GEDRAG

Working from home

The negative influence of single-room-houses on work satisfaction

In preserving jobs and production in the context of the Covid-19 crisis, many students and employees of all ages work from home. However, their home situation might not be optimal for working from home. Working from home is not new, but the COVID-19 pandemic forced our hand in working from home and probably after COVID-19 more people might also continue to work from home.
This paper studies the working environment at home during the COVID-19 situation in the Netherlands and supports the development of ideas to facilitate a better working environment at home. This research, amongst 40 home situations, shows the importance of the number of rooms at home. Since this variable seems related to the ability to create a dedicated desk, to get away from the work you do, or the ability to separate work and private life.
All these factors influence the change in satisfaction of working from home compared to at an office or a university, and consequently influences productivity.

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When there was no COVID-19 yet, of the teleworking group less than 20% received compensation for creating an ergonomically sound home work station, or advice on how to set-up a home office space (Mastrigt e.a., 2011). This could imply that there is a chance people do not have a suitable work station at home and that their workspace is not following the ergonomic guidelines. Furthermore, a non-suitable workspace, for example the lack of a sit-standing desk, limits the ability to vary their posture leading to problems related to static posture loading such as musculoskeletal discomfort (Robertson e.a., 2013).

Other problems workers might face when working from home, is the lack of control over some environmental factors. For example, the local news reported an observation by a student that showed the temperature in his room reached 40 degrees Celsius (Omroepwest.nl, 2020). Working under high-temperature conditions leads to a decrease in productivity, as was shown by Kosonen and Tan (2004). Participants were 30% less productive in a room of 27 degrees Celsius compared to a room of 21 degrees Celsius.

Other ergonomic factors, besides having no control over the environmental factors, can also be burdensome at home, such as controlling the entry of daylight and the air quality, since we might assume that installations

such as air-conditioning units are not common in households in The Netherlands. This lack of control also decreases the perceived comfort (Bazley, 2015).

Another aspect to take into consideration is the personal wellbeing (PWB) of working from home. According to Robertson & Cooper (2011), PWB consists of physical, social and psychological well-being, and is linked to physical health and happiness of office workers. This PWB is influenced by multiple work-related factors, such as the work itself, work relationships and social support at work, the purpose and clarity of the work performed, as well as management and leadership that relates to improving PWB.

While working from home, some factors such as social support and the clarity of work goals might be disturbed, which could also lead to a reduction in PWB. A reduction in PWB is also linked both to negative physical and negative mental effects, such as stress, a burn-out, or muscle injuries. A reduction in wellbeing furthermore also correlates to a reduction in productivity (Robertson & Cooper, 2011).
In this paper, we will answer the question how the satisfaction of performing the work from home has changed with the change from working at an office or university to working from home, and which factors influence a possible change in this satisfaction.

Method

This study looked at the factors which influenced a change in satisfaction of working from home, compared to working at an office or university. This study was performed using an online survey which was sent out to 40 participants who worked or studied largely from home during the COVID-19 pandemic.
Of the respondents, 13 are students, and 27 are employees. The distribution of age can be seen in figure 1.

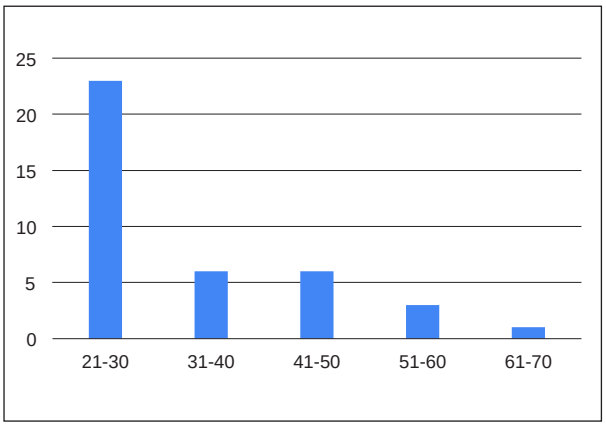

Figure 1. The age distribution of the 40 respondents.

Respondents were asked to indicate their satisfaction or hindrance on several aspects in their work environment, like temperature, space, number of rooms, work station, quality of the internet, light, adjustability of the chair etc. Averages were calculated and plotted in graphs.

Their satisfaction with performing the work from home might be lower in one-room-apartments compared to working at an office or university. An unpaired t-test ($p<.05$) was used to compare this satisfaction score of the one-room-apartments with the two or more room apartments (5 point scale: much lower, lower, equal, higher, much higher). The same test is used to see if there is a difference between the students and employees regarding this satisfaction score (5 point scale: much lower, lower, equal, higher, much higher).
In this questionnaire, the following aspects were addressed: change in satisfaction of performing the work from home, productivity and workspace ergonomics.
To measure the change in satisfaction, the following question was asked during the online survey: "What is your overall satisfaction of working from home, compared to working at an office or the university?"
We asked a similar question to measure productivity: "How would you rate your overall productivity of working from home, compared to working at an office or the university?"
Finally, for the workspace ergonomics, respondents had to mark factors on a list derived from factors presented in the literature by Rolfö, Eklund, & Jahncke (2017) and Blok e.a. (2012), whether these are of importance for the respondents. One question was related to which factors they perceive to be important for a nice work environment, in another question the respondents are asked to mark which factors they find most disturbing.

Results and discussion

Table 1 shows elements in the home environment that could influence a change in satisfaction of working from home compared to at an office or a university. In the columns, a distinction is made between the change in this satisfaction with a certain number of rooms.
The columns show the percentage of respondents who reported that factor.
Looking at the hindrances that affect this satisfaction, we can see that for respondents in a single room the main factors are: Temperature, room layout, no dedicated studying desk and a non-adjustable desk. Interesting to see, is that also the quality of the internet at home is mentioned. This has been described before (e.g. Vink, 2017). The internet is a crucial element for the main contact with the office.

Figure 2 shows that in total, most respondents are less satisfied with working from home compared to working at a university or an office. In total, 23 answered lower or much lower satisfaction compared to 10 answers of higher or a lot higher.

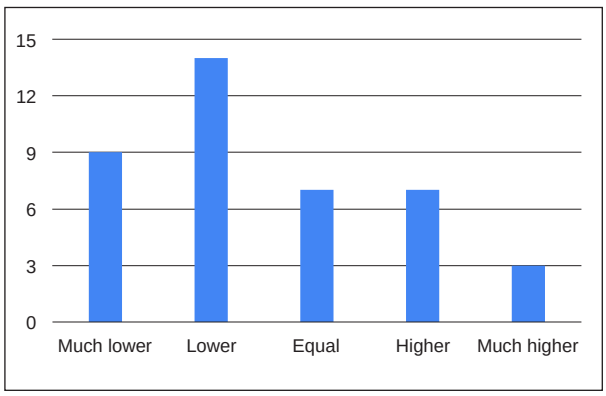

Figure 2. The score of 40 participants on the change in satisfaction of working from home compared to the 'old' situation (the number of participants who score the category is on the y-axis).

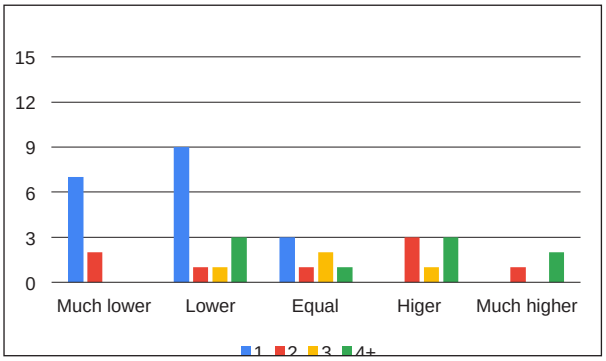

Figure 3. The score of 40 participants on the satisfaction while working from home compared with the 'old' situation, divided over the amount of rooms available to work from (the number of participants who score the category is on the y-axis; 1 = one room, 2 = two rooms, etc.).

