UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

Safe and Sound (Asleep): Sleep Pod Safety Perceptions

Enviroloverz: Rachel Pavlakovic, Palvi Sandhar, Rebecca Tang, Tony Liang, Yingjun Ruan, Nick Kotsos

University of British Columbia

PSYC 321

Themes: Buildings, Health, Wellbeing

April 4, 2019

Executive Summary

The purpose of our research was to discover which features of the napping pod environment would be perceived as the most safe. In order to answer this question, we surveyed 103 undergraduate students, all of who are currently studying at the University of British Columbia. The level of safety respondents felt when napping in sleep pods was measured by a survey containing 10 questions, an outline of which is included in appendix A. Respondents were able to rate their felt safety on a scale ranging from 1 (I don't feel very safe) to 7 (I feel very safe). There was an additional question at the end of the survey, which allowed participants to comment and address any other safety concerns they had regarding the implementation of sleep pods on campus. The results of the survey showed that, while students would generally feel safe napping in sleep pods, the introduction of secure storage for belongings and the inclusion of interior locks on the sleep pods, account for the greatest increase in perceived safety.

Keywords: Nap, Safety, Sleep Pods

Introduction

Within the next couple of years the University of British Columbia will be introducing sleep pods on campus, and students will have the ability to take naps in an environment especially suited for their sleep needs. The workload of University students often involves a high amount of stress, which can negatively impact sleep. Napping has been shown to increase productivity and also has positive benefits for health across cultures (Autumn, Jitendra & Bharat, 2016). The convenience of sleep pods on campus would greatly benefit students. One of the most important concerns to address regarding sleep pod implementation is making sure that students feel safe while using the pods.

There is very little research to do with sleep pod safety, aside from infant sleeping pods. The academic literature regarding infant sleep pods primarily attempts to identify their possible relationship to Sudden Unexpected Infant Death (SUID). One version of this, the Pepi-pod, is a small plastic enclosure with a simple foam mattress. The simplicity of the design is intended to reduce the risk of infant suffocation (Tipene-Leach et al., 2018).

Student sleep pods are currently in use at the Burnaby campus of BCIT. Some of BCIT's safety regulations include limiting sleep pod occupancy to one person at a time, as well as having security staff posted nearby at all times (Yeung, 2016). A cross-cultural study examining differences in sleep safety definitions of Westerners and Walpiri (An Australian aboriginal group) found that sleep safety is culturally variable. While westerners preferred solitary confined sleeping arrangements, such as a house, the Walpiri feel safest in co-sleeping environments (Musharbash, 2013). Our research attempts to identify what napping pod features contribute to safety and will make students feel safe while sleeping. We specifically hope to contribute to literature about sleep safety, with regards to sleeping pod safety features, and inform the design of the napping pods that will be implemented on UBC's campus. Throughout our research we wanted to identify what features of the napping pod environment students would perceive as the most safe. We predicted that the security of the sleeping pods would be associated with higher perceived safety. We additionally predicted that the security of students belonging would contribute to higher perceived safety.

Methods

Participants

The participant sample consisted of 103 undergraduate UBC students. Age, gender and year of study were not collected in the sample data.

Conditions

Our study contained a total of seven conditions, with the independent variable being the sleeping pod safety features. The first condition concerned location, and tested the perceived safety felt napping at school. The second condition was napping in a public setting, or social environment. A public setting, for the purpose of our research, is defined as any napping space within the University of British Columbia, aside from napping pods. This definition includes napping spaces such as the library, buildings and outdoor spaces where other people may be present. The third condition was napping with a light on, and measured safety felt with a

lighting feature. The fourth condition was napping in a nap pod that contains a lock, in the sense that each individual nap pod would have a locking feature, which students could control. The fifth condition was napping in a sleeping pod with locked storage for belongings. This condition pertains to the security of students' belongings as one of the features of the napping pods. The sixth condition was napping in a sleep pod that has security staff posted nearby. In this condition nap security staff would monitor pods in order to prevent any disruptive behaviour, and multiple occupancy. The seventh condition was napping in a noise free environment. This feature suggests that the pods would be designed to minimize noise and sound.

