UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

The Magical Power of Aroma on Relaxation

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Executive Summary

Relaxation can be found as a significant factor that promotes a higher level of sleeping quality. To explore the correlation between relaxation and aroma, this experiment was conducted in University of British Columbia to measure people's relaxation levels after providing three different scent conditions. The three scents includes lavender, yuzu, and neutral scent, which was water. We examined how each scent has an influence on promoting relaxation to a certain degree by using an online questionnaire survey. Our participants smelled each type of scent first and then gave an answer about how relaxed they felt afterwards. The results showed that there is a significant difference in the levels of relaxation between the aroma scents condition and the control condition, which demonstrates that regardless of lavender or yuzu, people felt more relaxed after smelling pleasant aroma scents compared to a neutral scent. Our research can be applied to the project of building UBC napping area by implementing a pleasant aroma scent, in sequence to providing a comfortable sleeping environment for students.

Keywords: relaxation, aroma, sleeping, pleasant scent, neutral scent

Introduction

Relaxation is a condition of resting from intensity and anxiety not only in physical contents, but also in psychological aspects (Shiina, et al., 2008). It plays an important role in achieving a satisfying sleep quality before and during the process. Previous research illustrates that different kinds of aroma scent can promote people's relaxation to a greater degree, of which lavender and yuzu are two of the scents that can improve the individual's likelihood of being relaxed (Lehrner, 2005). Lavender is a unique fragrance that has a powerful impact on various products, specifically affecting people to feel revived, comfortable, and relieved (Lehrner, 2005). In addition, the aroma scent of lavender oil is able to loosen the muscles and sedate the mind. Therefore, lavender oil is well-known for its

efficiency to improve sleep quality by enhancing relaxation. Lavender scent not only produces physiological effects and promotes feelings of well-being, but also induces sleep in older patients and reduce anxiety in the intensive care unit setting (Cavanagh & Wikinson, 2002). Our second condition which is a yuzu scent also produces great effects on people's relaxation (Lan-Phi, Shimamura, Ukeda & Sawamura, 2009). According to a study conducted by the University of Manchester, participants stated that twenty models looked three years younger than their actual age in their eyes after the participants smelled yuzu aroma scent than the participants who did not (Lan-Phi, Shimamura, Ukeda, & Sawamura, 2009). To put it differently, yuzu can help people to feel relieved, thus making the participants to think that the models look younger. In addition, yuzu scent is used to relieve nausea and dizziness (Lan-Phi, Shimamura, Ukeda & Sawamura, 2009). As lavender and yuzu aroma scents can influence people's relaxation level, we will choose these two scents and water (neutral scent) as our research objects to explore how scents influence people's relaxation level and which one has a stronger effect.

Our motivation for the study was influenced by the previous studies done on lavender and its calming effects. We aimed to expand the study by including another type of aroma scent and a control condition to really compare the difference between lavender and other scents. Because aromatherapy is widely used for sleeping and promoting relaxation, we focused our research topic on how different types of aroma scents influence relaxation. In our study, we hypothesize that people will report the highest level of relaxation after inhaling lavender aroma scent, followed by yuzu, and neutral scent.

Methods

Participants

There were 108 people who participated in our study (34 males, 74 females; mean age = 21.25 years, excluding 4 who chose not to provide their age information). (Fig. 8 in Appendix) Majority of the participants were 3rd year students (38.89%) and only 9.26% of participants were in their 5th or more year in UBC. (Fig. 7 in Appendix)

Conditions

The participants were randomly selected within the UBC campus. We randomly assigned each participant into the random set order of A, B, and C conditions. The whole study took about 5 minutes to complete for each participant. The independent variables were 2 types of aroma scents which were lavender and yuzu, and 1 neutral scent which was water. The dependent variable is the level of relaxation score the participants answered in our online survey after smelling the different types of scents.