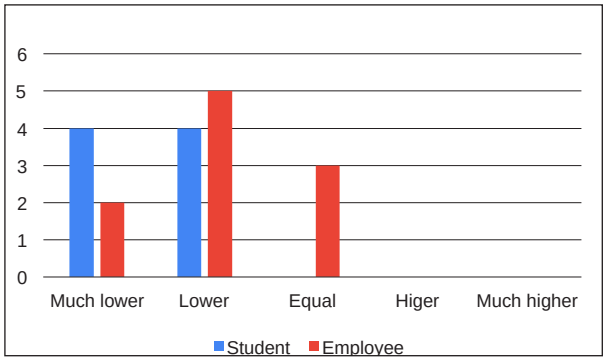

Figure 4. The sum of the scores of 18, out of the 38 participants, who have a single room to realistically work from, on the change in satisfaction of working from home compared to the 'old' situation, divided over students and employees.

Analysing the factors that play a role in the change in satisfaction of performing the work from home, the one-room participants showed a significantly lower satisfaction than the two or more room situations (the two tailed p value was 0.0001 (t=4.29; df=38) (also see figure 3).

Further analysing this satisfaction of respondents which only have a single room, we can see that in figure 4 both students, as well as employees, have an overall reduced satisfaction when working from home compared to at an office or a university.

We additionally looked for demographic differences in the change in satisfaction of performing the work from home, compared to at an office or a university. As can be seen in figure 5, students are more likely to have lower satisfaction compared to employees. The scores were higher for the employees compared to the students. The unpaired t-test showed that the difference was just significant (p=0.046; t = 2.07; df = 36). In this case, two persons being student as well as employee were deleted from the sample. We should be careful with the interpretation as two-third of the student respondents live in a single room.

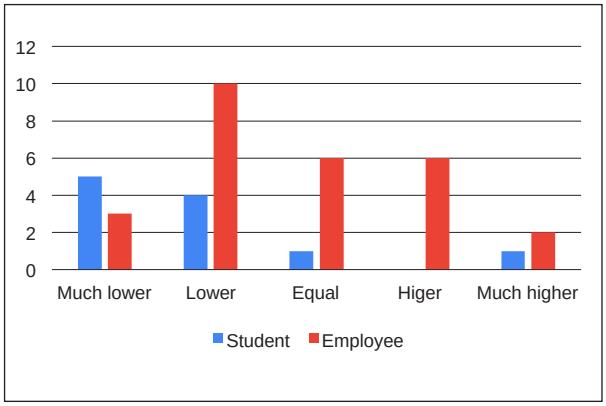

Figure 5. The sum of the score of 38 participants on the change in satisfaction of working from home compared to the 'old' situation, divided into student or employee (the number of participants who score the category is on the y-axis).

Change in satisfaction	Satisfaction of working from home compared to working at an office or at the university																			
	Much lower				Lower				Equal				Higer				Much higher			
	Amount of rooms availible to work from																			
Hinderances	**1**	**2**	**3**	**4+**	**1**	**2**	**3**	**4+**	**1**	**2**	**3**	**4+**	**1**	**2**	**3**	**4+**	**1**	**2**	**3**	**4+**
Temperature	57%	0%	0%	0%	44%	0%	0%	0%	67%	0%	100%	100%	0%	100%	0%	67%	0%	100%	0%	0%
Lighting	14%	50%	0%	0%	22%	0%	100%	0%	33%	100%	0%	0%	0%	67%	0%	0%	0%	100%	0%	0%
Air quality	29%	0%	0%	0%	22%	0%	0%	0%	0%	0%	0%	0%	0%	33%	100%	0%	0%	0%	0%	0%
Room layout	57%	100%	0%	0%	33%	100%	0%	67%	67%	100%	0%	0%	0%	67%	0%	33%	0%	0%	0%	0%
Non-adjustable chair	29%	50%	0%	0%	33%	0%	0%	67%	67%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
No dedicated studying desk	86%	50%	0%	0%	22%	0%	0%	33%	33%	0%	0%	0%	0%	33%	0%	0%	0%	0%	0%	0%
Non-adjustable desk	57%	50%	0%	0%	44%	0%	100%	100%	67%	0%	50%	0%	0%	100%	0%	33%	0%	0%	0%	50%
Communication	0%	50%	0%	0%	11%	0%	0%	0%	33%	0%	0%	0%	0%	33%	0%	0%	0%	0%	0%	0%
Being disturbed	29%	50%	0%	0%	22%	0%	100%	67%	67%	0%	0%	0%	0%	67%	0%	0%	0%	0%	0%	0%
Lack of ownership of the space	14%	50%	0%	0%	11%	0%	0%	33%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Visual distractions	14%	0%	0%	0%	11%	0%	0%	33%	67%	100%	0%	0%	0%	33%	0%	0%	0%	0%	0%	0%
Quality of internet	29%	100%	0%	0%	22%	0%	100%	33%	67%	0%	50%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Quality of electronics	0%	0%	0%	0%	0%	0%	0%	0%	33%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Quality of software	0%	0%	0%	0%	0%	0%	0%	0%	67%	0%	0%	100%	0%	0%	100%	0%	0%	0%	0%	0%