Measures

A survey was used to measure the felt safety of participants in response to a number of safety features the nap pods could contain. The dependant variable in our study was participants' perceived nap safety, or their felt safety as indicated in the survey. The survey consisted of ten questions regarding napping pod safety features. Participants rated their felt safety in response to questions about sleep pod safety features on a seven-point Likert scale from one (I do not feel very safe) to seven (I feel very safe). The final question was qualitative, and allowed respondents to provide additional comments or concerns regarding their opinions about sleep pod safety.

Procedure

The survey was uploaded to an online survey software in order to generate a link that could be shared with respondents. The link was then sent to respondents and they were required to read a written consent form about the study procedures, and confidentiality of data prior to completing the survey. After consenting to participate, the link would direct them to the survey. There were ten questions targeting participants' perceived safety. There was one open-ended question meant to gather participants' opinions about sleep pod safety and address concerns that were not covered in the survey questions. Demographic variables of participants were not included in the survey, and convenience sampling was used to share the link. A convenience sampling method was used in order to maximize the number of responses, and a total of 103 survey responses were obtained.

Results

The overall results are shown in Appendix H. A one-way ANOVA (Analysis of Variance) was conducted to compare the effect of safety on the differences in means between group samples and their statistical significance (see Appendix E). The ANOVA was used to compare seven distinct factors of Sleep Safety: Location, Social Environment, Lighting, Locking ability, Belonging Storage, Staff Monitor and Noise. An analysis of Variance showed that the effect of *safety features* on *level of safety reported* was significant $F\ [6,65]= 11.93$, $p < .001$. As seen by the data, the group means do vary and the statistical significance is of the highest level. A Bonferroni Post-Hoc was also run and as the pBonf illustrates, the means of Location and Social Environment, Lighting and Staff Monitor, Lighting and Noise Level, Locking ability and Storage, Staff Monitor and Noise do not vary significantly (see Appendix F). The Distribution of mean scores for Overall Safety is shown in Appendix C.

Additionally, a Pearson's Correlation coefficient was calculated for the safety features (see Appendix G for a table with various levels of p-values highlighted). There are medium positive correlations between reported safety felt napping in a public setting and level of safety reported when napping at school, $r_s(100) = .54$, $p<.001$, reported safety felt if nap pods had locked storage for belongings and safety felt if the nap pod could be locked from the inside, $r_s(100) = .57$, $p<.001$, reported level of safety felt if staff monitored the sleep pods and level of safety felt with a light on, $r_s(100) = .43$, $p<.001$, reported level of safety felt if staff monitored the sleep pods and level of safety felt if the sleep pod could be locked from the inside, $r_s(100) = .50$, $p<.001$, reported level of safety felt if staff monitored the sleep pods and level of safety felt if the nap pods had locked storage for belongings, $r_s(100) = .42$, $p<.001$, and reported safety felt if the sleep pod could be locked from the inside and level of safety felt with a light on, $r_s(100) = .43$, $p<.001$.

There are small positive correlations between reported safety felt when napping in a room with other people and reported safety felt when napping at school, $r_s(100) = .32$, $p=.009$, reported safety felt if staff monitored the nap pods and level of safety felt when napping in a noise free environment, $r_s(100) = .32$, $p=.009$. There are small positive correlations between reported safety felt when napping in a room with other people and reported safety felt when napping in a noise free environment, $r_s(100) = .26$, $p=.035$, reported safety felt when sleeping with a light on and reported safety felt when napping in a noise free environment, $r_s(100) = .28$, $p=.02$, reported safety felt when sleeping with a light on and when napping in a room with other people, $r_s(100) = .29$ $p=.016$, reported safety felt napping in a public setting and reported safety felt when napping in a room with other people, $r_s(100) = .3$, $p=.014$, reported safety felt if the sleep pod could be locked from the inside and reported safety felt when napping in a noise free environment, $r_s(100) = .25$, $p=.04$, reported safety felt if the sleep pod could be locked from the inside and reported safety felt when napping in a room with other people, $r_s(100) = .31$, $p=.01$, reported level of worry felt over safety of belongings while napping and reported safety felt when napping in a noise free environment, $r_s(100) = .33$, $p=.01$, reported level of worry felt over safety of belongings while napping and reported safety felt if the sleep pod could be locked from the inside, $r_s(100) = .26$, $p=.046$, reported level of safety felt if the nap pods had locked storage for belongings and reported level of safety felt sleeping with a light on, $r_s(100) = .25$, $p=.04$ (see Appendix H).

