UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

Trend vs. Fad: The Long-Term Impact of Pro-Stair Usage Initiatives

Peter Bow, Zain Alansari, Shahil Shah

University of British Columbia

PSYC 321

Wellbeing, Buildings

April 5, 2018

Executive Summary

This report utilizes an observational study to determine the long-term impact of pro-stair initiatives. Furthermore, we examine whether these initiatives are able to promote sustained increases in stair use over time. We observed building traffic in relation to the deco-stair initiative that was implemented during the MoveUBC campaign within the CIRS building on the UBC campus. We compared our observational mean stair use to another study's mean baseline, which was previously collected within the CIRS building via a one-sample T-test. Ultimately, we found that stair traffic steadily increased over elevator traffic during the duration of our study. However, the increase remained statistically insignificant compared to the control mean. In regard to our overall research question, it appears that the deco-stair intervention not only initially increased stair traffic, but also persisted over the duration of our observations. The results ultimately imply that, despite an insignificant finding, nudges can still promote increased stair use vs. elevator use over time.

Introduction

Stairs: ancient by design, however, more relevant than ever. In the wake of modernized living conditions that prompt sedentary lifestyles, the need to move has never been higher. Pro-stair initiatives that increase daily stair use of active participants within a given population can increase the level of cardiovascular fitness, reduce cholesterol levels, and contribute to weight control (Boreham, Wallace, & Nevill, 2000; Boreham, Kennedy, Murphy, Tully, Wallace, & Young, 2005). In addition, as stair traffic increases, and as a consequence the subsequent decrease in elevator traffic, electricity is conserved, which has pro-environmental implications as an active reducer of individuals consumer footprint – the effects of which are cumulative over time should pro-stair behaviors persist.

Multiple studies have shown that an individual's decision on stair usage can be swayed by signage, point of decision prompts, and education. These social facilitators create awareness of the small lifestyle choices one can engage in day to day that can lead to improved overall health (Cohen, 2013). A study by van Nieuw-Amerongen, Kremers, de Vries, and Kok (2011) examines whether increasing the attractiveness and accessibility of a stairwell had an impact on stair use among students and employees of Maastricht University in the Netherlands. The findings reveal that total stair use saw a significant increase of 8.2% and that the effects persisted and remained stable over the 4-week post-intervention period. The study shows that improving the stairwell environment can positively and continuously influence stair use.

Within our current study, the initiative we chose to follow was the deco-stairs that were put up during the MoveUBC campaign as a nudge to increase stair traffic. MoveUBC is a campaign which aims to increase physical activity amongst students, staff, faculty and the UBC community. MoveUBC will seek to engage and inspire the UBC community to be more active in order to improve wellbeing and enhance success and retention.

Research question

What is the long-term impact of pro-stair usage initiatives? If they do initially successfully promote increased stair usage, does this behavior within a given population persist over time?

Hypothesis

We hypothesize that the deco-stair initiative in the CIRS building designed for the move campaign, will transiently increase stair traffic, with a subsequent decrease in stair traffic over time.

The MoveUBC campaign decided to put up decals on the stairs in the CIRS building thereby increasing their attractiveness to the given population in an attempt to get them to use the stairs more often. A good nudge in this case is generally designed to be noticed in a given environment in order to steer people in a particular direction. Therefore, within the context of this environment, the nudge must operate as a novelty or an uncommon feature designed to draw people’s attention. However, as time passes, the people get more acclimated to the nudge and thus its novelty wears off. We predict that the nudge’s effects on the given population will wane with time. As the decals on the stairs become part of the given environment, the nudge will fail to stimulate an increase in stair traffic.

If an environmental nudge is to have a significant effect on a given population's attention and consequently their behavior, it must be able to continuously capture one's attention. A well-designed nudge has to evolve over time to compensate for people's loss of attention to repeated stimuli. As a consequence of the deco-stairs' static nature, while the nudge may initially increase stair traffic, we hypothesize that in the long run the nudge will fail to elicit a sustained increase in stair traffic.

