

Where do students rest at MacEwan University

A Mini-Research Project by Terence Kamau

SCIE 201 AS40

Supervisor: Dr. Karen Buro

MacEwan University

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1. Abstract

In university and colleges, napping is a common occurrence and practice used by students to alleviate daytime sleepiness. Sleep debt up to 19 hours is on par with a drunk individual having a blood alcohol content (BAC) of 0.05 (two wine glasses), whereas most states have the BAC limit at 0.08 for non-commercial and 0.04 for commercial drivers. Napping stops the symptoms, where there's too little time to cure the restlessness. MacEwan University will be observed for proportions of students napping on furniture and the proportion of total seats taken in the same area. Data was collected twice a day (once Monday) for 7 days. Areas were observed for an hour interval, at four different times. Furniture seating was counted through furniture design. Five areas were observed for 10-minute periods for napping individuals and total seats occupied. Sex of the individual presumed male, presumed female, ambiguous was observed. Sound level of each area was recorded by a sound app for a one-minute interval. Area description will account for furniture differences for suitability of napping area. A binary logistic regression was used to analyze the data, which showed location and time as significant to where people sat (p -value <0.05).

2. Introduction

In universities and colleges, napping is a common occurrence and practice used by students to alleviate daytime sleepiness to help regain physical and mental alertness. How Sleep Works (retrived March 2018) describes a nap as a ‘brief period of sleep taken outside of the main sleep period’, otherwise called siesta. Siesta’s are normally controlled by the circadian rhythm in the brain; an individual human being’s 24-hour biological clock and internal cellular processes that keeps you alive and maintains your sleep cycle. It’s responsible for relative tiredness, at predictable times. One of these times is the post-lunch dip period, a natural tendency to be sleepy around 2-4 pm due to a dip in the circadian rhythm alertness cycle, not the cause of eating lunch (How Sleep Works (retrived March 2018) para. 8). Though when suffering through sleep restriction; factors that prevent you from sleeping such as heavy term paper assignments, the lost hours of sleep will add up. This leads to sleep deprivation- the total loss of sleep, and when prolonged it leads to sleep debt, where the effects of sleep deprivation becomes apparent. It affects cognitive functions such as slower response times, bad impulse control, and impaired judgement. Sleep debt up to 19 hours is on par of drunkenness with an affected individual having equivalent blood alcohol content (BAC) of 0.05 (two wine glasses), whereas most states have the BAC limit at 0.08 for non-commercial and 0.04 for commercial drivers, in where more sleep debt would double this value [(Calverio 2017, Para. 5- 13), (Valley Sleep Center (n.d.) para. 1- 3), (How Sleep Works (n.d.) para. 1-3)]. In a battle over sleep, the body always wins and will put people to sleep to pay back its sleep debt. This study investigates the area’s where fatigued

students at MacEwan University would ‘nap’ on the provided furniture in relatively noticeable ‘resting areas’, and the effect the furniture has on attracting weary students to those locations, along with other discernable factors such as sound and number of people present in the area.

2.1 Literature Review

There have been many studies trying to understand the nature of a nap, its detrimental and positive effects, and how its tied to the circadian rhythm and bedtime sleep beforehand. Naps have proven effective in increasing growth hormone secretion which helps repair your body and metabolism, effectively lowering blood pressure. Naps promote arousal [in terms of wakefulness] and enhances performance and learning ability [(How Sleep Works n.d. para. 3), (TheBotanyofSouls (2012), para. 4 and 8-10)]. Lee, T., Chang, P., Tseng, I. & Chung, M.(2017, October) did a morningness–eveningness questionnaire (MEQ), that gauges whether people go to bed earlier (morningness) or later (eveningness). An actigraphy apparatus to record their sleep a week prior to the experiment and Polysomnography to their sleep cycle. There was a positive association between morningness-eveningness and nighttime shows that those with evening preference have larger sleep debt and this causes them to nap in the evening, which leads to shorter nighttime sleep duration (pg. 1-7, (Matsuura, N., Hayashi, M., Hori, T. 2002, pg. 223-224). Another study had multiple surveys were students reported to have significantly worse daytime functioning, trouble collecting their thoughts, being motivated, staying focused and were

generally more depressed than non-napping students due to excessive sleepiness and sleep debt (Lavato, N., Lack, L., Wright, H. 2014, pg. 3-11). Other universities tried to tackle the sleepiness health issue than look at the causes with centers like 'Nap Nooks' with disposable pillows and antibacterial mattresses, or bean bag chairs, or do surveys on campus asking which areas are the most pleasing to stay at. Whereas others decided to go futuristic with \$10, 000 MetroNaps Energy Pod, or \$4000 PodTime nap stations [(Diament, M. 2005 pg. A6-1), (The Buzz 2015, pg. 223-224), (Waxman, O.B. 2014, p. 1)].

