Transformation of the office: territorial behaviour and place attachment in shared desk design

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Received 15 December 2021
Revised 6 May 2022
11 July 2022
Accepted 16 August 2022

Abstract

Purpose – The purpose of this paper is to present an environmental psychological case study regarding an office design change. The employees of the researched company had the chance to decide whether to stay in the classic open office set-up or to switch to a shared desk supplemented by a one-day-a-week home office possibility. The authors examined the development of participants' territorial behaviour and place attachment.

Design/methodology/approach – The given organizational situation is a quasi-experimental design; the variables were examined via questionnaire in a longitudinal model. Quantitative measurement was supplemented with focus group discussions.

Findings – The degree of personalization (a type of territorial behaviour) decreased significantly not only among those who lost their permanent workstations – as we expected – but also in the entire population. Workplace attachment stagnated for the entire population, but workstation attachment showed a significant decrease among those who switched to the shared desk.

Research limitations/implications – The limitations and the advantages are also followed by the nature of a case study: high ecological validity with relatively low sample size.

Practical implications – Redesigning an office is never just an economic or interior design issue, but a psychological one. This paper provides practical environmental psychological insights into implementing office designs without permanent individual workstations.

Originality/value – This paper presents the environmental psychological background of shared desk design implementation. The authors point out the significance of repressing personalization behaviour and as per the authors' knowledge, they are the first to introduce the concept of workstation attachment.

Keywords Office environment, Territorial behaviour, Personalization, Workplace attachment, Workstation attachment, Shared desk design, Office design change, Case study

Paper type Case study

Journal of Corporate Real Estate
Vol. 25 No. 3, 2023
pp. 229-245
Emerald Publishing Limited
1463-001X
DOI 10.1108/JCRE-12-2021-0043

Introduction

In the field of workplace research, the *office* is a key topic, as it is the intellectual centre of every organization (Dúll and Tauszik, 2006), hence a kind of imprint of how a given age thinks about work and people. In the past 10–15 years, a paradigm shift has begun towards thinking about the office as a socio-physical system. More flexible ways of working have become less and less exceptional, and in parallel, the traditional office design concepts started to be questioned (Inalham, 2009). As a result of the *economic crisis after 2008*, the *changing labour* market and the rapid spread of *project-based work* and *digitalization,* organizations have been forced to move towards more sustainable solutions which might lack private offices or even workstations. Along this, we can say shared desk design might be one of the lead office designs in the near future, especially as the described trend was further accelerated by the COVID-19 pandemic (Gartner, 2021). In our study, we present some of the environmental psychological aspects of this way of working, where the permanent *place* of an employee is disappearing. The concept of place always refers to a location that is meaningful for an individual. It "is an entity that has a social dimension, but also a palpable and very real physical basis" (Lewicka, 2011, p. 213). Scannel (2013 in Scrima *et al.*, 2021) even describes it as a safe haven that can satisfy human needs. A place becomes meaningful after repeated interactions with it which allow to create meaningful representations of it (Scrima *et al.*, 2021). An important question then is how the *office as a place* is transforming along the changes around its concept.

Shared desk – the increasingly popular office model

Shared desk is an office solution where there are fewer workstations than employees in the organization. Hence, (some of) the employees do not have their own offices or even desks, and they typically do not work from the office every day. It is important to highlight that shared desks can be implemented in a large company without the remote work opportunity, as 10–15% of the employees are typically not in the office because of illness, free day or off-site activity. If remote work is possible, then this rate can be much higher (Bodin Danielsson and Bodin, 2009). Bodin Danielsson and Bodin (2009) defined the shared desk model as the most open office design; in our view, however, it does not fit into the classical *enclosed-open dimension*. We believe that because of the lack of individual and personalized spaces, the shared desk represents a completely different philosophy and embodies a paradigm shift in the office concept. On the employer's side, the advantage of this system is clearly the possibility of cost reduction along with more efficient use of space. To achieve all these, however, organizations need to provide appropriate virtual (e.g. communication and collaboration software and easy digital access to work-related information) and physical environments (e.g. appropriate collaboration or co-creation spaces), as well as well-designed work organization processes for their colleagues.

There are benefits on the side of the employees too, such as greater flexibility in space use and greater possible autonomy (Frankó, 2019). However, the biggest potential disadvantage of the shared desk is also on the employees' side which is the possibility of experiencing loss and lost opportunities for personalization (Fried, 1963; Wells *et al.*, 2007; Dúll, 2015; Vischer and Wifi, 2016). All these changed circumstances can rewrite the *space–user transactions* and affect many other organizational processes, which must be taken into account in the case of design or cultural change. It can be stated, however, that the psychological characteristics of shared desk design are both theoretically and empirically largely unexplored.

Territorial behaviour in offices

In many cases in practice, changing the office design is considered only an economic or an interior design issue. Although it raises many environmental psychological questions as well, for example, the question of *territorial behaviour,* which involves "marking of a place

or object and communication that it is 'owned' by a person or a group" (Altman, 1975, p.107). Territorial behaviour is a space-specific construct and is also socially and culturally defined (Taylor, 1988). The main questions related to its research are how someone manages the ownership, the occupation or the use of space in a given period.

