Olfactory Perception and Emotional Arousal

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Abstract
This study will examine the relationship of olfactory perception and emotional arousal.

Emotional arousal can be defined as an increase in heart rate above metabolic demand (Myrtek, Frölich, Fichtler & Brügner, 2000). An individual’s heart rate will be measured while smelling ambient room odors to establish metabolic demand, or a baseline. The individual should be a nonsmoker and relatively healthy. The individual will be blindfolded to ensure smell is the only associated sense contributing to the measurement. Then the individual’s heart rate will be measured while the odorous stimuli of roses and vanilla are presented. If the heart rate increases then this is most likely a condition of emotional arousal resulting from the olfactory perception.
Olfactory Perception and Emotional Arousal

Olfactory perceptions are an interesting part of our lives and play an important role in our quality of life. Many of us may take our sense of smell for granted. There is a strong connection between flavor and smell (Shepherd, 2006). This could explain why foods taste bad or seem to have no taste when you have a cold. Smell also contributes to taste aversion (Capaldi, Hunter, & Privitera, 2004). An example of this would be when you eat something that makes you sick, and then in the future when you smell that substance you may start to get sick and avoid eating it. Many of us smell our food to check if it is spoiled. This supports the theory that hedonic responses, or likes and dislikes, to certain odors are learned through emotional associations (Herz, Beland, Hellerstein, 2004). It’s possible that when smelling something, we try to match it to a previous smell which is associated with an emotion that helps us decide to approach or decline the stimuli based on the pleasantness of the emotion (Stevenson & Boakes, 2003).

In a recent study, it was found that subjects responded faster to unpleasant odors rather than pleasant ones and subjects responded faster to food odors rather than nonfood odors (Boesveldt, Frasnelli, Gordon, and Lundström, 2010). This illustrates the use of the olfactory system as a means of protection against certain dangers. It is interesting to note that cultural learning may give meaning to odors that one has not had an emotional encounter with. For instance, you don’t have to be in a building that is on fire to know that the smell of smoke could mean your life is in danger.

Our sense of smell is useful for many other reasons. Wine tasters, bakers and chefs may rely heavily on their sense of smell to do their jobs. Sometimes we smell things and vivid memories or images come to mind (Tomiczek, & Stevenson, 2009).
It is important to note that there is no way to predict what kind of association an individual has with a certain odor. I find the smell of diesel exhaust pleasant, perhaps because my father was a truck driver. However, someone else may find the same odor unpleasant due to a different association. Some smells may have a high percentage of individuals with generally the same associations attached to them. For example, rose oil and vanilla are usually found to be pleasant odors (Kenneth, 1923). This may also be the basis for aromatherapy, which is the use of odors to positively affect moods and emotions. In aromatherapy, it is believed that certain odors, like lavender, may produce a calming effect in some people. Conversely, a person wearing the same perfume or cologne of a loved one may walk by and excite you. This illustrates the powerful connection of odors to emotions.

Emotional arousal is defined as an increase in heart rate above metabolic demand (Myrtek, Frölich, Fichtler & Brügner, 2000). The minimal condition of body processes to survive, i.e. resting pulse, is called metabolic demand. Mostly all emotions except anger result in an increase in heart rate (Alaoui-Ismaili, Robin, Rada, Dittmar, & Vernet-Maury, 1997). Therefore, it is my hypothesis that the olfactory perception of rose and vanilla will invoke emotional arousal.

Method

Participant

One individual from Broome Community College will be studied. The individual will be between the ages 18 to 30 and must be a nonsmoker in relatively good health (No Cold or Flu symptoms).

Materials and Apparatus
One chair will be used for the individual to sit on. A computer with Biopac Science Lab software and a sensor module MP40 with electrodes attached (ECG monitor) will be used to measure and record heart rate. A blindfold will be used to insure that the measurement will be based on purely olfactory stimuli and not visual. Vanilla extract and a rose will be used as odorous stimuli.

**Procedure**

Upon obtaining consent from the participant, he will sit at the desk and electrodes of the Biopac MP40 device will be placed on the inside of his wrist and ankle. Then the individual will put on a blindfold. While smelling ambient room odors, we will record heart rate for five minutes to establish a baseline. Then the individual will be asked to smell a rose while his heart rate is recorded for one minute. For a two minute period, ambient room odors will be observed and heart rate will be recorded. The individual will then be asked to smell a bottle of vanilla extract while his heart rate is recorded for one minute. Then another two minute period of ambient room odors will be observed and the experiment will end.

**Method of Analysis**

After completing the experiment, recordings of the heart rate during metabolic demand (baseline) will be compared to those during the presentation of the stimuli. The heart rates should be higher during the smelling of the stimuli, which would show emotional arousal. It is nearly impossible to predict the emotional association of each and every individual, therefore some error may be found in this experiment if the individual has a negative emotion of anger attached to the odor of vanilla or rose.
References