Discussion

The purpose of our study was to discover what nap pod features would make students feel the safest. Consistent with our hypothesis our results found that the features associated with the highest perceived safety were the sleep pod lock condition, and the security of belongings condition. The lighting condition was also found to have an impact on perceived safety. The lighting condition was closely followed by the staff monitor condition and the noise free condition. These results indicate that participants tend to feel safer when there is a lighting feature, monitor staff and the environment is noise free. There was a small positive correlation between those who felt safe sleeping in a public setting and those who felt safe sleeping at school. In general students indicated that they would feel safe when napping in sleep pods on campus.

There are several limitations of our research. No demographic data was collected from participants without which, it is impossible to determine whether variables such as age gender or

ethnicity influenced the statistical significance of our data. Excluding such variables could have unintentionally strengthened our correlational findings. In future it is important to conduct a study that measures demographic data of participants in order to identify their possible influences on the observed correlation.

Another limitation is that our study is only correlational in nature. It highlights a positive correlation between some of the sleep pod safety features and felt safety, but cannot suggest that the features are the actual cause of perceived felt safety. It does not account for confounding variables or factors that may have influenced the data. Participant sampling was not done by random selection and was instead collected through convenience sampling. The chosen sampling method could have affected the reliability of the sample, as the participants in the sample may not accurately represent the UBC population. Participants were required to rate their felt safety on a scale of one to seven. This type of self-report measure could have elicited a response bias, impacting the validity of our findings. Future studies should be conducted with an experimental design, and actually test the felt safety of participants when using sleep pods. A more conclusive study is needed to accurately identify all aspects of sleep safety that can contribute to students feeling safe in napping pods on campus.

Recommendations

Based on the survey results there are a number of recommendations for our UBC client. Our results indicate that perceived safety was mostly affected by whether or not the sleep pods contained a locking feature, secure belonging storage and a lighting feature. Based on this data we would recommend that the sleep pods be designed with locks that the user can control from the inside of the sleep pods. Our study also found that students felt safer when their belongings were securely stored, and subsequently we would also recommended that there be secure places for students to store their belongings while they nap. Participants indicated that lighting was a factor in felt safety and accordingly, we would suggest that a controllable lighting feature be included in the pods so that students will have the ability to adjust the light based on their preferences. One of the concerns brought up in the qualitative portion was the access to sleep pods, and whether it would be limited to UBC students. We did not test this particular concern but since they are intended for students we would recommend student cards be used as a form of verification.

References

Autumn, M., Monica, H., Jitendra, M., & Bharat, M. (2016). The perfect nap. *Advances in Management, 9*(4), 1.

