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The possibility of a connection between the sense of smell and the perception of beauty was investigated. Twenty-two participants were sorted into three different groups: group 1 (no stimulus), group 2 (negative stimulus), and group 3 (positive stimulus). The research procedure consisted of participants filling out a quick survey before and after the experiment to evaluate mood. Each individual was then asked to rate the attractiveness of the ten models. The hypothesis was that smell would have an impact on perception, a negative impact associated with a negative smell, a positive impact associated with a positive smell. No statistical significance was found in the research to support the hypothesis, however there was an unplanned statistical significance found with mood alteration and participating in this experiment. There was an indication that with a larger number of participants different results might have occurred.

Research evidence reveals that mood, emotion, and behavior are indeed influenced by olfactory stimuli. Prior studies used performance tasks such as memory retrieval and problem solving to gain perspective on the influences of odor (Zoladz & Raudenbush, 2005). Zoladz and Raudenbush (2005) produced evidence that behavior is affected by odor. It was found that the most powerful way for the participants to receive the stimuli was orthonasally, or through the nose. Through a series of tasks completed by participants, it was found that peppermint increased vigor and jasmine reduced fatigue

(2005). In a study conducted by Field et al. (2004) empirical evidence was consistent with prior studies indicating that lavender increased relaxation and reduced depressive feelings. Some concern about these effects rests on the question to whether the odor affected the individual aesthetically or bio-chemically. What information is perceived through our sense of smell?

Cupchick, Phillips, and Truong (2005) conducted a study and found that responses to odors can be spontaneous or as a result of association. The sense of smell is a mechanism to warn of danger, such as inconsumable food or noxious fumes (Cupchick, Phillips & Truong, 2005). It is also the mechanism by which pheromones are detected and possibly attract sexual partners (Furlow,1996). The bad odor will be perceived as a warning and motivate an avoidant response in almost everyone, whereas pleasant odor such as cologne is interpreted subjectively. The pleasant odor of essential oils have however been shown to consistently produce similar effects in positive response (Moss, Cook, Wesnes & Duckett, 2002).

Odor influences our cognitions. The way we think or feel will have an effect on our behavior. Therefore, the hypothesis is that smell will directly affect the behavior of participants involved in a rating task regarding beauty. Varied olfactory stimuli will cause a deviation in the assessment of beauty. Participants exposed to the odor of a rotten egg while rating the attractiveness of a stranger should present low scores. The stimulus is a warning and if perceived as such should bring about an aversive reaction. The mood state of the participant while exposed to bad odor will be negative as indicated by low scoring

of reasonably attractive people. The perception of 'beauty' is distorted due to somatic discomfort and biochemical reaction.

Conversely, the odor of vanilla is expected to increase the scores given by participants while assessing attractiveness. Vanilla is used in this experiment because it is an essential oil, and should produce a pleasant atmosphere more consistently than a manufactured fragrance. Processing the odor will enhance positive mood states causing the participants to 'see' beauty more readily.

Beauty is difficult to gauge, for each individual's preference is highly subjective. Experimenters have a third group of participants as a control. This group serves as a guideline for scores of attractiveness as it will not receive exposure to olfactory stimuli. Scores from the experimental groups will be compared to the scores from the control to detect any significant effects.

The investigators are looking to see whether or not behavior will be affected by stimulating olfactory senses. The underlying assumption of the study is that our psychological state is influenced by our physical environment. Information gathered through our senses is assimilated into our reality, our perception of the world. Changes in the environment therefore change our perceptions and should, in some way, affect our behavior. Specific questions under investigation are to which type of stimuli is more powerful, negative (odor) or positive (fragrance) in influence. Can aversive stimuli affect our mood, opinion, and dealings with others? Is an opinion or perception of others enhanced when accompanied with pleasant fragrance? Or perhaps no evidence will be

found to support the idea that the sense of smell is a significant contributor to our perception of the world and others.