Methods

The study is observational in nature, and anonymous, as such, consent of the population is not required so long as we do not identify individuals within the study. Therefore, the participant population is the students and faculty of UBC and any individuals that utilize the CIRS building during the hours of data collection.

The independent variable is the deco-stair intervention, and the dependent variable is stair traffic vs. elevator traffic. The measures within this study will be traffic flow in the CIRS building. This includes traffic going upwards from ground floor of the staircase that has been outfitted with decos for the UBC move campaign. Building entrance traffic from the two main entrances of the building and elevator traffic going upwards from ground floor. We refrained from measuring any downward traffic from either the staircase or elevator because the decals are not visible going down a staircase thus it won't be related to our hypothesis.
The conditions within this study include a control group (stair and elevator traffic before the deco-stair initiative), and the intervention group (stair and elevator traffic during the deco-stair initiative).

Pre-intervention control data will be utilized from another student's previous data on staircase and elevator traffic within the CIRS building.

All data is collected by researchers manually using hand counters. Data collection took place on the 13th, 15th, 27th, and 28th of February, and the 6th, and 8th of March from 12:30 to 13:30. We selected this time taking into consideration traffic during lecture hours. We were forced to omit the data collected on February 28th due to construction within the building on this date that would lead to a confounding variable. These dates were selected specifically so that they land on a Tuesday and Thursday of every week, providing a reliable set of results.

Results

The anticipated outcome of this study is that stair traffic would initially increase at the beginning of the intervention, followed by a decrease in stair traffic over time. If our hypothesis is supported, it will indicate that pro-stair initiatives might be largely ineffective over time if the population is not continually cued, or nudged to act accordingly.

Chi-Square:

In order to determine significance between total stair use vs. total elevator use, we conducted an analysis using the Chi-Square. Out of a total sample size of 578 people, 207 people choose the stairs, 70 people chose the elevator, and 301 people remained on the ground floor. Overall, a significant portion of the sample population chose to use the stairs over the elevator. This finding is expressed utilizing the Chi-Square statistic, that clearly states that the probability that this finding isn't due to chance is $p < .05$ (Aka. A significant finding).

	Stairs	Elevator	*Marginal Row Totals*
use	207 (160.09) [13.75]	70 (116.91) [18.82]	277
not use	301 (347.91) [6.33]	301 (254.09) [8.66]	602
Marginal Column Totals	508	371	879 (Grand Total)

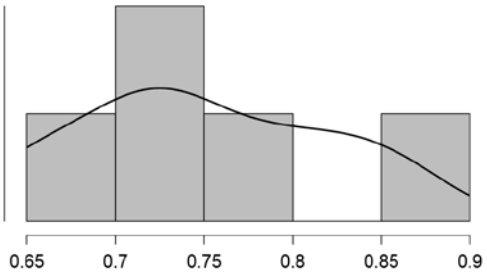
(The chi-square statistic is 47.56. The result is significant at $p < .05$)

Descriptive Statistics:

The range of stair use over elevator use within our observations was 65.5% to 85.1%, with a mean stair use of 74.98%, a standard deviation of 7.51%, and standard error of the mean of 3.36%. However, our data was positively skewed at 0.23, meaning that our sample data was generally higher near the beginning of our study, and decreased over time. This relationship is expressed within the mode of 65.5%, median of 73.2%, and mean of 74.98%, which further indicates that the mean is influenced by a positive skew over the mode and median.

