

UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

Sound Related Napping Preferences Among UBC Students

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Executive Summary

Napping is a useful way for sleep-deprived students to catch up on missed sleep. With the upcoming introduction of a nap room in the planned Arts Student Centre, it is important for UBC to learn about the varied preferences its students may have for their sleeping and napping environments. Our group conducted a survey to investigate which sounds UBC students prefer to listen to when napping. We distributed an online survey containing questions regarding their sound preferences. More students indicated that they prefer to sleep to silence compared to classical piano music, white noise, and nature sounds ($p < .05$), suggesting that a silent napping room may be most suitable for student preferences, comfort, and sleep onset. A sizable proportion of students also indicated that they would have preferred to listen to a different type of music than classical piano music, which was the only genre option presented in our survey. This may have affected our findings, as those students may have preferred music overall but selected another option due to the absence of their preferred genre. Future research may benefit from including a wider variety of music genres in the sound conditions.

Keywords: Napping, Sound, Music, Silence, Nature, White Noise

Introduction

In the modern work environment, a university degree is necessary to find good employment. This puts a large amount of stress on university students, as they must juggle a wide variety of responsibilities, such as grades, finances, extracurricular activities, and their social lives. All of these stresses hinder the ability for students to sleep well at night, often leaving them sleep deprived and tired throughout the day. In their study, Angelika Schlarb, Anja Friedrich, and Merle Claßen (2017) found that 74% of their student subjects showed signs of sleep disturbances, with 52% meeting the requirements for a diagnosis of insomnia. Napping is an easy and effective way for students to catch up on their missed sleep. Just like a night time sleep, there are many factors that affect how easily a student can nap, especially in regards to noise. For example, Montgomery et al. (2009) subjected participants to two separate types of noises or no noise at all. Participants fell asleep faster listening to the two sounds but also slept less; silence helped them sleep longer but caused trouble falling asleep.

During especially stressful times, such as during final exams, many students may attempt to catch up on sleep whenever they can, sometimes even in public places like libraries. However, a library may not be the best setting for a nap, as the constant distractions of background noises, such as people walking and doors closing, can have a prominent effect on sleep quality. In a study regarding noise distractions and sleep quality, Ebben et al. (2018) found that New York City residents complaining of poor sleep quality had fewer interruptions in their sleep when exposed to white noise during sleep trials.

The stress that students experience can significantly affect their ability to sleep, and can contribute to insomnia. Insomnia is characterised by “subjective complaints about dissatisfaction with sleep quality or duration, difficulty falling asleep at bedtime, waking up in the middle of the night or too early in the morning, or non-restorative or poor quality sleep” (Morin & Benca, 2012). Since many students suffer from stress-induced insomnia, it may be difficult for them to nap. Research has been conducted to determine whether artificial noise can help people with insomnia sleep better. Taranto-Montemurro et al. (2017) studied whether white noise affected sleep onset in people with transient insomnia, finding a positive effect of white noise on sleep onset compared to participants sleeping in silence.

With the construction of a nap room within the Arts Student Centre, students would have a dedicated place to nap whenever they felt the need to do so. The purpose of our research was to investigate whether UBC students differ in their preferences for the type of sounds (white noise, nature sounds, music, or silence) they hear while napping. Since each student most likely has slightly different preferences for sounds to hear or listen to when they nap, it is imperative to discover the perfect environment in the room that enables napping and research the varied individual preferences in sound. The findings of our research will help UBC develop a napping space that can accommodate the different preferences of UBC’s diverse student body. We hypothesized that if students are questioned on their napping preferences regarding sound, they will indicate that they prefer sleeping to silence, as people also tend to sleep at night in silence.

Methods

Participants

95 UBC students (54 female, 38 male, 3 other/prefer not to say, mean age = 20.344 years) participated in this study. As required by UBC research policy, all participants completed a

consent form prior to participating in the survey. In order to gain a large sample size, we distributed the survey amongst many different student groups that we had access to. These student groups included UBC Recreation, the Alma Mater Society, and various Greek life organizations such as sororities, fraternities, and affiliated clubs. Because the survey was created and conducted online, a link to it was sent out to using various social media platforms in order to reach as many participants as possible.