2.2 Objectives

The objective is to determine the association between the proportion of people napping and the proportion of seats taken in five observed 'resting areas' with the factors of time, average (sound), day (weekday), and location (areas) tested. The area of study is MacEwan University in Buildings 5,6,7, 8 and 9. The response variables are POP'n (proportion of people napping from entire sitting population in an area) and POST (proportion of seats taken in total in an area). Predictor variables are day, location, time and average. Controls is my methodological approach and the times I visit 'napping' areas. This study is significant as no other study has looked at the relative frequency to students and the furniture they rest on, along with present observational study in a non-controlled university environment.

2.3 Hypothesis

At least 1 predictor for both POST and POP'n will be significant.

3. Materials and Methods

Five areas' within MacEwan University were observed, recording the number of people resting and napping in the area, [the proportion of total people seated in an area](#), the presumed sex of napping individuals and the noise level. The relative pathway (RPA) and starting point (SP) of the buildings ventured are stated in compass directions of MacEwan University's buildings [N/S/E/W] as viewed on Google Maps. The five areas are labeled 1 to 5, where the numbers are also in the order they were observed. Area I: the second-floor bridge (pedway) linking building 7 and 8 with RPA [E to W] and SP [E] down the hallway. Area II: Paul Byrne Hall with RPA [E to W], first floor of building 9 through elevator entrance SP [N]. Area III: the first-floor of building 7 SP entrance [W] side, [S to N] RPA. Area IV: the second-floor bridge (pedway) linking building 6 and 5 with RPA [W to E] and SP [E]. Area V: the first-floor of building 5 [W to E], from its [E] entrance SP. To check the sound level, I used a sound recording app called "SmartEAR1 MACTOOLS" on my iPhone 6S. The 'refresh rate' is at 500ms, 'offset' is at 0dB, and the 'volume' is centered on the scroll, and the microphone icon is used to record the sound. The sound of each area was recorded for one minute, as I walked around covering as much of the floor as possible, in a circular path, without moving too fast to greatly alter the sound frequency. The exception to this rule is the hallways on the second floor, located in the Pedways leading

from Building 5-6 and Building 7-8, as the area is too small to circle without drawing excessive suspicion; the observer sat stationary at the Pedway locations to record the sound. The minute interval was timed by waiting for a time change of one minute, where the observer tapped on the app's screen, while clicking continue. Observer walked around and took a screenshot on mobile device the moment the time changed a minute from the start of recording, to capture a still of the sound. The POST and POP'n will be recorded twice per day for an hour interval (except for Monday, which the areas were only observed once due to a constraining schedule).

Consequentially the apparent sex of an individual [presumed male, ambiguous, presumed female] was observed as well, which was recorded for nappers only, out of safety measures to insure the observer included as much data as observably possible to see if it was significant, but did not make it into the final analysis.

No Research Ethics Board approval is needed for this study as it stayed totally observational. No people were confronted or spoken to during observation of students, nor were their personal space invaded as the area's chosen were widely publicly accessible and known to not draw any unwanted suspicion. All data that couldn't be obtained with people present was done during off hours (weekends), were the student population would be at the bare minimum, or early times in the morning were student population was the least.

3.1 Data Analysis:

For data analysis a logistic regression from SSPS was used to see if there was significant association of the dependant variables POST and POP'n and the predictors time, day, location, and average in the data analysis:

POST- proportion of seats taken by people observed (includes nappers)

POP'n- proportion of people napping (non-nappers excluded)

Boxplots will be used to show the behavior of POST and POP'n vs time and location individually.

4. Results:

Sample size (n=59) from the number of locations visited total, nappers was 26 individuals, and total seats taken by both nappers and non-nappers was 1058 (1032 non-nappers). A Logistic Regression analysis was conducted for POST and POP'n in dependency on Day, Location, Time and Average noise level. The Omnibus Test for both POST and POP'n were significant ($p < 0.001$).

Results of the binary logistic regression indicated that there was a significant association between POST and location ($\chi^2(4) = 204.965, p < 0.001$) and time ($\chi^2(3) = 31.446, p < 0.001$).

Results of the binary logistic regression also indicated that there was a significant association between POP'n and location ($\chi^2 = 69.22, p < .001$). The Omnibus Test for both POST and POP'n were significant ($p < 0.001$).

Table 1: Shows the Omnibus and Test Model Effects of POP'n (left), and the POST (right).