Descriptive Statistics

	stairs
Valid	5
Missing	0
Mean	0.7498
Std. Error of Mean	0.03360
Median	0.7320
Mode	0.6550[a]
Std. Deviation	0.07512
Skewness	0.2259
Std. Error of Skewness	0.9129
Kurtosis	−0.5149
Std. Error of Kurtosis	2.000
Minimum	0.6550
Maximum	0.8510



(percent stair traffic over 5 observations)

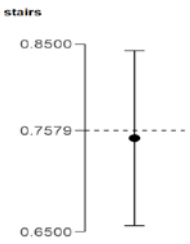
One-sample T-test:

To determine statistical significance, we ran a One Sample T-test. The rationale behind using this test, is to compare two means against one another: the mean from the control stair traffic data, and the mean from our intervention stair traffic data. We ultimately found the probability to not be statistically significant at 0.82. The T-statistic was -0.241, and a rejection rule set at 5% two-tailed which equals -/+ 2.776. The T-statistic was not greater or less than these critical values, as such, there was not a statistically significant effect. Furthermore, there was a small effect size at cohen's d -0.08, and we found a Confidence Interval of 65.7% - 84.3%, meaning that we are 95% sure that the population mean lays within these parameters.

One Sample T-Test

	t	df	p	Mean Difference	95% CI for Mean Difference		Cohen's d	95% CI for Cohen's d	
					Lower	Upper		Lower	Upper
stairs	−0.241	4	0.821	−0.008	0.657	0.843	−0.108	−0.981	0.778

Note. Student's t-test.



Discussion

Ultimately, our hypothesis was not supported: stair traffic steadily increased over elevator traffic over the duration of our study. However, the increase remained statistically insignificant vs. the control mean. In regard to our overall research question, it would appear that the deco-stair intervention not only initially increased stair traffic, but also persisted over the duration of our observations. The results ultimately imply that despite an insignificant finding, that nudges can still promote increased stair use vs. elevator use over time.

However, our study was not without its limitations. The intervention was initiated in the CIRS building on the UBC campus: a building that was built with sustainable practices in mind. As such, through reputation, the building may prompt environmentally friendly practices among its population. In addition, in concurrence to the deco-stair initiative, the move campaign was underway, which makes it difficult to untangle the true influence of both the deco-stairs and the overall campaign on stair traffic. Related to the statistics, our sample size decreased over the course of our observations, which potentially decreases external validity of our findings over time. Also, our control data was collected via another studies observations prior to our study. Related specifically to the nudge itself, the deco-stairs where not easily visible from the main floor, which potentially decreases its effectiveness. Another potential limitation to this study is that we did not account for people with disabilities that would otherwise prevent them from using the stairs. However, over the course of our study, we did not observe anyone with a visible disability. Nonetheless, given that individuals with physical disabilities may not have the option of using stairs, this population may be identified and taken out of the analysis sample. Similarly, given the nature of an observational study, we were unable to account for unobservable disabilities that may hinder some people from using the stairs.

Recommendations

Research on past interventions confirm that actively engaging participants aided in proactive behaviours. This demonstrates that pro-stair decision making can be facilitated through motivational signage and choice prompts. As stair traffic increases subsequent elevator traffic decreases, which will result in energy conservation having pro-environmental implications. With pro-stair behaviours persisting, individuals combined engagement can actively reduce their consumer footprints. Architectural features such as attractiveness and accessibility also impact stair use. As such, organizing the context in which people make decisions can be taken into consideration when conducting the design and building codes.

Going forward, consideration of cultural and social settings of the target population is important prior to intervention. Future studies may look at interventions involving different locations where sustainable practices haven't been implemented. Additionally, where choice architecture is absent, there should be nudges guiding individuals to the appropriate stair well. Some building layouts are designed with fire escape in mind, and have staircases tucked in the corner with easier accessibility to the elevator and escalator. Supplementary emphasis should be put in directing traffic towards these stairwells. For example, in our intervention due to the design of the staircase, the stairwell decals were only visible after turning the first landing, this is a confound in itself because participants had already decided to take the stairs. Another confound to account were that the decals were only present on each riser of the step, which could only be seen while ascending. Future interventions could provide nudges starting from the buildings entrances or at the floor base of each stairwell. Both the landing and riser should also have decals to account for participants ascending and descending the stairwell. Post intervention surveys could be used to have a better idea of the rationale of why people choose either the stairs or elevator, for future studies to influence intrinsic motivations to use the stairs or elevators. Through intervention and education, small lifestyle changes can factor into broader health related issues of today.