Musharbash, Y. (2013). Night, Sight, and Feeling Safe: An Exploration of Aspects of Walpiri and Western Sleep. *The Australian Journal of Anthropology*,24(1), 48-63. https://doi.org/10.1111/taja.12021

Tipene-Leach, D., Baddock, S. A., Williams, S. M., Tangiora, A., Jones, R., McElnay, C., & Taylor, B. J. (2018). The pēpi-pod study: Overnight video, oximetry and thermal environment while using an in-bed sleep device for sudden unexpected death in infancy prevention: The pēpi-pod study. *Journal of Paediatrics and Child Health, 54*(6), 638-646. doi:10.1111/jpc.13845

Yeung, L. (2016). BCIT Installs New Sleep Pods in Library. *CBC News.* Retrieved from https://www.cbc.ca/news/canada/british-columbia/bcit-sleep-pods-library-1.3704552

Appendix A

Survey questions:

1. If you nap at school/were to nap at school, how safe do/would you feel?
2. How safe do you feel when napping in a room with other people?
3. How safe do you feel sleeping with a light on?
4. How safe do you feel napping in a public setting (such as at school)?
5. How safe would you feel if the sleep pod could be locked from the inside?
6. How worried are you about the safety of your belongings while you nap?
7. How safe would you feel if the nap pods had locked storage for your belongings?
8. How safe would you feel if staff monitored the nap pods?
9. How safe do you feel napping in a noise free environment?
10. Overall how safe would you feel napping in nap pods on campus?
11. In the space below, please provide any additional comments or concerns you would like to address about sleep pod safety.

Responses to the qualitative question (Q11):

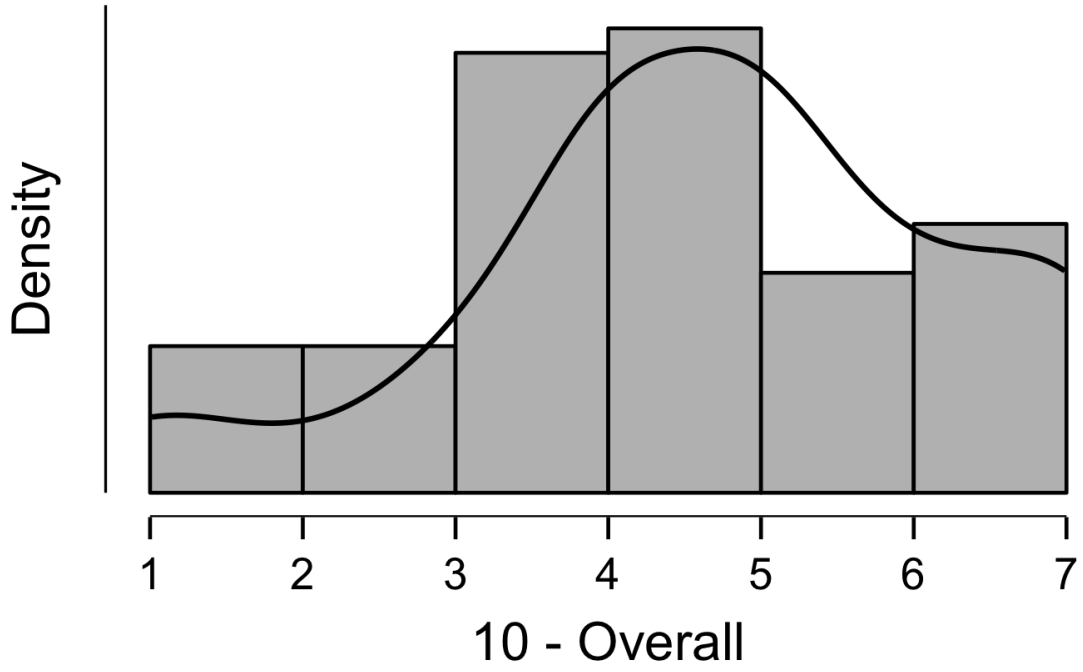
1. I think sleep pod is uncomfortable
2. Sleeping room
3. I do like to grab onto my bag when I nap in Irving, but I don't think napping pod is necessary for me.
4. If have light and safety aid bag would be good
5. Would want to make sure any blankets are cleaned also bed bug resistant mattress, only real safety concern. Naps are the most best amazing
6. security camera
7. NAPS ARE VERY IMPORTANT. Students get soooo stressed out and tired i think nap pods would be genius. Honestly I wish they were in every college/university.
8. House with family
9. Would sleep pods allow access to anyone in the city or only students/faculty?

Appendix B

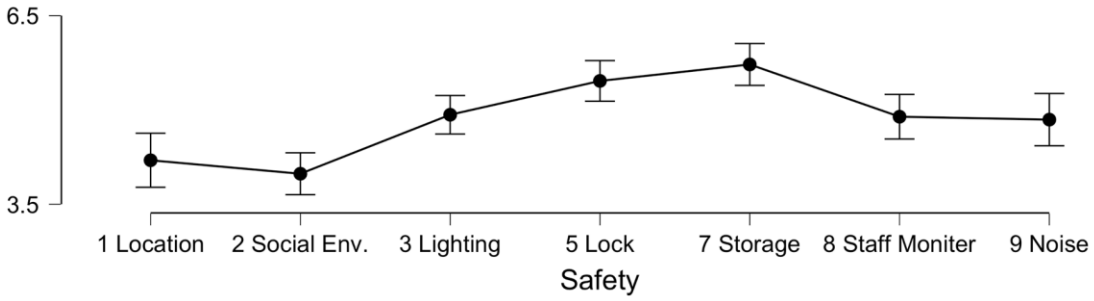
Our survey questions did not address our original hypotheses and research question. In order to make use of the data we collected, we had to remove three questions from our data, and also reframe our research question and hypotheses. Some of our survey questions (i.e., 4, 6, and 10) were too vague and/or redundant and did not help to answer our research question. Our original research question was, what would make UBC students feel safe when napping in sleep pods on campus? In order for the survey questions (and responses from participants) to serve our research question, we had to modify it. We modified our research question to: which features of the napping environment are perceived as the most safe? Likewise, our original hypotheses were: Most students will prefer to nap in a monitored sleep environment, which will in turn allow them to feel safer when napping in sleep pods on campus. Also, that the safety felt by students when napping will be contingent on both the security of their belongings and the security of the sleep pods. Our amended hypothesis was that the security of the sleep pods and belongings would be associated with higher perceived safety.

Appendix C

Our final quantitative question (Q10) in our survey was, overall how safe would you feel napping in nap pods on campus? On a likert scale of 1 (I wouldn't feel very safe) to 7 (I would feel very safe), the average answer was 4.69.



Appendix D


6.5
3.5
1 Location
2 Social Env.
3 Lighting
5 Lock
7 Storage
8 Staff Moniter
9 Noise
Safety

Appendix E

Repeated Measures ANOVA ▼

Within Subjects Effects

	Sum of Squares	df	Mean Square	F	p
Safety	152.8[a]	6[a]	25.461[a]	11.93[a]	< .001[a]
Residual	832.5	390	2.135		

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	439.4	65	6.760		

Note. Type III Sum of Squares

Assumption Checks

Test of Sphericity

	Mauchly's W	p	Greenhouse-Geisser ε	Huynh-Feldt ε
Safety	0.598	0.040	0.844	0.924

Appendix F

Post Hoc Comparisons – Safety

		Mean Difference	SE	t	Cohen's d	p_{bonf}
1 Location	2 Social Env.	0.214	0.230	0.931	0.115	1.000
	3 Lighting	−0.724	0.274	−2.648	−0.326	0.213
	5 Lock	−1.262	0.274	−4.603	−0.567	< .001
	7 Storage	−1.524	0.285	−5.349	−0.658	< .001
	8 Staff Moniter	−0.693	0.296	−2.341	−0.288	0.468
	9 Noise	−0.647	0.316	−2.045	−0.252	0.942
2 Social Env.	3 Lighting	−0.938	0.224	−4.185	−0.515	0.002
	5 Lock	−1.477	0.240	−6.163	−0.759	< .001
	7 Storage	−1.738	0.250	−6.948	−0.855	< .001
	8 Staff Moniter	−0.907	0.270	−3.356	−0.413	0.028
	9 Noise	−0.861	0.254	−3.383	−0.416	0.026
3 Lighting	5 Lock	−0.538	0.222	−2.419	−0.298	0.385
	7 Storage	−0.800	0.220	−3.629	−0.447	0.012
	8 Staff Moniter	0.031	0.219	0.142	0.018	1.000
	9 Noise	0.078	0.253	0.307	0.038	1.000
5 Lock	7 Storage	−0.262	0.204	−1.283	−0.158	1.000
	8 Staff Moniter	0.569	0.225	2.526	0.311	0.294
	9 Noise	0.616	0.276	2.228	0.274	0.616
7 Storage	8 Staff Moniter	0.831	0.225	3.694	0.455	0.010
	9 Noise	0.877	0.276	3.178	0.391	0.048
8 Staff Moniter	9 Noise	0.046	0.270	0.172	0.021	1.000

Note. Cohen's d does not correct for multiple comparisons.

Appendix G

Correlation Matrix

Correlation Table

	9 Noise Free	1 Location	2 Social Environment	3 Lighting	4 Void Redundant	5 Lock	6 Void Redundant	7 Storage	8 Staff Moniter
9 Noise Free	—								
p-value	—								
Spearman's rho	—								
p-value	—								
1 Location									
Pearson's r	-0.006	—							
p-value	0.962	—							
Spearman's rho	-0.034	—							
p-value	0.784	—							
2 Social Environment									
Pearson's r	0.257	0.317	—						
p-value	0.035	0.009	—						
Spearman's rho	0.237	0.32	—						
p-value	0.053	0.008	—						
3 Lighting									
Pearson's r	0.282	0.058	0.294	—					
p-value	0.02	0.638	0.016	—					
Spearman's rho	0.238	0.028	0.298	—					
p-value	0.05	0.82	0.014	—					
4 Void Redundant									
Pearson's r	0.035	0.507	0.3	-0.068	—				
p-value	0.774	< .001	0.014	0.583	—				
Spearman's rho	0.109	0.543	0.32	-0.024	—				
p-value	0.378	< .001	0.008	0.843	—				
5 Lock									
Pearson's r	0.249	0.189	0.311	0.433	0.134	—			
p-value	0.04	0.122	0.01	< .001	0.276	—			
Spearman's rho	0.243	0.273	0.25	0.374	0.221	—			
p-value	0.046	0.024	0.042	0.002	0.071	—			
6 Void Redundant									
Pearson's r	0.333	0.036	-0.02	0.174	-0.14	0.261	—		
p-value	0.01	0.788	0.879	0.186	0.292	0.046	—		
Spearman's rho	0.34	-0.057	-0.021	0.153	-0.125	0.292	—		
p-value	0.008	0.667	0.875	0.248	0.347	0.025	—		
7 Storage									
Pearson's r	0.045	-0.143	-0.025	0.252	0.098	0.471	0.337	—	
p-value	0.718	0.25	0.841	0.04	0.428	< .001	0.01	—	
Spearman's rho	0.076	-0.124	0.003	0.276	0.075	0.572	0.348	—	
p-value	0.538	0.319	0.978	0.024	0.547	< .001	0.007	—	
8 Staff Moniter									
Pearson's r	0.315	0.105	0.173	0.485	-0.003	0.507	0.213	0.396	—
p-value	0.009	0.397	0.165	< .001	0.982	< .001	0.105	< .001	—
Spearman's rho	0.315	0.089	0.207	0.429	0.071	0.49	0.286	0.423	—
p-value	0.009	0.474	0.095	< .001	0.567	< .001	0.028	< .001	—

Highlight Key

* p < .05
** p < .01
*** p < .001

Appendix H

Descriptives

Descriptives

Safety	Mean	SD	N
1 Location	4.199	1.693	66
2 Social Env.	3.985	1.504	66
3 Lighting	4.923	1.572	66
5 Lock	5.461	1.790	66
7 Storage	5.723	1.330	66
8 Staff Moniter	4.892	1.882	66
9 Noise	4.846	1.858	66