Conditions

This study featured four conditions: silence, classical piano music, white noise, and nature sounds. As this was a within-subjects, repeated measures experiment, participants were exposed to all four conditions (in the same order) when completing the survey. Participants were asked to rate their agreement with each of four statements of preference for falling asleep to silence, to classical piano music, to white noise, and to nature sounds.

Measures

Our independent variable in this study was the four different sound types, which comprised the four levels of the independent variable. The dependent variable was participants' self-reported levels of agreement with statements of preference for each of the four sound types. To collect data, we created an online questionnaire consisting of 16 items regarding nap frequency, sound preferences when napping, and other questions regarding various sleep disturbances. Four questionnaire items each asked participants to rate their agreement with a statement of preference for one of the four sound types. Following each question regarding a particular condition, we provided a short video clip detailing what each sound was so that all participants could have the same reference points when evaluating their preferences for each of the four sound types. All participants received each questionnaire item in the same order.

Each answer was quantified on a five point Likert scale between 1 ("Strongly Disagree") and 5 ("Strongly Agree"), with Strongly Disagree and Strongly Agree as the extreme scores, and Agree, Disagree, and Neutral as the other options. Following the Classical Piano Music question in particular, participants were asked a yes-or-no question if the participant enjoyed listening to another genre of music, and, if so, which one they would prefer to listen to. Because the participants' self-reported levels of agreement to each of the four statements indicated their degrees of preference for each sound type, we treated the levels of agreement as levels of preference when interpreting the results of the study.

Procedure

We posted the survey onto various UBC Facebook groups, such as UBC Recreation, the Alma Mater Society, Greek life organizations such as sororities, fraternities, affiliated clubs and the UBC Classes of 2019, 2020, and 2021. Participants who agreed to participate in this study opened a link to a consent form and a link to the survey. After completing the consent form, participants answered 16 questions. The questions included demographic questions and primarily investigated student napping preferences pertaining to the four sound conditions. After each of the four questions asking about specific sound preferences, a video link was included as a reference point for each sound type. After indicating their level of preference for classical piano music, participants were then asked if they would have preferred another genre, and were given the option to fill in a short answer about which genre they would have preferred to listen to. Finally, participants answered questions about whether their sleep is often disrupted by sound,

whether they often have trouble falling asleep, and how likely they would be to use a personal napping space at UBC.

Results

We assigned each survey option a numerical value to quantify our data. For example, Strongly Disagree was assigned a value of one and Strongly Agree was assigned a value of five. After quantifying our data, we found that Silence had the highest average score ($\mu = 4.137$, $SD = .858$), while Nature sounds had the next highest average score ($\mu = 2.663$, $SD = 1.277$). Additional scores can be seen in Table 1. We ran a one-way, within-groups ANOVA to see if there was any significant differences in our groups, as there were four conditions and each participant was questioned on each condition. As shown in Table 2, we reported a significant difference amongst groups after running the ANOVA, with $F(3,282) = 76.01$, $p < .001$. This indicates that, overall, there was a significant difference in means between silence and the other sound conditions. To investigate which specific differences were significant, we ran a post-hoc Tukey's HSD comparison. This test enabled us to individually compare each group's mean to one another and determine exactly which differences between pairs of group means were significant. As shown in Table 3, every difference between means was significant except for the difference in mean preference levels for Classical Piano Music and White Noise ($p > .05$).

Discussion

We primarily conducted this study to gauge the preferences of UBC students regarding which sounds they would most like to fall asleep to. Information about these preferences will be used to develop napping spaces at UBC that account for the varied needs and preferences of the diverse UBC student body.

Based on the results of our experiment, we conclude that UBC students tend to prefer silence as a primary sound to listen to while taking a nap, compared to classical music, white noise, and nature sounds. After conducting an one-way, within-groups ANOVA and a post-hoc Tukey's HSD comparison, we found that the mean preference rating of silence was the highest of all four tested sound conditions. The difference between the mean preference for silence and the other mean preferences was statistically significant at the .05 alpha level. Therefore, we conclude that UBC students would prefer taking a nap in silence over taking a nap listening to classical music, white noise, or nature sounds. The difference in preference was large, as silence was the only condition that had an mean self-reported preference rating above two ("Disagree").

Our study had some limitations that could have affected our findings or our interpretation of them. At 95 participants, our sample size was fairly small, with 16 more female participants than male. With only 95 participants, we were unable to gather large numbers of participants from each year of study. As the purpose of this study was to garner information about a planned napping space at UBC, obtaining more student opinions through a larger sample size would have improved our ability to investigate the sounds UBC students prefer to listen to while napping. By obtaining a larger sample, we could have sampled more participants from each year of study, which may have allowed us to detect differences in napping patterns across year levels.

One factor affecting the size of our sample was we sampled our participants by posting links to the survey on a variety of Facebook groups that we primarily chose because of our own memberships in them and because of their large amounts of members. This method reduced the

scope of our investigation into our research question, as our sample may not have been fully representative of the entire UBC student body. Having more access to more student groups on social media would have allowed us to obtain a more representative sample of the UBC student population, which in turn would have made our findings and conclusions more generalizable.

Another limitation of our study was that our condition for music only included one genre, classical piano music. Including four sound conditions - silence, classical piano music, white noise, and nature sounds - allowed us to investigate preferences for markedly different types of sound that could be played in the background in a napping room or in an individual napping space. However, we only included a free response section for participants who indicated that they would have preferred listening to another type of music. The lack of alternative options for music may have affected our findings, as UBC students who would have preferred to listen to music if a different option were presented may have assigned their highest preference to one of the other three options. We may have been able to acquire more accurate information about how much UBC students may prefer listening to music while napping if we had included additional, different genres.

Recommendations for UBC Client

Listening to the input of students will be very important when designing a napping room with the intention of catering to a wide variety of student needs. Conducting this experiment with the self-reported opinions of UBC students has, therefore, provided insight into how a possible napping room at UBC may be improved during the planning process. In the survey, participants were asked if they had difficulty sleeping due to sounds, if they predicted that they would use a napping space at UBC, and if they preferred any genres of music to sleep to other than classical music.

32.7% of participants responded that they regularly experienced difficulty sleeping due to sounds. If such a high proportion of participants reported that sound easily disrupts their sleep, then it is possible that ambient sound in a public napping space could disrupt sleep, contrary to the project goal of facilitating sleep for quick naps. Therefore, when designing a dedicated nap room, it is imperative that noise level be taken into account so that all students can use it with the expectation that they will not have difficulty falling asleep due to sound disruptions. One way to avoid disrupting sleep with sound would be to not play sound in the napping rooms at all: this way, there would be no played sound disrupting sleep onset or quality. However, eliminating played sound from the napping room would remove the option of sleeping to ambient noise for students who prefer sleeping to it. Though silence had the greatest mean preference level of all sound types, many students still may enjoy the option to sleep to some kind of ambient sound. Thus, it may be more prudent to implement personalized sound options for each individual napping space so that each student may listen to whatever they like at that moment. This could be done by installing small media players, fitted with Bluetooth connectivity and auxiliary ports into each napping space so that students can easily listen to ambient noise in the individual napping spaces by connecting headphones to the media players. This function can be made even more accessible by providing loaned headphones to students who wish to use them in the napping room.

One issue of concern is that 37.7% of participants stated that they would not use a napping space at all if it were implemented at UBC. This calls into question the viability of the program at all, as the costs of developing and maintaining a napping space may not be

worthwhile if a large enough proportion of students do not feel that they would use napping spaces. Based on the information on student opinions that is currently available, it is difficult to determine whether this proportion is large enough to make such a decision. More research into how likely students would be to use a napping room would further illuminate whether the project would be popular enough among the student body to be worth continuing.