Measures

Our group used *Qualitrics* to create the online questionnaire survey. The questionnaire consisted of multiple choice and open ended questions, and Likert-type scales. In order to measure the level of relaxation, we used a 11-point scale from "0" being not (relaxed) at all to "10" being extremely relaxed to the questions "How relaxed do you feel after smelling the scent?". (Fig. 6 in Appendix) We disregarded 3 questions in the survey that asked our participants how many times they nap on or off campus per week and whether or not they have aroma oil in their bedroom to help fall asleep, because those questions are irrelevant towards measuring the variables in our study. The questionnaire also contains demographic information of age, gender, and school year at the end of the survey.

Procedure

During the weekend prior to starting the experiment, we purchased lavender and yuzu essential oils from the Muji store as well as three congruent empty spray bottles. (Fig. 3 in Appendix) We also prepared paper fragrance testing strips. Before conducting the study, we

placed the three different types of liquid in each spray bottle to make the distribution of scents easier and more balanced. (Fig. 4 in Appendix) Our team is composed of six group members. We divided into three subgroups of two people depending on the time availability of our group members. Each group members were assigned to conduct the study to 18 participants. Our study began on March 5th and ended on March 12th, 2019. Subgroups were scattered into different areas in UBC campus, including Rose Garden, Forestry building, Irving library, Woodward library, and Ponderosa residence in order to collect the data throughout the whole campus. Participants were recruited with no pressure or remuneration from the team members, and they were informed that they have absolute rights to cease this study or leave the questions blank if they don't feel comfortable answering them. After participants had agreed to be in our study, we provided the online survey on our own electronic devices. All participants were asked to read through the consent form we attached at the beginning of our questionnaire. After the consent form page, one of the group members would randomly choose a set of orders of lavender, yuzu, water to counterbalance the scents presented. In total, there were 6 set of orders including ABC, ACB, BCA, BAC, CAB, and CBA. Then, the other group member would pump one of the scent bottles according to the order twice to a paper strip. (Fig. 5 in Appendix) Afterwards, we asked them to smell the three paper strips without any information or labels on the strips. The participants completed the question asking how relaxed they felt after smelling each scent which gave them a break to refresh their scents. Option for debriefing was given to the participants after the experiment. Data was automatically collected by the online system and all the scores of A, B, and C were categorized respectively. Finally, we ran our data analyzation using JASP and conducted our report based on the data results.

Results

The overall results are shown in Appendix Figure 1. To measure our descriptive statistics, we used ANOVA one-tailed independent sample t-tests to calculate the mean, standard deviation, and error bar of participants' average relaxation score among the three different ABC conditions. The finding result shows that the lavender group (A) ($M = 5.889$, $SD = 2.50$) and the yuzu group (B) ($M = 5.574$, $SD = 2.30$) are not significantly different from each other. However, both lavender and yuzu group are significantly higher than the control group (C) ($M = 3.639$, $SD = 2.81$). The post hoc test summarizes that while lavender and yuzu are not significantly different ($t(2) = 0.91$, $p = .634$), lavender is significantly higher than the control group ($t(2) = 6.51$, $p < .001$) and yuzu is significantly higher than the control group ($t(2) = 5.60$, $p < .001$). In line with our predictions, Figure 2 in Appendix displays that the lavender condition was rated highest in relaxation score, followed by the yuzu condition by a slight difference, meaning participants felt more relaxed after smelling the aroma scents, whereas control group was rated significantly lower which means they didn't feel very relaxed after smelling the neutral scent.

Discussion

The purpose of this study is to determine whether inducing the lavender and yuzu aroma scents would make participants experience a higher level of relaxation compared to inducing the neutral scent. Data analyzation of our study demonstrates that the hypothesis is inconsistent with our experiment's result. We predicted that people will feel most relaxed after smelling the lavender condition. However, our results showed that lavender and yuzu scents did not show a significant difference in the relaxation levels. This is contrary to our hypothesis in which having a lavender scent will significantly increase relaxation levels while

yuzu and neutral scent will not increase relaxation levels by very much. Our results showed that both lavender and yuzu conditions demonstrated a significant increase in relaxation levels in our participants regardless of the type of pleasant-smelling aroma scent. Our data was insufficient to prove that lavender scent is the most relaxing scent since there is no significant difference between lavender and yuzu.