Appendix:

References

Boreham, C., Wallace, W., & Nevill, A. (2000). Training effects of accumulated daily stair climbing exercise in previously sedentary young women. Preventive Medicine, 30, 277-281. DOI: 10.1006/pmed.2000.0634

Boreham, C. A. G., Kennedy, R. A., Murphy, M. H., Tully, M., Wallace, W. F. M., & Young, I. (2005). Training effects of short bouts of stair climbing on cardiorespiratory fitness, blood lipids, and homocysteine in sedentary young women. British Journal of Sports Medicine, 39, 590-593. DOI: 10.1136/bjsm.2002.001131

Cohen, S. M. (2013). Examining the effects of a health promotion intervention on the use of stairs. Journal of Articles in Support of the Null Hypothesis, 10(1), 17. Retrieved from: http://www.jasnh.com/pdf/Vol10-No1-article2.pdf

Moatari-Kazerouni, A., Pennathur, P., Tucker, S. J., & Leyden, L. A. (2016). Design Implications to Increase Utilization of Stairwells. Workplace health & safety, 64(2), 57-64. DOI: 10.1177/2165079915612789

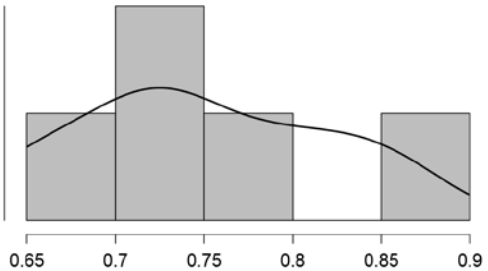
Van Nieuw-Amerongen, M. E., Kremers, S. P. J., de Vries, N. K., & Kok, G. J. (2011). The use of prompts, increased accessibility, visibility and aesthetics of the stairwell to promote stair use in a university building. Environment and Behavior, 43(1), 131-139. doi: 10.1177/0013916509341242

Supporting statistical tables:

	Stairs	Elevator	*Marginal Row Totals*
use	207 (160.09) [13.75]	70 (116.91) [18.82]	277
not use	301 (347.91) [6.33]	301 (254.09) [8.66]	602
Marginal Column Totals	508	371	879 (Grand Total)

Descriptive Statistics

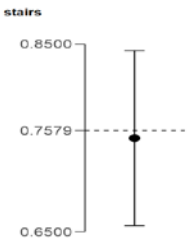
	stairs
Valid	5
Missing	0
Mean	0.7498
Std. Error of Mean	0.03360
Median	0.7320
Mode	0.6550[a]
Std. Deviation	0.07512
Skewness	0.2259
Std. Error of Skewness	0.9129
Kurtosis	−0.5149
Std. Error of Kurtosis	2.000
Minimum	0.6550
Maximum	0.8510



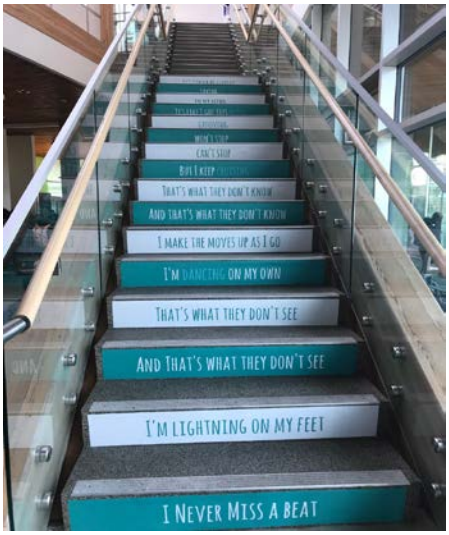
One Sample T-Test

	t	df	p	Mean Difference	95% CI for Mean Difference		Cohen's d	95% CI for Cohen's d	
					Lower	Upper		Lower	Upper
stairs	−0.241	4	0.821	−0.008	0.657	0.843	−0.108	−0.981	0.778

Note. Student's t-test.



Picture of the deco-stair intervention:



Poster from previous study: