THE EFFECT OF THE BUILT ENVIRONMENT ON MENTAL HEALTH, PHYSICAL HEALTH, AND ACADEMIC PERFORMANCE

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INTRODUCTION

- On March 11th the WHO classified the Covid-19 outbreak, which originated in China, a pandemic
- Social distancing became the new norm and students couldn't see friends and family as often
- Another consequence of the Covid pandemic is that students spend more time in their (student) room. Before Covid they would spend on average 87% of the time in their room and now, during Covid, they spend on average 96% of the day in their room
- Because students spend more time in their room, the learning space and living environment are more important than ever
- Not yet researched: There is no doubt that students are forced to spend more time indoors, but less evidence exists as to the effects that the home environment has on their mental health, physical health and learning capabilities.
- **In this study we aim to show how the built environment has an effect on students in the city of Maastricht.**

METHODS

Participants

- Semi structured interview survey among University and College students in Maastricht
- Opportunity sampling over a time span from January 2021 until April 2021
- Participants who filled in the survey for 10% or more were included
- Eventually, 189 of the 209 respondents were included in the study
- All data was pseudo-anonymised and remained confidential throughout the study.

Study design

- There were five different categories regarding the questions in the survey;
- Demographics, physical activity, sedentary wellbeing, mental wellbeing, "physical basic" of the built environment.

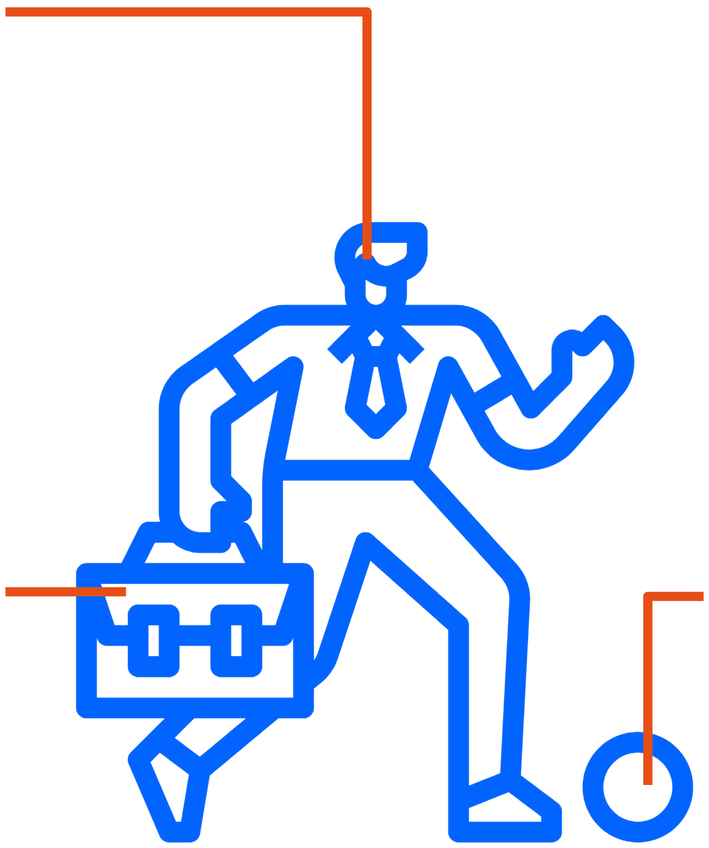
RESULTS: MENTAL HEALTH

- **Relationship between mental health and gender**: Female and non-binary students rate the state of their mental health worse than male participants did.
- **Hours of sleep and mental health**: Sleep has a positive impact on mental health.
- **Room and mental health**: Overall condition of the room is positively related to mental health, as well as the quality of temperature inside the room. The mental health decreases with 0.506 with each additional hour spent inside the bedroom during the day.
- In the best case, our estimations explain about **13.5%** of the variation concerning mental health.

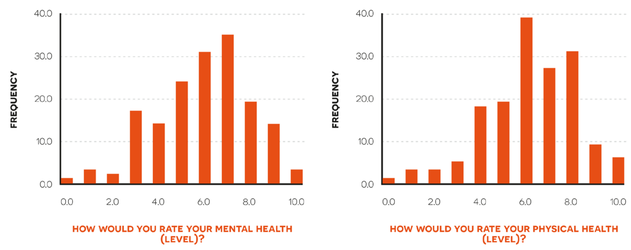
Mental Health
(dependent variable: Self-Assessment of Mental Health)

	(1)	(2)	(3)	(4)
Constant	7.292***	6.178**	2.749	3.769
Demographics				
Age	-0.16	0.006	0.014	0.004
Gender	-1.003***	-1.154***	-1.137***	-1.189***
Year of Study	0.36*	0.164	0.173	0.147
Controls				
Sleep h/day		0.766**	0.711*	0.511
Workouts per week		0.156	0.18	0.137
Time in Room		-0.506**		
Housing				
Bedroom size (m^2)			0.313	0.433
Housemates			-0.03	-0.005
Overall Room Condition			0.316**	
Time*Condition			-0.049	
Temperature				1.793**
Time*Temperature				-0.662***
Air Quality				-1.12
Time*Air				0.405
Light Quality				0.224
Time*Light				-0.022
Noise Level				-0.419
Time*Noise				0.219
Observations	189	189	189	189
R^2	0.086	0.146	0.174	0.219
Adj R^2	0.069	0.113	0.125	0.135

Note:
Significance at the 0.10, 0.05, and 0.01 levels are indicated by *, **, and ***, respectively.



DESCRIPTIVES



The mean mental health was a 5.97, which is in line with studies that have shown that the pandemic has taken a toll on students' mental health (Son, et al. 2020).

The mean physical health is 6.23.

- **Gender**: The variable gender consists of 58 males, 128 females, 1 non-binary person, and 1 person that did not prefer to say their gender.
- **Age**: The mean age was 20.29, The minimum age found was 18 and the maximum age was 55. The two outliers of age 36 and 55 will not cause big effects on the regressions later on, because of the fact that the sample is large.
- **Bedroom size**: The mean bedroom size of respondents was in the category 10-20m^2. There were 20 respondents with a bedroom size smaller than 10m^2, 107 respondents with a size of 10-20m^2 and 48 with a bedroom larger than 20m^2.

RESULTS: ACADEMIC PERFORMANCE

- **Year of study program and academic performance**: With each year of of the study program, the academic performance increases.
- **Mental health and academic performance**: Mental health positively affects students' academic performance. On the contrary, being emotionally drained from studying has a negative relation.
- **Sleep quality and academic performance**: the quality of sleep also increases performance.
- The overall fit of the model shows that mental health is more explanatory than physical health measured by the adjusted **R^2**.

Performance
(dependent variable: Self-Assessment of Performance)

	(1)	(2)	(3)	(4)
Constant	7.812***	7.945***	6.49***	5.484***
Demographics				
Age	-0.093	-0.095	-0.073	-0.078
Gender	-0.1	-0.061	0.256	0.085
Year of Study	0.594***	0.604***	0.306***	0.308***
Study at home/university		-0.38	-0.254	-0.318
Mental State				
Mental Health			0.204***	
Emotionally drained (studying)			-0.1*	
Physical State				
Physical Health				0.091
Sleep Quality				0.225***
Observations	189	189	189	189
R^2	0.064	0.076	0.17	0.158
Adj R^2	0.046	0.052	0.138	0.125

Note:
Significance at the 0.10, 0.05, and 0.01 levels are indicated by *, **, and ***, respectively.

RESULTS: PHYSICAL HEALTH

- **Sleep, sports and physical health**: The hours of sleep and the number of workouts per week have a significant positive influence on the state of physical health.
- **Condition of room and physical health**: The size of the bedroom and its overall condition has a positive impact on the physical health. The temperature quality is highly significant and has a large contribution with a coefficient of 2.33, whereas the time spent in the room with a certain temperature decreases physical health. On the other hand, it increases for each hour spent inside under a given light.
- The general fit of the model is about **20.2%** and therefore we cover about one fifth of the determinants of physical health.

Physical Health
(dependent variable: Self-Assessment of Physical Health)

	(1)	(2)	(3)	(4)
Constant	7.399***	3.902	0.835	2.023
Demographics				
Age	-0.067	-0.03	-0.027	-0.038
Gender	-0.053	-0.098	-0.147	-0.28
Year of Study	0.14	-0.08	-0.088	-0.114
Controls				
Sleep h/day		0.835**	0.732**	0.576
Workouts per week		0.644***	0.686***	0.64***
Time in Room		-0.231		
Housing				
Bedroom size (m^2)			0.57**	0.543**
Housemates			0.151	0.123
Overall Room Condition			0.224*	
Time*Condition			-0.027	
Temperature				2.33***
Time*Temperature				-0.854***
Air Quality				-0.605
Time*Air				0.23
Light Quality				-0.845
Time*Light				0.421**
Noise Level				-0.532
Time*Noise				0.178
Observations	189	189	189	189
R^2	0.005	0.14	0.192	0.277
Adj R^2	-0.014	0.106	0.144	0.202

Note:
Significance at the 0.10, 0.05, and 0.01 levels are indicated by *, **, and ***, respectively.

CONCLUSIONS

- There is a significant relationship between the **gender** of the students and their mental health: female and non-binary students rate the state of their mental health worse than male participants did.
- **Positive relationship** between overall condition of the room and its temperature and the **mental health** of students.
- **Negative relationship** between time spent in the room and **mental health**: by every hour more spent in the room, mental health decreases.
- **Negative impacts** of time spent in the room and **physical activity**: every additional hour spent in the room leads to a decrease in physical health.
- **Positive impacts** on the size of the room and physical activity: could be explained by the fact that a larger room favours home workouts.
- **Mental health is a crucial factor which affects positively for academic performance.**
- Physical health was not found to have a significant effect in determining academic performance but **quality of sleep affects academic performance**: better sleep quality increases academic performance.
- **There is a relationship between mental health and the built environment and thus a relationship between the built environment and academic performance.**

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