In environmental psychological studies, the classical, individual office desk is usually discussed as a *primary territory* – so as a place with high significance and high controllability by one permanent user, who feels discomfort in case of an intrusion (Altman, 1975). In this regard, the function of territorial behaviour is mainly to protect privacy, psychological property, personal identity and communicate roles (Altman, 1975; Wells, 2000; Wells and Thelen, 2002). Altman (1975) distinguishes four different patterns along the nature of this behaviour: identity-oriented marking, control-oriented marking, anticipatory defending and reactionary defending. The first type is *identity-oriented marking* or *personalization* (Altman, 1975), which means intentional decoration or repositioning of objects (Sundstrom and Sundstrom, 1986). Through personalization, employees express ownership of a territory (Altman, 1975), the identity of an individual or a group or even a commitment to an activity (Brown, 2009). It is the most researched type of human territorial behaviour in organizational environments, and it also occurs most frequently. More than 90% of employees personalize their workplace if the space and company policies allow it (Wells *et al.*, 2007). It is manifested primarily in the placement of objects that are important to the space user (e.g. children's drawings, photographs and diplomas) and in the rearrangement of space. Altman (1975) stated that personalization can be a protective factor against a negative mental state. Laurence *et al.* (2013) later proved empirically that open office employees can decrease the negative impact of low experienced privacy by personalizing the space. It can even strengthen group cohesion by letting co-workers get to know each other easier. Wells (2000) emphasizes that it is important in an organization to feel a sense of belonging, but employees also like to consider themselves distinguishable from others (Brown and Zhu, 2016). The personalization activity follows this duality: office users can simultaneously appear as a member of the group and as independent individuals within it. Although the literature typically describes the protective role of personalization, it can also be a source of conflict as the expression of identity can sometimes offend others or make someone an out-group (Brown and Zhu, 2016).

Brown (2009) highlights that in the case of unclear territorial conditions – such as the time of an office design change – Altman's (1975) other three subtypes of human territorial behaviour may intensify. *Control-oriented marking* aims to demarcate and communicate boundaries to others. It helps to organize the environment and express the need for own space (Brown, 2009). It can appear in an office environment, for example, in the form of fencing the workstation with folders, cables or plants. The third subtype of territorial behaviour is *preventive defence* (Altman, 1975). The primary purpose of its emergence is to prevent an attempted trespass, for example, by locking lockers and drawers or using passwords. This behaviour can also be manifested by involving others and asking them to supervise the space (Brown *et al.*, 2005). It differs from the control-oriented marking in its nature: the purpose of preventive defence is not only communicating boundaries but also preventing a potential territorial infringement. The space user in this case feels that marking and communication are not enough; protective actions are needed (Brown *et al.*, 2005). The fourth subtype of human territorial behaviour is called *reactionary defence*, when the space user reacts to an already occurred border violation (Altman, 1975). Its purpose is to express negative emotions (e.g. anger, resentment or sadness) or the sense of loss over the invaded territory (Fried, 1963). Reactionary defending may also aim to restore the territorial status quo, if possible (Brown *et al.*, 2005). It can appear in an organizational environment in the

form of shouting or complaining, which can lead to a decrease in performance or even in group morale (Brief and Weiss, 2002 cited in Brown *et al.*, 2005).

Overall, it should be emphasized that an office design change in itself can generate new territorial behaviour manifestations. In shared desk, the amount and the subject of personalization will certainly change because of the disappearance of fixed territories. But its exact course is still a question, just as the evolution of the self-protective functions of personalization. Kicking up the status quo could also lead to the emergence of other subtypes of territorial behaviour to create a new balance for the long run, which, nonetheless, may lead to conflicts in the short term. Therefore, how the organization labels and handles these disagreements in practice is crucial.

Place attachment in offices

Place attachment is an evolutionarily rooted phenomenon. It is closely intertwined with territorial behaviour, as it can be considered as one of its human variants and also requires personal history between self and place (Taylor, 1988). Altman and Low (1992) define it as an emotional relationship or an emotional component of a relationship between a person and his/her meaningful environment. They also describe it as a multi-dimensional and integrative construct. This means that the central component of place attachment is emotional, while the construct also integrates cognitive, behavioural, cultural or social components as well (Altman and Low, 1992). Inalham (2009) argues that the key aspect of place attachment is emotional though, as it is "a significant part of human well-being and psycho-cultural adaptation to an environment" (Inalham, 2009, p. 19). The theoretical relationship between human and place attachment has also been widely discussed over the past 10 years (Little and Derr, 2018; Scrima *et al.*, 2021). These studies point out that it may be worthwhile to examine not only the attachment to specific places (*my current workplace*) but also settings (*workplaces in general*).