Possible explanations for the inconsistency of our hypothesis includes the limited size of participants, significant sample size difference in genders (Fig. 8 in Appendix), and existing mood bias of the participants. We also discovered that the paper strips we used to provide the scents were not strong enough since the scent was continuously fading, which resulted in an ambiguous judgement of relaxation from our participants. Furthermore, the duration in which we allowed our participants to smell the scents was not very long, which restricted our participants to achieve the maximum relaxation level from smelling the scent. Another limitation suggests that we were not be able to control the aroma scents among the environment where the participants were located, especially the food smell emitting from the areas near the cafeteria, which may have clashed with our sample scents. There are some important implications and improvements that can be drawn from these limitations in our study.

One of the challenges we faced in our study was getting the participants to participate in our experiment. Many students at UBC rejected to participate in our study, especially the males, which resulted our participant demographic to be biased from mostly females. If we were able to re-run this study, we could improve to get more male participants by selecting more male populated area on UBC campus. Additionally, our paper strips and aroma scent bottles were put into a single bag which caused the scents to mix, fortunately, we were able to separate the bottles and paper strips into separate bags in order to isolate the scent of each condition so that they do not mix up again. For our survey, we used a 11-point scale to measure the participants' relaxation levels, which resulted in participants to provide very vague answers that were not specific enough to define how relaxed they actually felt. To improve this, we should reduce the scale to a 5-point scale where each number from 1 to 5 will be more accurately identify the participants relaxation levels. A limitation we had in our study was that we only experimented with two types of pleasant aroma scents. We were unable to experiment with more scents due to the time constraint we had in collecting the data for our research. Another limitation includes that we could not put our participants to sleep since we did not have the resources and time to do so. Due to this, we were only able to conduct the study to measure the relaxation levels that our participants felt. This will give us a more relevant result about measuring the direct correlation of relaxation level and aromatherapy and can be used towards future studies in building napping pods at UBC.

Recommendation

Our study aims to help UBC to build an ideal environment for the napping room by providing a pleasant aroma scent. It is expected to improve the napping quality for students since aroma scents are known to help people feel relieved and relaxed. From the result of our study, we recommend to implement aroma scents in the napping room to improve relaxation level and sleeping quality.

Since there was no significant difference between two pleasant scents that we have tested, our client can offer one of the scents in sleeping area such as lavender or yuzu. Furthermore, for future studies, various aroma scents can be comprehended to test their relationship with relaxation and sleeping quality improving, except the two that we did. The replication of our study with the condition of actual sleeping in the napping pods is also provided as a suggestion for future study.

A persistent aroma releasing process is helpful to implement in the napping room. Once people who have slept in the napping pods are accustomed to the released aroma scent, they will experience a more comfortable sleeping environment in the napping room with the given familiar scent. In addition, there are multiple ways to provide aroma scents in the napping room, such as an aroma diffuser, room perfume sticks, or humidifier with scents. The artificial flowers may also be used to offer aroma instead of the real plant, in order to avoid pollen allergy or poor diffusion effect. To conclude, multiple ways could be applied based on our findings in order to develop an optimal napping environment at UBC.

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References

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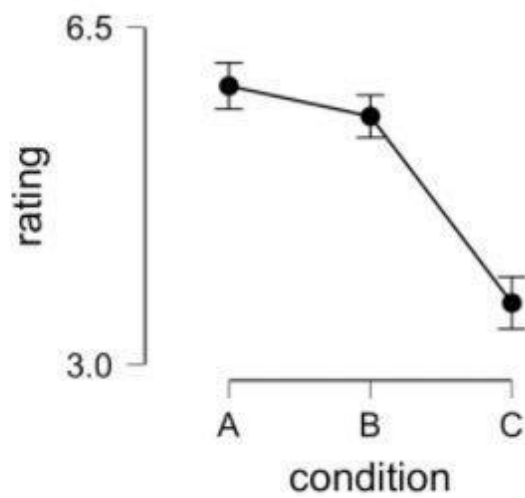
Appendix

Figure 1
The mean, standard deviation, and error bar of each lavender (A), yuzu (B), and water (C) condtions.