Table 1. The responses on the ergonomic hindrances (y-axis) grouped in the satisfaction of working from home compared to the 'old' situation (x-axis), and further divided over the amount of rooms available to work from (x-axis; 1= one room, 2= two rooms, etc) shown as a percentage of responses of that x-axis.

When analysing the difference of this change in satisfaction for students and employees with two or more rooms available (figure 6), a clear difference between the levels of satisfaction is not visible. As such, the living situation might play a larger role than being a student in itself.

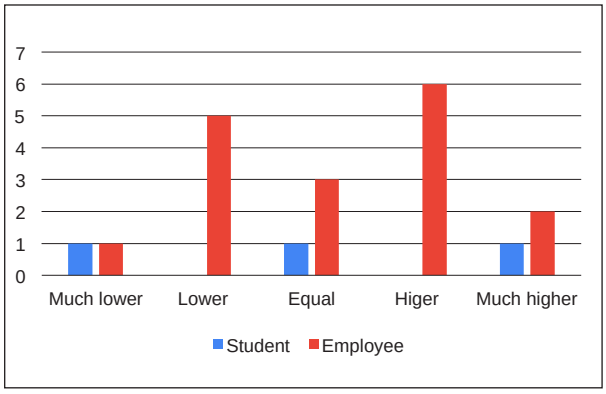

Figure 6. The sum of the score of 20, out of the 38 participants, who have two or more rooms available to realistically work from, on the change in satisfaction of working from home compared to the 'old' situation, divided into student or employee (the number of participants who score the category is on the y-axis).

Furthermore, the other factors were analysed; the availability of a dedicated desk for work or studying, difficulty in separating work and private life, and the room layout. Their effect on the change in satisfaction with working from home compared to working at an office or a university is shown in figure 7. In this figure, we can see that all three factors seem to be linked to lowered satisfaction.

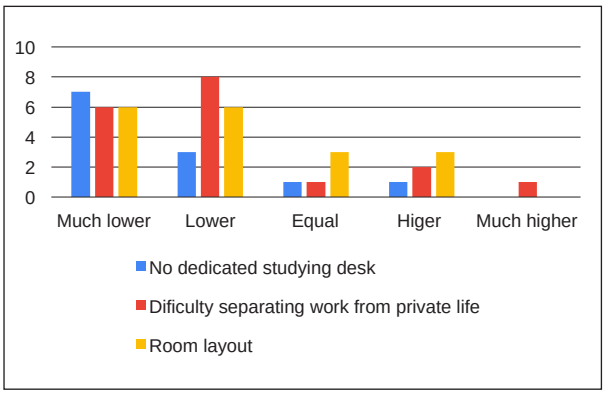

Figure 7. The score of 40 participants, who marked one or more of the factors in the legend, on the change in satisfaction of working from home compared to the 'old' situation (the number of participants who score the category is on the y-axis).

These factors were compared to the availability of the amount of rooms (figure 8). As can be seen, all three factors are mostly mentioned by the participants living in a single-room-home. People living in a single-room-home seem to have difficulty in setting up a dedicated study desk. This might also seem related to the difficulty of separating work and private life.