Method

Participants

Participants for the study included 22 undergraduate students attending Lindenwood University. Students were recruited through the LU Human Subject Pool and each received one bonus point towards a respective course as compensation. Ages of participants ranged from18 to 45, with a mean age of 21.95 and consisted of eight men and 14 women. Of the 22 students, three groups were established using random assignment. Eight participants including six women and two men were assigned to Group 1 and received no stimuli in order to represent the control group. Eight participants including six women and two men were assigned to Group 2 and received aversive stimuli, ammonium sulfide. And, six participants including two women and four men were assigned to Group 3 and received pleasant stimuli, vanilla.

Ten adults from the general population were used as models and photographed for materials needed to complete a rating task. Investigators personally recruited five men and five women ranging in age from 18 to 45 to be representative of the typical physical appearance of strangers we encounter daily. Images were obtained with consent to be used solely for the study, and then destroyed. Models received no compensation.

Materials

Ten photograph albums containing ten 4x6 snapshots were used in conjunction with a response sheet. Each photograph was intended to be from the shoulders up and

against a solid, dark colored background with the person smiling (Appendix A). The film was processed into color prints, and each print was individually placed in a slot in the 4x6 album. Photographs were ordered identically in every photo book alternating man and woman. The number associated with the photograph corresponded to the number on the response sheet where participants rated the attractive qualities of the model.

A pre-task survey was developed to assess age, sex, and general mood of each participant. Potential risk of allergic reaction was also addressed in this survey (Appendix B).

A post-task survey was administered in order to again assess general mood, and also physical well-being (Appendix C). This survey was also used to give the participant an opportunity to report a noticeable aroma. All surveys and response sheets filled out by participants were coded with a three digit number so that paperwork could be grouped together following the trials. The codes were in no way associated with the names or identities of the participants.

Two rooms were used for each trial. The first room was an unaffected "waiting" room. The waiting room was large enough to accommodate ten people comfortably and contained one large table and chairs to be used by participants. It was amply lit, and of a comfortable temperature. The second room used was a classroom. This room was amply lit and had at approximately thirty desks for the participants and one desk with two chairs for the investigators. Temperature of the room was comfortable. Windows were present in the classroom as well.

Substances used as stimuli to create aroma were vanilla extract for the fragrance and ammonium sulfide (stink bombs) for the odor. The vanilla extract was heated for fifteen minutes in order to increase the intensity of the aroma in the classroom. The ammonium sulfide vial was cracked just before the participants entry to the classroom because its intensity is strongest initially then is dissipates on its own.

Pens and all forms used by participants and investigators were supplied by the investigators.

Procedure

Trials were conducted on three separate days at approximately noon on each day. Participants were randomly assigned to one of three groups: Group 1 (control group), Group 2 (negative stimuli), and Group 3 (positive stimuli). Upon arrival, the participants were greeted by one investigator in the waiting room where they were asked to fill out an informed consent form and the pre-task survey. Any participants with a risk to allergies were excused from the remainder of the trial. Simultaneously a second investigator in the classroom set up the desks with photo books and pens, leaving empty desks between participants' seats and prepared the olfactory stimuli. After all pre-task surveys were completed each participant received a response sheet and instructions as to how to complete the rating task as follows:

"You will now be going into a different room across the hall where you will complete a rating task. We would like you to rate each individual's physical attractiveness on a scale of 1-10, 1 being the lowest score and 10 being the highest. Write the rating on the response sheet provided making sure that the number of the photo

corresponds to the number on the response sheet. For example, the score for photo one should be written in the blank next to #1 on the response sheet. Please assess each photo individually, do not rank them. Please do not compare the photos to each other; several photos may have the same score. We ask that you refrain from speaking to the other participants while completing the task. When you have finished, please turn in your response sheet and pick up a post-task survey. Make sure that all forms that you complete have the same three digit code in the upper left-hand corner. Fill out the survey, turn it in and please be seated until all participants are finished for a debriefing."

The group was then dismissed to the classroom.

Windows and doors of the experimental room were kept closed to prevent the odor or fragrance from escaping. The groups were given the same directions, and completed the task in the same room. Only the experimental condition of aroma was manipulated. Group 1 received no additional stimuli and represents our control group. The average scores on the response sheets by Group 1 were used as the norm by which the scores of Group 2 and Group 3 were compared.