Omnibus Test^a

Likelihood Ratio Chi-Square	df	Sig.
40.323	12	.000

Events: Nappers
Trials: People
Model: (Intercept), Day, Location, Timel, Average

a. Compares the fitted model against the intercept-only model.

Omnibus Test^a

Likelihood Ratio Chi-Square	df	Sig.
95.855	12	.000

Dependent Variable: PropOfSeats
Model: (Intercept), Day, Location, Timel, Average

a. Compares the fitted model against the intercept-only model.

Tests of Model Effects

Source	Wald Chi-Square	Type III	
		df	Sig.
(Intercept)	1.694	1	.193
Day	1.379	3	.710
Location	9.950	3	.019
Timel	2.673	3	.445
Average	3.498	1	.061

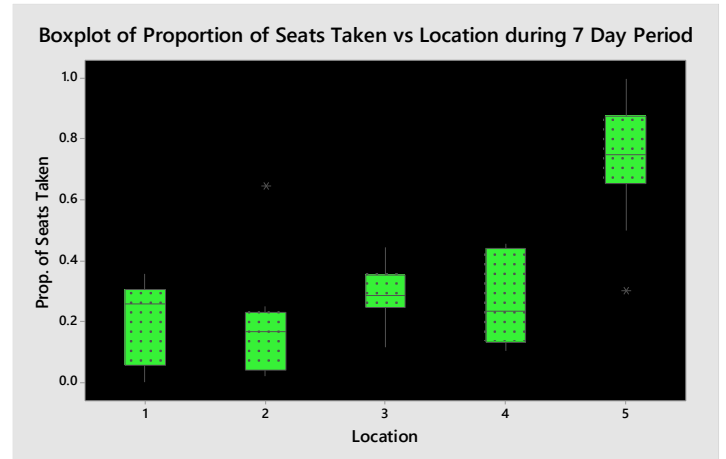
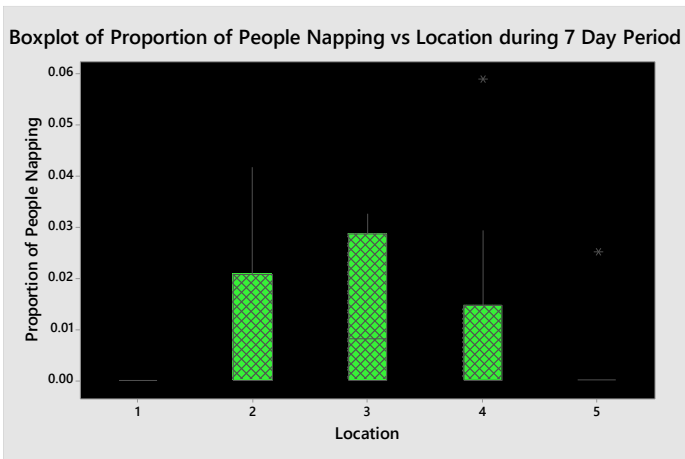
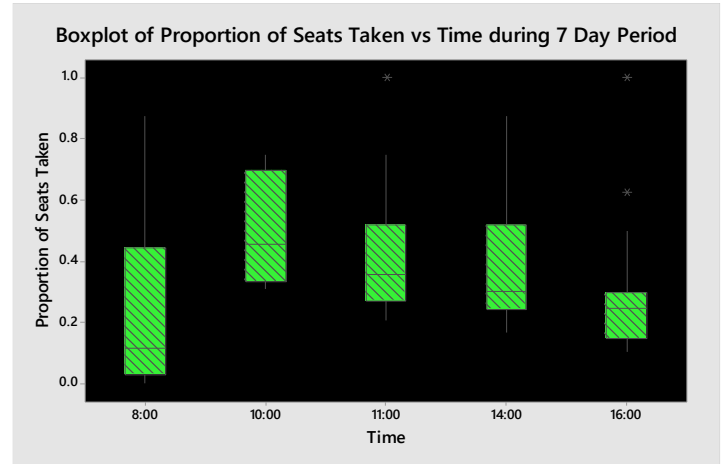
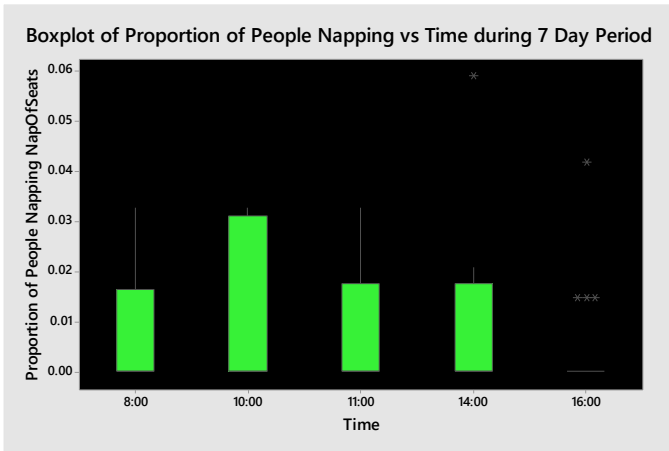
Events: Nappers
Trials: People
Model: (Intercept), Day, Location, Timel, Average