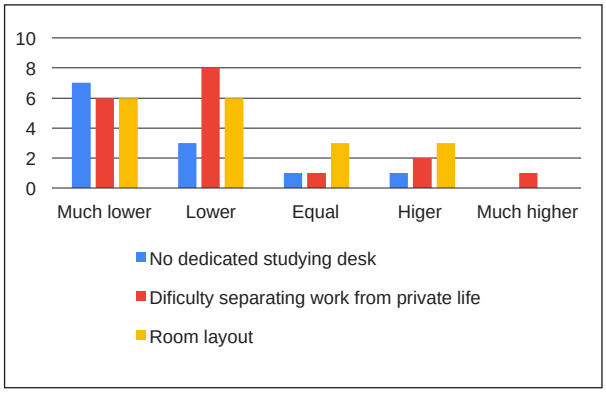

Figure 8. The score of 40 participants, who marked one or more of the factors in the legend, divided over the amount of rooms available to work from. (the number of participants who score the category is on the y-axis; 1 = one room, 2 = two rooms, etc.).

Lastly, when analysing productivity, Robertson & Cooper (2011) described a link between productivity and work satisfaction. Our data shows a similar link, as participants who mentioned lower perceived productivity also mentioned lower satisfaction of performing the work from home, as can be seen in figure 9.

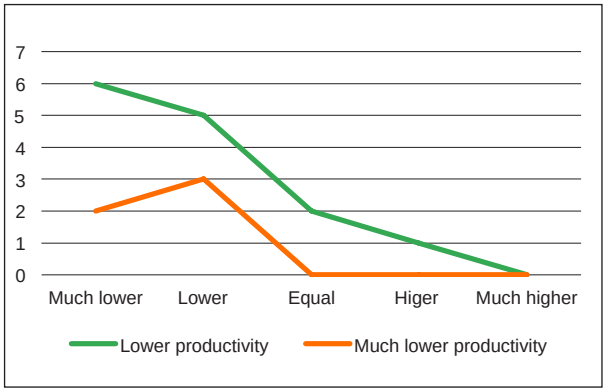

Figure 9. The sum of the scores of 19, out of the 40 participants, on the change in satisfaction of working from home compared to the 'old' situation, divided into two groups; lower and a lot lower productivity of working from home compared to the 'old' situation.

Reflection and discussion

This research shows the factors which influence the satisfaction of performing the work from home compared to working at the university or an office. The biggest problems can be found in situations when workers and students living in single-room-houses. This is not often mentioned in the literature and a factor that might be overseen. However, this study shows the importance of this factor.

Persons with one room do not have the ability to go to another room or to walk away from work. Neither do they have the space available to create a dedicated workspace. As such, it is assumed that some respondents work, eat and relax at the same desk.

Seeing your work when you go to sleep might also have a negative effect on your sleep quality. Furthermore, their workspace might always be in their peripheral vision, which ties into the fact that respondents who live in a home with a single room, might find it difficult to separate work and their private life.

But people working from home face many other factors influencing them in the creation of a suitable work environment, like the setup of a dedicated workspace, the quality of the internet, and environmental factors. To solve the above-mentioned issues attention is needed for improvements. In the given circumstances, employers could support or advise on setting up an ergonomic workspace. However, Mastrigt e.a. (2011) showed that employer support is an area that needs much attention. Additionally, more research into and attention for the work-life balance is needed, which might mean that additional coaching or attention from the management is required (Robertson & Vink, 2012). As currently there is not a clear end in sight to the current COVID-19 pandemic, we can assume that for the foreseeable future, students and workers will have to continue to work from home. For those that live in a single-room-home, the effects of not being able to walk away from work, or to create a good balance between work and private life, should not be overlooked.

We advise investigating the possibilities of workspaces near the homes of all that need to work from home. For example, cafes and restaurants could be transformed into temporary working spaces, to reduce the impact of having to live and work in the same space. Another solution, of course in line with the Covid-19 regulations, could be rental of private office spaces provided by several companies. Initiatives for shared working spaces are already taken like for instance 'seats2meet.com', 'spacesworks.com', 'regus.nl', 'tribes.world' and 'mindspace.me'.

For future research, we advise to pay attention to the working environment and include the number of rooms in the study.

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