Participants were debriefed as a group following the task. It was at this time that they were informed of the objectives of this study. Feedback letters were distributed also stating these objectives as well as inviting the participants to the results of the study. Contact information for investigators was included in the feedback letters. Investigators addressed any concerns and questions raised by participants. Investigators requested that details and objectives of the study remain undisclosed to others until completion of all trails. Participants were then thanked for their participation and excused.

Lastly, investigators returned to the classroom and opened the windows to direct air flow outside. The fragrances dissipated in approximately ten minutes. The door to the experimental was opened after the air was properly circulated.

Results

Analysis using a one-way ANOVA with type of stimuli as the independent variable indicated no statistical significance, $F(2,9) = 1.624$, $p > .05$. Experimenters fail to reject the null hypotheses. There was no statistical significance found between smell and perception, yet it was found that most of the photographs were rated overall higher with absolutely no stimulus $F(9,18) = 10.536$, $p < .001$. A one-way MANOVA indicated a statistical significant main effect of moods $F(1,19) = 5.563$, $p = .029$. Moods of the participants were depressed as a result of participating in the study but not as a result of type of stimuli. Participants were asked if they were experiencing any particular feelings at the time of the experiment, and 54.5% answered yes. Participants were also asked if any feelings of distress or discomfort were present. The results showed 4.5% suffered from hangover, 31.8% were hungry, 13.6% were experiencing cold like symptoms, 13.6% marked other, and 36.4% had no distress.

Discussion

The research hypothesis of this experiment, odor will affect mood and rating of attractiveness, was not supported by the data. These results are inconsistent with prior research. However, results reveal that the procedure of the experiment did produce an unexpected mood change. The mood scores of the participants were generally lower overall following completion on the task, regardless of the type of stimuli.

One limitation associated with rejection of the hypothesis is the participants. Results were approaching significance; with a larger number of participants there would be more data for analysis, possibly providing support for the initial hypothesis. Additionally, the participant groups should be more varied demographically. Recruitment outside of the Human Subject Pool would offer different age, attitude, and social status ranges. The assignment of participants to experimental groups was based upon participant sign-up. A more appropriate way to assign participants would be random assignment by experimenters, giving investigators better control over group dynamics.

Photographs used in the project should have been identical in background, closeness, clothes, and facial expressions. Also, more ethnic diversity should have been used to account for the general population. Increasing the number of photographs would yield more useable data in addition to increasing the exposure time to the stimuli. The subjective nature of attractiveness needs to be better researched and defined in order to keep the photographs similar in this characteristic.

The unexpected depression in mood due to procedure must be addressed. Any change not accounted for by stimuli creates unreliable results. In future studies, the evaluation of attractiveness may require only opposite-sex photographs. In this study, men reported discomfort from 'judging' other men.

It is possible that olfactory stimuli will produce no results related to rating attractiveness based on a photograph independent of sample size. The use of vanilla could be modified to use an essential oil with previous positive results. Investigation further into the role of our senses as providers of environmental information would prove useful.

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Appendix A

Sample Photo

Appendix B

Survey (Pre-Task)

Please answer each of the following questions.

Sex_____

Age_____

Do you have any food allergies that you are aware of? (please circle) Yes No
If so, please explain.

On a scale of 1 to 10 (10 being the highest, 1 being the lowest), how would you rate your mood? _____

Appendix C

Survey (Post-Task)

After completion of the task please rate your mood using the scale of 1 to 10 (10 being the highest, 1 being the lowest) _____

While performing the task, was there any particular feeling you were having? _____

Please explain.

Before performing in the experiment were you experiencing any of the following:
(Please check all that apply)

Hangover_____ Hunger_____ Flu____

Physical ailments____ Cold like symptoms____

Other (please explain) _____

Did you at any time notice a distinct smell of some kind?

If so, please rate the pleasantness of smell on a scale of 1 to 10 (10 being the highest, 1 being the lowest) _____