Place attachment has, thus, been defined in many ways to date, and it remains a very popular topic in the field of environmental psychology. Perhaps it is no exaggeration to say that the history of this phenomenon is actually being written in the present day. The empirical study of *workplace attachment* started relatively late though, only around 2000 (Inalham, 2009). Research methods had to be matched to the ambient nature of the construct. An excellent tool for measurement is the EALT Questionnaire (Echelle d'Attachement au lieu de travail e EALT) developed in French by Rioux (2006), which enabled the author to prove the relationship between workplace attachment, performance and well-being. In a later study, Rioux characterizes workplace attachment as a resource which helps to develop team spirit and a helpful attitude towards colleagues (Rioux and Pignault, 2013). Dinç (2010) says that the more attached someone is to his/her workplace, the more satisfied he/she is with it in general, so less likely will leave the organization. The author also describes that employees who experience their workplace as comfortable and aesthetic report higher workplace attachment (Dinç, 2010). Inalhan and Finch (2004) state that examining workplace attachment may be important to understanding the development of loyalty, the sense of community and organizational culture – issues that will be particularly even more important after the COVID-19 pandemic.

As recent empirical research has demonstrated, there could be even a smaller emotion-based transactional unit than workplace attachment in organizational context (Frankó and Dúll, 2018). *Workstation attachment* may be such a construct because many important psychological processes within the office are closely related to individual desks. In classical designs, the private workstation is the employees' only own territory; hence, a special space-user transaction can be assumed in this case, and this transaction may also be the basis of the primary territory status of workplaces (Brown and Zhu, 2016). Regarding place attachment, the literature describes that the pattern of attitudes towards intertwined spaces

can be different (Altman and Low, 1992). It means we can develop emotional relationships with different strength and direction to the workstation, to the workplace or to the neighbourhood hosting the workplace. According to previous research, workplace and workstation attachment can be empirically separated, but there is a strong, positive correlation between them (Frankó and Dúll, 2018).

We believe that any change in the office design is a perfect opportunity to research the nature of place attachment in organizations, because such situations make these nested attachments separable and available for measurement. And if there is switch from classical design to shared desk, we can also gain a better understanding of the role of own space within the office and the nature of territoriality in general. Along this, we can also find out more about whether the lack of own space repositions the office in employees' life.

Hypothesis

In the present case study, we examined the environmental psychological aspects of an office design change in a longitudinal research design. The examined organization decided to introduce shared desk based on mostly economic considerations and on current labour market trends. There were teams involved in a pilot project before the organization-wide implementation and their employees had the chance to decide whether to *stay in the classic open office design with a permanent workstation* or to *switch to shared desk supplemented by one day a week home office possibility*. The changes in these two subgroups were documented in our research.

In terms of *territorial behaviour*, we expected that personalization will decrease in case of switching to shared desk, because of the loss of the permanent workstation. On the other hand, we expected an increase in the other three subtypes of territorial behaviour (control-oriented marking, anticipatory defending and reactionary defending), because of the unclear territorial relations suddenly occurring:

H1. We expect a decrease in the level of personalization among those who gave up their own workstation.

H2. We expect increases in the levels of control-oriented marking, anticipatory defending and reactionary defending among those who gave up their own workstation.

Regarding place attachment, we did not expect any change in any of the examined subgroups in *workplace attachment*. It is because employees could decide about staying or switching, so presumably everyone chose the more favourable option for them. However, along with their choice, everyone also gave up some benefits: a personal workstation or the opportunity to work remotely. But in terms of *workstation attachment*, we hypothesized the subgroups to diverge. We expected a decrease in the level of workstation attachment among those who gave up their own workstation:

H3. We expect a decrease in the level of workstation attachment among those who gave up their own workstation.

Method

Procedure

We examined the environmental psychological aspects of the *transition from classic open design with personal workstations* to the *combination of shared desk design and home office.*

The research was hosted by a large multinational company with several thousands of employees in Hungary, Europe. The changes in the office design did not affect the entire administrative organization during this research period. The modifications were introduced as a pilot program first with the company's five voluntary functional units, four of which wanted to participate in our research. The employees of the participating groups had the individual choice to *remain in the classical design* or to *switch to shared desk with a once-a-week home office opportunity*.

We used a mixed method approach. The central element of the study is an online questionnaire survey; the hypotheses discussed here were tested along its results. A set of questionnaires was sent out in three phases:

(1) before the intervention;

(2) two months; and

(3) six months after it.

Between the two- and six-month data collections, we organized two focus group discussions with a total of eight randomly, chosen employees to be appropriately interpret the quantitative results.

When we designed the measurement process, we needed to take into account that the intervention did not happen simultaneously, each of the examined groups had different starting dates. The development of the measured environmental psychological variables was followed in a quasi-experimental design: the participants were not randomly split but based on the individual's decision; therefore, the sample size and composition of subgroups were not controllable by us.

The measurement tool was delivered online by our organizational contact person to all the employees of the participating groups. Participation in the research was anonymous and voluntary. Respondents were asked to generate a complex identification sign based on personal data to be able to match research data from the different phases. The research was approved by the Research Ethics Committee of the Eötvös Loránd University, Budapest (license numbers: 2017/319 and 2017/378).

Participants

Our sample of participants was taken from four different functional areas, but they can be considered a homogeneous group in terms of the working conditions and the job requirements. A total of 235 evaluable questionnaires were received from 176 respondents in the three measurement phases: 132 people responded once, 32 people twice and 13 employees participated all three times. Because of the low number of respondents who participated in all three phases, we tested the hypotheses with independent sample tests. The average age of the participants was 37.59 years (SD = 7,44), 45.11% were male and 54.89% were female respondents. The study was conducted in Hungarian, the mother tongue of the participants.

Our study was conducted in a longitudinal design. In the first phase, 66 people responded, 72 in the second and 97 in the third (Table 1). All three times analyses were performed along one independent variable with two outputs: *the presence or the absence of a personal workstation*. The proportion of these groups differed at each measurement time. Before the intervention, of course, all the participants had their own workstations. From then on, the opportunity to switch to shared desk was continuous. At the two-month follow-up, the proportion of subgroups was about 50–50%. Half a year after the majority (about two-thirds) had shared desks (Table 1).

Measurements

Besides the *identification signs*, we asked respondents for their *gender* and *age*.

For measuring territorial behaviour, we used the Hungarian version of the *Territorial Behaviour Questionnaire* (α = 0.89) created by Brown (2009). Following the original questionnaire, we used a seven-point Likert scale and measured along all four subscales such as identity-oriented marking (α = 0.86; "Decorated the space the way I wanted."), control-oriented marking (α = 0.8; "Created a border around my workspace."), anticipatory defending (α = 0.67; "Avoid leaving my workspace unattended.") and reactionary defending (α = 0.93; "Avoided working with or interacting with the infringer in the future."). The adaptation of this questionnaire into Hungarian was presented in a previous paper (Frankó, 2019).

For measuring workplace attachment, we used the Hungarian version of the *Workplace Attachment Scale* (α = 0.84; "If the organization had to move, I would miss my current workplace.") validated and published in English by Scrima (2015), based on a French questionnaire by Rioux (2006). We created the *Workstation Attachment Scale* (α = 0.88; "I am attached to my workstation.") for this research by revising the items of the *Workplace Attachment Questionnaire*. Some items were developed by only replacing the word *workplace* with *workstation*, but for certain items, a larger change was needed to make the statement meaningful. The workstation attachment questionnaire is one item shorter so consists of five items. Following the original tool, we used a five-point Likert scale in both cases. The attachment questionnaire's adaptation process into Hungarian was also presented earlier (Frankó and Dúll, 2018).

Other environmental psychological aspects and well-being were also measured, but they are not included in this round of analysis. The questionnaires used for testing the hypotheses are available in the Appendix.

Results

Quantitative results

The development of territorial behaviour was examined along all the subtypes. The distribution of the scale is asymmetric, extending to the right and significantly differing from the normal, so we applied nonparametric tests. Regarding the subscales, we found significant change over time only in personalization (mean = 2.43; SD = 1.51), but this alteration was only partially consistent with our former hypothesis (*H1*). Namely, personalization decreased not only among those who lost their own workstation but also in the entire study population based on the result of the Kruskal–Wallis test (χ^2 = 26.911, df = 2, $p < 0.001$ and r = 0.302). This decrease was significant for the entire population by the two-month measurement, based on the Mann–Whitney test (W = 3210.5, $p <$ 0.001 and d = 0.394), and we found no difference between the two subgroups ($p > 0.05$). This trend persisted for the six-month measurement: the frequency of personalization behaviour remained significantly lower in the entire population compared to the baseline (W = 4461, $p < 0.001$ and d = 0.392), although no further significant decrease was observed compared to the two-month measurement. There was no significant difference between the two subgroups at either of the follow-up measurements. The development of personalization behaviour is illustrated in Figure 1.

Table 1. Proportion of the respondents along time and workstation status

	No workstation	Own workstation	Total
Before the intervention	0	66	66
Two-month follow-up	39	33	72
Six-month follow-up	64	33	97

We expected control-oriented marking (mean = 1.51; SD = 0.79), anticipatory defending (mean = 1.67; SD = 0.94) and reactionary defending (mean = 1.24; SD = 0.75) to increase among those who gave up their own workstations (*H2*). This hypothesis was not confirmed ($p > 0.05$); the level of these behaviours remained unchanged. This stagnation seemed true for the entire population.

Regarding place attachment, we tested the development of workplace attachment first, although we did not expect any change here. The distribution of this scale can be considered normal (W = 0.988, $p = 0.0524$, mean = 3.00 and SD = 0.81). We did not get a significant change from the baseline in any of the subgroups at any of the measurement points [F (2,225) = 0.07 and $p = 0.932$]. There was no significant difference between the examined subgroups, neither at two months ($t = -1.34$, df = 56 and $p = 0.187$) nor at six months ($t = 0.08$, df = 63 and $p = 0.937$). The development of workplace attachment is shown in Figure 2.

We also examined the evolution of workstation attachment. The distribution of the scale differs from the normal, it is symmetrical and has one modus (W = 0.959, $p < 0.001$, mean = 2.71 and SD = 1.09), so parametric tests were used. We expected a decrease in the level of workstation attachment among those who gave up their own workstation, and we were able to verify this hypothesis (*H3*). There was no significant change in the level of workstation attachment among those who kept their workstations ($p > 0.05$). In contrast, among those who switched to shared desk design, workstation attachment was significantly lower at the six-month measurement point than at the baseline ($t = 2.42$, df = 124, $p = 0.017$ and d = 0.21). We found significant difference between the two subgroups already at the two-month measurement point ($t = -2.25$, df = 53, $p = 0.029$ and d = 0.29); this difference increased further by the six-month follow-up ($t = -3.76$, df = 63, $p < 0.001$ and d = 0.43). The small effect size resulting at the two-month point (d = 0.29) became a medium effect size at the six-month point (d = 0.43). The development of workstation attachment is illustrated in Figure 3.

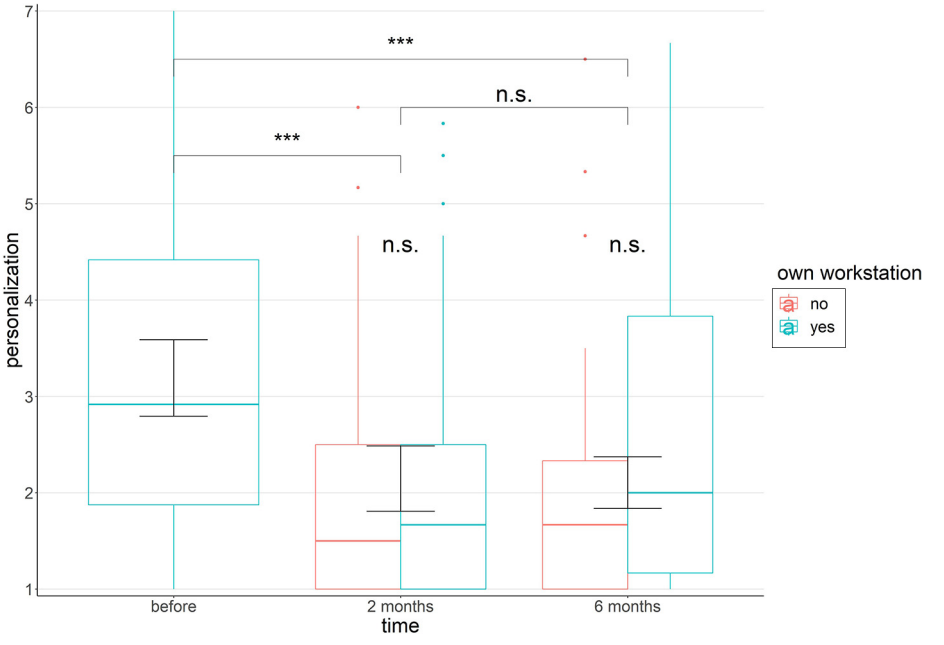

Figure 1.
Development of identity-oriented marking (personalization) over time with regard to the presence or the absence of an own workstation

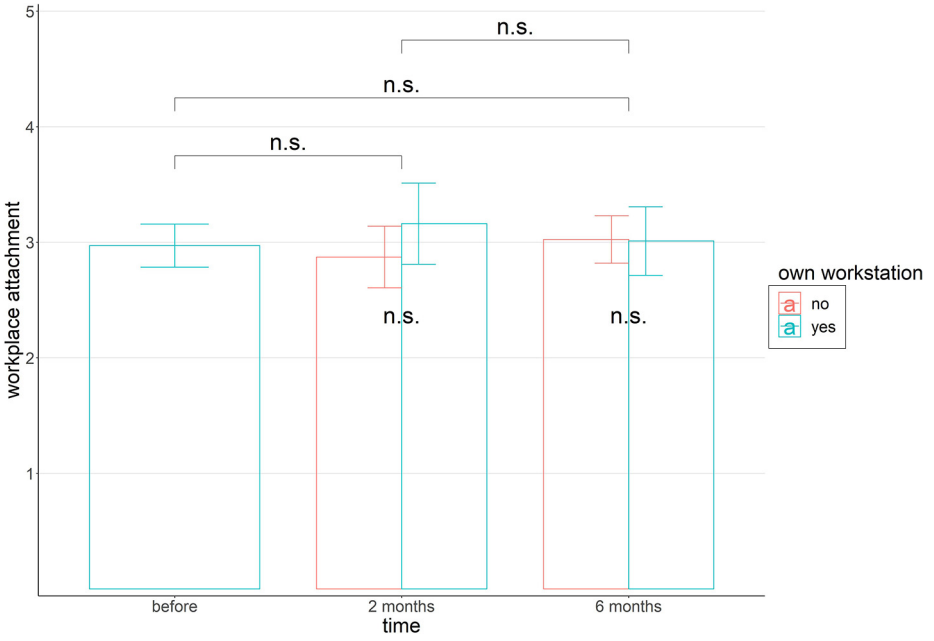

Figure 2.
Development of workplace attachment over time with regard to the presence or the absence of an own workstation

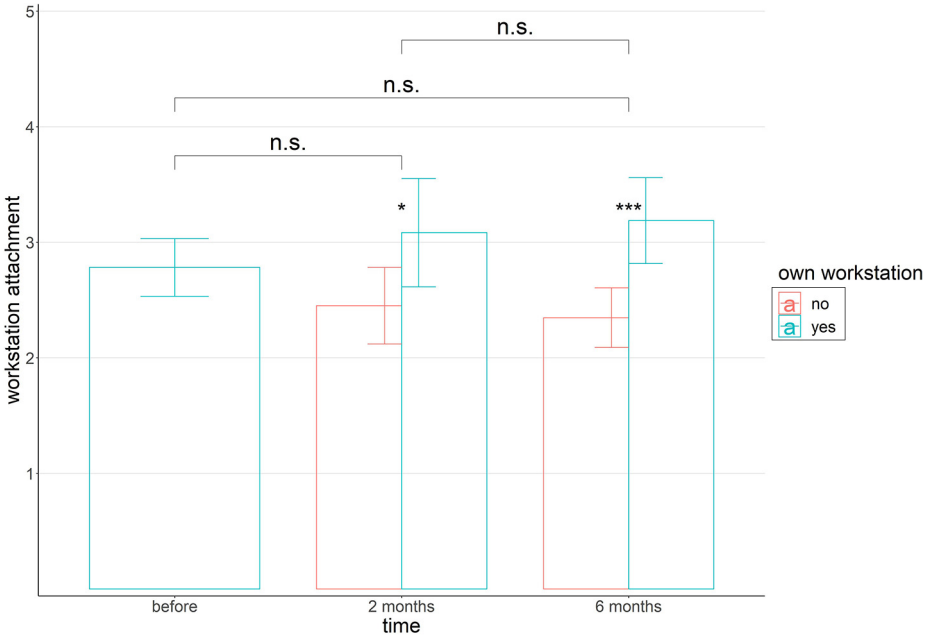

Figure 3.
Development of workstation attachment over time with regard to the presence or the absence of an own workstation

Notes: * < 0.05; ** < 0.01; *** < 0.001

The development of workplace and workstation attachment shows different patterns with the introduction of shared desk design, but a significant positive correlation can be measured between the two constructs ($r = 0.61$ and $p < 0.001$), and workstation attachment explains 37% of the value of workplace attachment.

Qualitative results

Two focus group discussions were conducted with four-four people along six aspects:

(1) general experiences;
(2) development of space use habits;
(3) benefits of the new system;
(4) disadvantages of the new system and coping with them;
(5) development of social relations; and
(6) home office experiences.

In both focus groups were employees who kept and also who gave up their own workstation. Result of the focus group discussions summarizes the most important comments about the partial implementation of shared desk.

(1) general experiences:
   - work organization takes now more time; and
   - not everyone had a real option to switch to shared desk.

     My wife is home with three small children under the age of 5. I would like the new system, but for me it is not an option at the moment.
   - first experiences are positive for colleagues who like flexibility;
   - shared desk can be seen as an expression of trust towards the employees;
   - promises more flexibility in theory than in practice (e.g. it is strictly regulated which day can be chosen for home office); and
   - ergonomic, IT and health issues arose.
     It is unfortunate when a person with cat hair allergy has to sit in a chair covered by cat hair from a previous user.

(2) development of space use habits:
   - the transition was very sudden; old reflexes are still very active.

     If I see "my desk" is already taken, I become a little angry.
   - a booking system was introduced, but some older colleagues refused to use it in the beginning;
   - personal belongings can be locked in a private locker, but these lockers are fixed under a certain workstation, so not necessarily where the employee is sitting that day. Therefore, some prefer to carry the necessary tools and personal items on a daily basis.
   - were examples of personalizing shared workstation on a daily basis; and
   - adaptation to virtual meetings was quick.

(3) benefits of the new system:
   - decreased density;

- home office opportunity simplifies private administration; and
- fits well with many people's work schedules.

  I do 70% of my work over the phone, no matter where I am.

- office became more silent; and
- commuting time is reduced.

(4) disadvantages of the new system and coping with them:

- the boundary between work and private life is not so sharp anymore;
- less offline meeting with colleagues, friends;
- problems with the flow of information; and
- the issue of collective responsibility.

  Who are they taking out? The one who didn't do a task? No. The one who is in the office!

- mistrust in certain groups.

(5) development of social relations:

- teams started to mix; and
- more virtual contact about personal topics.

(6) home office experiences:

- focusing on individual tasks is easier; and
- they feel that constant availability is required.

I even take my phone to the toilet!

Discussion

In the framework of the research, we were able to obtain an initial picture of the environmental psychological aspects of an emerging office design, the shared desk system.

Theoretical explanation of the results

One of the most interesting findings of this research is that with the introduction of shared desk, *personalization* declined in the entire population. In case of those who gave up their own workstation, this observed trend met with our previous hypothesis. As the opportunity for personalization greatly reduces because of losing one's permanent workstation, this result seems logical, though it is not entirely evident. We have heard examples in the focus groups about day-by-day personalization of shared workstations; however, based on the questionnaire data, this behaviour did not appear extensively. It is a more interesting and surprising result that personalization has also significantly decreased among those who did not give up their permanent workstations. This trend appeared already at the two-month measurement point and persisted until the half-year measurement time. If we wanted to explain the result with the possibilities provided by the physical environment alone, then it would surely not suffice, as seemingly in their case there has not been a pronounced change in the central location of personalization. This part of the results can be explained by Brown and Zhu's (2016) concept. They say that the expression of identity can even make us an out-group member. It is conceivable that the newly depersonalized environment forced the

colleagues who still had their own workstations to reduce personalization, as they could even be pushed to the periphery of the group by emphasizing their advantages and differences. It is also possible that those employees who still had their own workstations lived with the belief that the shared desk intervention would sooner or later be extended to everyone. Hence, they no longer put much energy into personalization, even though they still had the opportunity.