Appendix A

References

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Appendix B

Figure 1
Means Plot

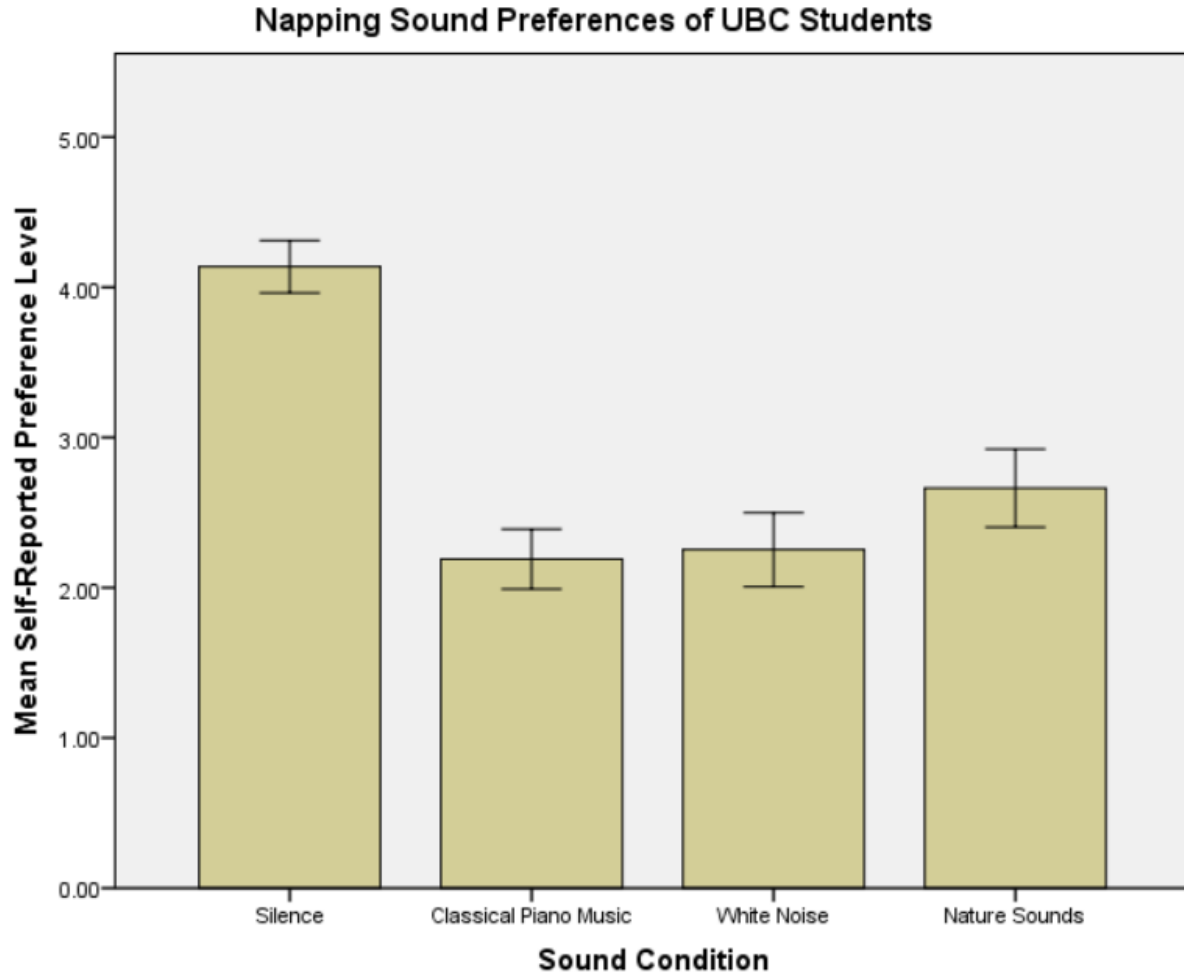


Table 1
Mean Scores for Each Condition

Descriptives

Self-reported Preference Level

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Silence	95	4.1368	.85813	.08804	3.9620	4.3117
Classical Piano Music	95	2.1895	.98169	.10072	1.9895	2.3895
White Noise	95	2.2526	1.21137	.12428	2.0059	2.4994
Nature Sounds	95	2.6632	1.27672	.13099	2.4031	2.9232
Total	380	2.8105	1.34572	.06903	2.6748	2.9463

Table 2
Results from One Way Within Subjects ANOVA

Repeated Measures ANOVA

Within Subjects Effects

	Sum of Squares	df	Mean Square	F	p
RM Factor 1	235.4 ^a	3 ^a	78.463 ^a	76.01 ^a	< .001 ^a
Residual	291.1	282	1.032		

Note. Type III Sum of Squares

^a Mauchly's test of sphericity indicates that the assumption of sphericity is violated ($p < .05$).