Descriptives

Descriptives – rating

condition	Mean	SD	N
A	5.889	2.489	108
B	5.574	2.297	108
C	3.639	2.810	108

Descriptives Plot

Figure 2
The ANOVA table shows the degree of freedom, F value, and p value and the Post Hoc tests table shows the comparison between lavender and yuzu (A and B), lavender and water (A and C), and yuzu and water (B and C) conditions with t value and p tukey value.

Results ▾

ANOVA

ANOVA – rating

Cases	Sum of Squares	df	Mean Square	F	p
condition	320.6	2	160.318	24.84	< .001
Residual	2072.0	321	6.455		

Note. Type III Sum of Squares

Post Hoc Tests

Post Hoc Comparisons – condition

		Mean Difference	SE	t	p_{tukey}
A	B	0.315	0.346	0.911	0.634
	C	2.250	0.346	6.508	< .001
B	C	1.935	0.346	5.597	< .001

Figure 3
Left is yuzu esstial oil and right is (french) lavender essentail oil in bottles.

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Figure 4
These are three congruent empty bottles that we placed the different liquids in.

Figure 5
This figure shows how we sprayed each scent on the paper strip.

Figure 6
This is an example of our questionnaire survey measuring the participants' relaxation level after smelling different type of scents.
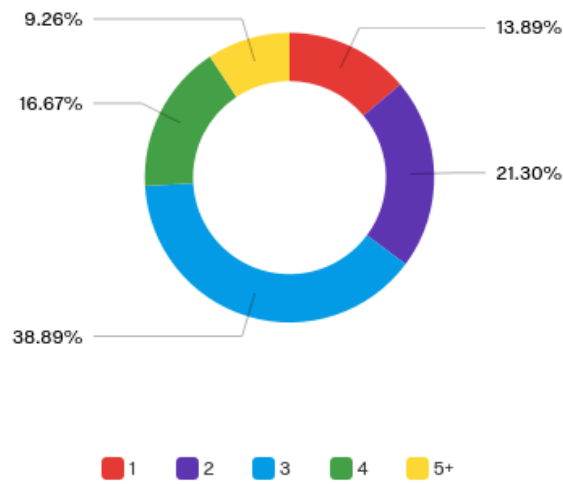

Figure 7
A pie chart showing the participants' current year in UBC

Figure 8
A graph bar showing the participants' gender
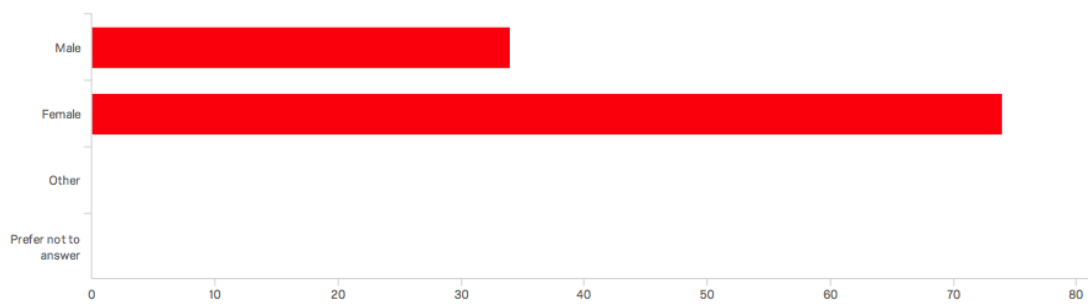
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	What is your gender?	1.00	2.00	1.69	0.46	0.22	108

#	Field		Choice Count
1	Male	31.48%	34
2	Female	68.52%	74
3	Other	0.00%	0
4	Prefer not to answer	0.00%	0
			108