It is also a possible scenario that the communication function of personalization is partially appeared in the form of *control-oriented marking*, as we expected its increase. Although this hypothesis has not been confirmed by the questionnaire data, this trend was absolutely discernible in the examined organization. After learning the details of the intervention during the focus group discussions, it became clear that control-oriented marking appeared in a way was not registered by the questionnaire. A booking system was introduced in which employees could reserve a table for the days spending in the office. This can be regarded as a classic manifestation of control-oriented marking, using not the physical but the virtual space. It can, therefore, be concluded from this experience that the questionnaire is incomplete in this respect and needs to be supplemented. We also expected an upward trend in *defensive behaviours*, but we could not verify that empirically. We found two potential explanations for this stagnation. One may be that defensive behaviours usually occur when the communication of borders is not sufficient, and it is possible that the online booking system was enough to clarify the new territorial conditions. This explanation is supported by the fact that the rate of those who switched to a shared desk increased between the two- and six-month measurement points. The other explanation lies in the nature of organizational culture. It is quite possible that implicit or explicit policies prevent employees from using any preventive defender actions (e.g.: use of padlocks). When talking about reactive defence, it may be labelled as aggressive or destructive by the organization and it may even be punished. Although this could prevent the appearance of this type of behaviour, the tension resulting from territorial insecurity may remain. In this very case, we have little information available to fully explain the lack of defensive behaviour; none of these explanations can be ruled out along the focus group discussions.

We also examined the development of place attachment in the form of workplace attachment and workstation attachment. In case of *workplace attachment*, we did not receive significant changes in any of the subgroups after the implementation of shared desk. We believe that the explanation for maintaining a high level of workplace attachment lies in the fact that the organization gave the employees the right to decide to keep their workstations or not.

We consider it a major finding that the existence of *workstation attachment* has been confirmed in shared desk design: participants were able to answer the attachment questions in relation to temporary workstations as well. This case we can talk about day-to-day micro-attachments. The evolution of workstation attachment developed according to our hypotheses in both subgroups. Employees who kept their permanent desks seemed to appreciate it more after the design change. The level of workstation attachment started to rise at this point, although the difference was not significant from the baseline to any point in time. On the other hand, the workstation attachment of those who gave up their permanent workstations showed a decreasing trend, which was not significant at the two-month measurement date but was so half a year after the intervention. It is worth noting that while the level of workplace attachment appeared to be stagnant in both subgroups, the level of workstation attachment became divergent; however, these two constructs show a strong, positive correlation. We can, therefore, state that these constructs are theoretically

nested in each other but can be separated empirically. From this, we can also conclude that there is a meaningful transactional unit within the office system that is smaller than workplace attachment: the workstation attachment. In this research, we examined the employees' attachment specifically to their current office, as the organization had no plans to move and the study was also made before the COVID-19 pandemic. However, in future workplace studies, it may be worthwhile to focus more on *attachment to settings* and *workplace attachment styles*. In the post-COVID era, physical and virtual spaces of work will be developing much faster than before; therefore, it could be important to research the *attachment to the office in general*. On the other hand, studying attachment styles may be a more suitable method for exploring the dynamics in *individual–organization–place relations*. It would be also worthwhile to extend questionnaires to include transactions with virtual spaces as well and also to build statistical models to explore causal relationships.

Practical implications of the results

In the workplace, the *assurance of clear territorial conditions* is a basic need for employees. A design change always causes a disruption in the previously experienced socio-physical environment and creates a precarious situation that can temporarily lead to "storms" and a decline in satisfaction. Thus, when planning such an intervention, it is worth considering the psychological aspects of the process.

Personalization, as the most common territorial behaviour in classical office deigns, has a number of protective effects on employees such as strengthening staff cohesion and decreasing the negative impact of low experienced privacy (Wells, 2000; Laurence *et al.*, 2013). Therefore, it is crucial even in the increasingly flexible offices to create opportunities for identity-oriented marking. However, the ways of personalization in spaces without permanent workstations will probably no longer appear in the form of posting children's drawings or diplomas but maybe in the form of *participatory planning*. Involving employees in smaller decisions about the equipment or the colours can greatly increase their engagement and take over some of the functions of classic office personalization (e.g. expressing identity). In shared desk systems, it might also be important to *create dedicated team rooms or areas*, where employees can feel more at home or perhaps more free-to-shape the environment within a large building complex. The *placement of personal lockers* in these areas can also be useful, as it can be the key to securing personal belongings, thereby resolving some of the territorial conflicts. However, it is important not to locate these lockers to shared tables, as it happened at the studied organization. *Allowing daily personalization* can also provide a sense of security for many, even if there is an end-of-day clean desk policy. In summary, personalization can be considered as the manifestation of the history between self and place, which is essential for maintaining place-attachment. In the absence of the above-mentioned personalization opportunities, office space could easily be reclassified into a secondary territory. That would mean that workplace as a physical environment would have significantly less role in employee's life, which can also result in a looser connection to the functional team or to the organization.

