vanilla, lavender flavor fragrance and driving without fragrance. A questionnaire was distributed to examine the emotion states of the driver after driving the simulator. Our results indicate that fragrance did not affect the speed reduction. The emotions of the drivers were calm due to the presence of the fragrance.

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**Keywords:** driving performance, vehicle fragrance, speed reduction

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## 1. Introduction

Many people do believe that senses of smell to the fragrance are responsible for the responses towards the environment via the connections in the brain. It has been demonstrated conclusively that the presence of fragrance affects the people's mood. One of the examples is a type of fragrance enhanced the alertness of the driver (Castro,

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2008) while they are behind the wheel. However, the analysis of driving with the presence of fragrance has rarely been done before. Previous studies of (Bucchi, Sangiorgi, & Vignali, 2012) have suggested that psychological relationship exists between the driver and the infrastructure where emphasizing on this relationship will enhance a safe driving.

Several explanations have been proposed in the literature regarding the performance of driving in regards to visual and auditory stimuli. For example, (Liu, 2005) emphasized on impact of traffic sign on drivers' visual search performance. Recent study by (Ünal et al., 2013) contributed to the knowledge of auditory distraction prompted by listening to the radio while driving. Their interesting findings suggested that listening to the radio while driving has no effect towards driving performance. Rather than adding yet another explanation for driving performance in conjunction with visual and auditory stimuli, in this study, we would like instead to focus on olfactory stimulation work.

## 2. State of arts

### 2.1. Using Fragrance and the impact on human behavior

Our sensory system consists of several senses that include a sense of vision, sense of smell, sense of hearing, sense of touch and sense of taste. The sense of smell is a very sensitive than other sense, and it can immediately detect fragrances. Another research noted that human psychological functioning that includes perception and mood to cognitive processes and behaviors have the potential to be affected by a fragrance (Lenochova' et al., 2012). (Johnson, 2011) also stated that the human performance in all contexts come from the effect of fragrance.

Past research indicates that the presence of the fragrance can have positive and negative impacts on the athletic task performance to their psychology perceptions. The present of alerting fragrances in vehicle can be used to maintain the alertness of sleepy drivers. Fragrances may give a better impression than listening loud sound (Castro, 2008). Many researchers believe that our sense of smell is the most directly connected to the part of our brain to process for response. As a simple understanding, when we give response with a sense of smell, our brain will give a response to the event or a situation before we think. Otherwise, different with other senses, we will think before coming out with any action. Therefore, it is realistic if a driver is able to use their response to smell and try to create an environment in the vehicle to get a positive influence such as ability to control their behavior that can cause accidents. Another study on the effect of ambient fragrance on the reaction in humans has been explored. The finding showed that with the present of fragrance, the reaction time in a simple task is decreasing as compared with the no fragrance condition. Results also stated that environment with fragrance is the most importance influence in human behavior (Millot, Brand, & Morand, 2002).

### 2.2. Effect of fragrance to peoples' mood

Limbic system consists of a group of structures located on the medial aspect of each cerebral hemisphere and diencephalon. It includes amygdaloid body, parts of rhinencephalon (cingulate gyrus, septal nuclei, hippocampus, dentate gyrus and parahippocampal gyrus), diencephalon (hypothalamus, anterior thalamic nuclei) as well as nerve fibers, fornix that interconnected all the brain structures above. In 1878, Paul Broca described the limbic system as "le grand lobe limbique" that refers to a ring of gray matter on the medial aspect of the cerebral hemispheres. The anatomical structure of limbic system was re-defined by James Papez in 1930's with a suggestion that limbic system also may underlie the relationship between emotion and memory (Papez' circuit). Human ability to select a specific stimuli to process at the higher center of the brain is crucial for attention. It is obvious that the human brain did not allow the conscious processing of all stimulus information that simultaneously impinges on the various senses. Recent research has showed that the fragrance-related visual cue is explored faster and for a shorter time in the presence of the congruent fragrance. Hence, it is suggested that fragrances can affect visual processing by attracting attention to the possible fragrance source and by facilitating its identification (Seigneuric et al., 2010).

It has been widely known that fragrance is capable in altering the emotional state of humans. In the study of medicine (Lehrner et al., 2005), fragrance effect towards the mood of patients waiting for dental treatment was tested. The results showed that orange and lavender flavor seems to reduce the anxiety and significantly improved mood of patients. In a study of (Millot, Brand, & Morand, 2002), the results showed that the reaction time in simple

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