Tests of Model Effects

Source	Wald Chi-Square	Type III	
		df	Sig.
(Intercept)	1.555	1	.212
Day	7.192	3	.066
Location	204.965	4	.000
Timel	31.446	3	.000
Average	.613	1	.434

Dependent Variable: PropOfSeats
Model: (Intercept), Day, Location, Timel, Average

Table 2: Shows the boxplot of the POP'n vs Time and Location (left) and POST vs Time and Location (right)



5. Discussion

- My hypothesis that at least one predictor (time, location, day, average) would be significant for both time and day was verified.
- The Omnibus Test proves significant that at least one of the pre
- For POP'n, location was significant predictor and possibly average (sound; p-value= 0.066). This may be because of how short the study time was and may be verified in another study. Though noise should be a factor as to where students rest as no-one would want to nap near a jackhammer. In the boxplot for POP'n vs Location, area 3 was the most napped at 'resting area', with areas 1 and 5 with little to no nappers. Area 3 building 7's entrance, a large area with dark furniture and dim lighting, with a streak of offices nearby, making for an exceptional napping area. Area 1 is normally noisy with Tim Hortons, swimming and basketball activities, which wouldn't be ideal for napping. Area 5 is normally packed with students which follows a lot of noise; the LRT being just outside it would make it a priority hotspot for students leaving than those napping there.
- For POST, location and time were significant predictors as why students rested in those 5 'resting areas' in MacEwan. In the boxplot for POST vs Location a curve like shape takes place, where building 5 (area 5) has the most occupied seats. This can possibly be

explained that in area 1, the bridge between buildings 7 and 8 has a Tim Hortons and recreation centers for students to eat and watch respectfully. Also, that the location is close to the library and building 9 bridge makes it a potent hotspot to be at. Area 2 is seldom visited unless there is an event and is directly across fast food restaurants which would make it a desired resting area, but not as convenient as area 1. Area 3 is connected to the cafeteria, leads direct access to the student registrar, classrooms, building 8, and a path to corona station, which makes it highly desirable. Area 4 is near building 5 which deals with a lot of sciences, and the library and cafeteria, which makes it even more desirable. Area 5 is closest to the MacEwan train station and scientific offices, and very spacious, which would make it the most desired place to rest.

- In the boxplot POST and POP'n vs time, most seats were occupied at 11:00 hours. This may be because that it's near noon, where most students would eat. Disclaimer: the time 10:00 hours is 11:00 hours mislabelled for Tuesday (the last day of research), and in the boxplots 11:00 and 14:00 hours are even before the addition of the mislabeled data, making 11:00 hours with the added proportion from 10:00 hours the time with the most occupied seats.

6. Conclusions

In this mini-research project to determine the relationship between MacEwan POST and POP'n in five observed 'resting areas' with the factors of time, average (sound), day (weekday), and location (areas) tested. Location and time were significant predictors in POST, as the main motives of a student to sit down in the 'resting areas'. Location was significant predictor in POP'n as the main motive for a student to lay down in a 'resting area'. Area III [building 7 first floor] had the most nappers, and Area V had the most proportion of seats taken. This study can help MacEwan Students know the best places to rest and nap, as well be used as a base to help determine if a university has proper 'resting areas' before having to take larger measures such as MetroNap Energy Pods or designing better resting areas for students in the future.

7. Recommendations

- Further research into resting area's in this mini-research project could observe the real time lighting of the napping areas and how that affects napping, could look at napping area's during testing periods to see if there is a substantial change in napping frequency, or look at another institution with this paper as a guide on how to research it correctly.
- Improvements to my methodology is to make a comprehensive map of the designated sleeping with a checklist to see which furniture people exactly sat on, with a 'chair ID' in the mix for a more concise research project.

- The application of my findings can help other universities determine in an active environment if they have the rooms necessary for weary sleepy student population, or may invest in student nap rooms? Future expansion on the campus can be designed to attend to the napping needs of students.

8. Acknowledgments

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