Along with the results, we also argue for the *importance of desk booking systems*, which could be considered as a manifestation of control-oriented marking in the virtual space. A transparent and well-functioning software can help people to maintain a sense of security through recognizing the social network and helping effective self-regulation processes. As it can be inferred based on the presented case study, the booking system was presumably enough to avoid defensive behaviours as open conflicts did not appear. However, when unclear territorial conditions occur, it is always an essential HR task *to identify what is*

responsible for the lack of defensive behaviour: basic satisfaction or fear of retaliation. The latter can be extremely harmful both at individual and community level, as it can be a source of strong distress. The importance of a booking system is also supported by the fact that workstation attachment appeared as a valid and measurable variable even when using shared desk. This means that a sense of psychological ownership can be developed for temporarily used workstations as well, so having control over access to them is essential in the long run.

In the case of next-generation office solutions, the question often arises whether these systems are better or worse than their predecessors. According to the results described here and the "axioms" of environmental psychology, we can say that there is no such thing as absolutely good environment. The main goal in all cases is to *create the most functional person–physical environment–organization fit*. Of course, general guidelines can be formulated on some terms, as we have outlined our practical suggestions above; however, the main question is always whether an environment and its user are congruent with each other. This is the key to create positive behaviour patterns in a given milieu. For this congruence to emerge in office environments, we always need to be aware of the needs and expectations of the employees and the psychological specialties of the given workplace designs. The basis for this desired daily fit can be the *wide range of real and virtual spatial solutions* (inside and outside the office building) and *ensuring free choice between them* – even in practice, not just in theory. It is also important to emphasize that space users are not necessarily and fully aware of the transaction between them and the environment; therefore, *fostering efficient space use* can also be an important upcoming HR issue. This can be achieved, for example, by *creating adequate space use policies* and *educational programmes* and also by *employing a community manager*. Thus, to answer the question originally posed, whether these more flexible, adaptable, but possibly less personalizable spaces are better or worse than their predecessors, we can say it all depends on the implementation. The details of a design, the surrounding physical and virtual environments and their compatibility with the human needs will all determine the reception of these systems. Scientists, HR experts and employers all have important roles in preventing the new generation offices from becoming dead-end interventions and rather making them a true success in office history.

Limitations

The most significant limitation of this study stems from the methodological difficulties arisen in this specific field situation. We were only able to communicate with employees through our organizational contact people, so the recruitment encountered difficulties. In addition, we had to adjust to some logistical issues associated with the design implementation, so we could perform an independent sample longitudinal analysis on a relatively small sample. At the same time, we believe that the high ecological validity can somewhat offset these limitation.

We can also mark the quasi-experimental design as a methodological limitation. For example, we had no influence on the size and randomness of the subgroups. On the other hand, the fact that we examined this issue under non-laboratory conditions can be considered a virtue of the study as well, especially because a key aspect of implementation has been highlighted: the importance of free choice and employee autonomy.

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Appendix. Scales

Territorial behaviour (Brown, 2009; Frankó, 2019)

Identity-oriented marking

- IM-1 brought in personally meaningful photographs (e.g. friends, family, pets and activities you enjoy);
- IM-2 displayed artwork in my workspace;
- IM-3 brought in work-related items (coffee mug and books);
- IM-4 decorated the space the way I wanted;
- IM-5 put things in the workspace that represent my personal hobbies and interests; and
- IM-6 brought in items or changed the workspace to make me feel at home.

Control-oriented marking

- CM-1 created a border around my workspace;
- CM-2 told people about the boundaries of the workspace;
- CM-3 wrote my name all over the workspace;
- CM-4 used signs to communicate that the workspace has been claimed; and
- CM-5 told people the workspace is mine.

Anticipatory defending

- AD-1 delayed allowing others to use my workspace until it is clear to everyone that it is mine;
- AD-2 enlisted support of others to protect my space when I am not there;
- AD-3 developed formal rules to protect workspace;
- AD-4 avoid leaving my workspace unattended;
- AD-5 had authorities in the organization identify the workspace as mine; and
- AD-6 used locks and passwords so others cannot access my workspace.

Reactionary defending

- RD-1 used facial expressions to express disagreement or dislike towards the infringer;
- RD-2 avoided working with or interacting with the infringer in the future;
- RD-3 explained to the infringer that the workspace was already claimed;
- RD-4 devised a strategy to get back your workspace from the infringer;
- RD-5 displayed hostility towards the infringer; and
- RD-6 complained to your supervisor about the infringement

Workplace attachment (Rioux, 2006; Frankó and Dúll, 2018)

- I am attached to my workplace.
- There are certain places in the organization to which I am particularly attached.
- If the organization had to move, I would miss my current workplace.
- This workplace is part of my inner self.
- There are places in this organization which bring back memories.
- After a holiday, I am happy to go back to my workplace.

Workstation attachment (Frankó and Dúll, 2018 – there is no validated English version of this scale, the data was recorded in Hungarian)

- I am attached to my workstation.
- Of all the places in the office, I am most attached to my workstation.
- I would quickly get used to get another workstation (reverse).
- If I didn't have my own workstation, I would miss it.
- My workstation is part of my inner-self.

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