Between Subjects Effects

	Sum of Squares	df	Mean Square	F	p
Residual	159.9	94	1.701		

Note. Type III Sum of Squares

Table 3
Results from Tukey's HSD Comparison
Multiple Comparisons

Dependent Variable: Self-reported Preference Level
 Tukey HSD

(I) Sound Condition	(J) Sound Condition	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Silence	2.00	1.94737*	.15890	.000	1.5373	2.3574
	3.00	1.88421*	.15890	.000	1.4742	2.2943
	4.00	1.47368*	.15890	.000	1.0636	1.8837
Classical Piano Music	1.00	-1.94737*	.15890	.000	-2.3574	-1.5373
	3.00	-.06316	.15890	.979	-.4732	.3469
	4.00	-.47368*	.15890	.016	-.8837	-.0636
White Noise	1.00	-1.88421*	.15890	.000	-2.2943	-1.4742
	2.00	.06316	.15890	.979	-.3469	.4732
	4.00	-.41053*	.15890	.050	-.8206	-.0005
Nature Sounds	1.00	-1.47368*	.15890	.000	-1.8837	-1.0636
	2.00	.47368*	.15890	.016	.0636	.8837
	3.00	.41053*	.15890	.050	.0005	.8206

*. The mean difference is significant at the 0.05 level.

Appendix C

Survey Items

1. What year of university are you in?
 - a. 1
 - b. 2
 - c. 3
 - d. 4
 - e. 5
2. What is your age?
3. What gender do you identify as?
 - a. Male
 - b. Female
 - c. Other
 - d. Prefer not to say
4. If you selected 'Other', what gender do you identify as? (If you selected 'Prefer Not to Say', you can ignore this question)
5. What ethnicity do you identify as?
 - a. White
 - b. Hispanic or Latino
 - c. Black or African American
 - d. First Nations or Indigenous
 - e. Asian or Pacific Islander
 - f. Other
6. If you selected 'Other', what ethnicity do you identify as?
7. How often do you nap in a typical week? (I.e: 30 minute to 2 hour sleep during the day time)
8. I would prefer to take a nap in silence.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral
 - d. Agree
 - e. Strongly Agree
9. I would prefer to take a nap listening to classical piano music. (Refer to video below)
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral
 - d. Agree
 - e. Strongly Agree
 - f. Video: <https://www.youtube.com/watch?v=ZAr-PKUyo7Q>
10. I would prefer to take a nap listening to another genre of music.
 - a. Yes
 - b. No
 - c. Indifferent
11. If 'Yes', what genre?
12. I would prefer to take a nap listening to white noise.(Refer to video below)

- a. Strongly Disagree
 - b. Disagree
 - c. Neutral
 - d. Agree
 - e. Strongly Agree
 - f. Video: <https://www.youtube.com/watch?v=nMfPqeZjc2c>
13. I would prefer to take a nap listening to nature sounds. (Refer to video below)
- a. Strongly Disagree
 - b. Disagree
 - c. Neutral
 - d. Agree
 - e. Strongly Agree
 - f. Video: <https://www.youtube.com/watch?v=d0tU18Ybcvk>
14. I find that my sleep is easily disrupted by sound.
- a. Strongly Disagree
 - b. Disagree
 - c. Neutral
 - d. Agree
 - e. Strongly Agree
15. I have trouble falling asleep.
- a. Strongly Disagree
 - b. Disagree
 - c. Neutral
 - d. Agree
 - e. Strongly Agree
16. How likely are you to use a napping pod (enclosed personal space for napping) with or without sound?
- a. Participants answered using a sliding 5 point scale (1 = Likely; 5 = Unlikely)