



"The dark side of office designs: Towards de-humanization"

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ABSTRACT

Recent research on flexible office designs have shown that open-plan and/or flex offices may not have the expected effects in terms of employees' productivity, well-being, job satisfaction, organizational commitment, and retention. In this article, we propose to consider that the feeling of de-humanization may explain such dark side of office designs. Adopting a mixed methods approach, we administrated a quantitative survey to 534 employees working in a variety of office designs, and conducted 12 semi-structured interviews among the respondents to the survey in order to investigate how they experienced their office designs, notably in terms of de-humanization. Results showed that the three specific office designs under study (i.e., cell, open-plan, and flex offices) are associated with different levels of de-humanization and that this feeling of de-humanization mediates their impact on employees' job satisfaction, affective organizational commitment, extra-role performance, psychological strains, and turnover intentions. Interviews' analysis reveals three main mechanisms in the development of the feeling of de-humanization in such office designs: a triple feeling of dispossession (of space, voice and professional mastery), a feeling of abandon and an injunction to adopt a modern behaviour.

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The dark side of office designs: Towards de-humanization

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Key words

Flexwork, office design, de-humanization, mixed method.

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The dark side of office designs: Towards de-humanization

Abstract

Recent research on flexible office designs have shown that open-plan and/or flex offices may not have the expected effects in terms of employees' productivity, well-being, job satisfaction, organizational commitment, and retention. In this article, we propose to consider that the feeling of de-humanization may explain such dark side of office designs. Adopting a mixed methods approach, we administrated a quantitative survey to 534 employees working in a variety of office designs, and conducted 12 semi-structured interviews among the respondents to the survey in order to investigate how they experienced their office designs, notably in terms of de-humanization. Results showed that the three specific office designs under study (i.e., cell, open-plan, and flex offices) are associated with different levels of de-humanization and that this feeling of de-humanization mediates their impact on employees' job satisfaction, affective organizational commitment, extra-role performance, psychological strains, and turnover intentions. Interviews' analysis reveals three main mechanisms in the development of the feeling of de-humanization in such office designs: a triple feeling of dispossession (of space, voice and professional mastery), a feeling of abandon and an injunction to adopt a modern behaviour.

Keywords: Flexwork, office design, de-humanization, mixed method.

Introduction

Research on workplace flexibility crosses a wide array of arenas, ranging from work schedule flexibility to telecommuting but also including office designs (Putnam, Myersand and Gailliard, 2013; Richardson and McKenna, 2014). Precisely, we focus here on spatial flexibility and refer to office designs encompassing office layouts such as cell offices, open-plan offices and flex offices (Bodin Danielsson *et al.*, 2014). While often associated with positive outcomes (Felstead and Henseke, 2017; Peters *et al.*, 2014; Sanchez *et al.*, 2007), recent studies on flexible office designs have shown that open-plan and/or flex offices may not have the expected effects in terms of employees' productivity, well-being, job satisfaction, organizational commitment, and retention.

The aim of the present research is to better understand why office designs may have negative effects. Specifically, relying on the recent literature on organizational dehumanization (e.g. Bell and Khoury, 2016) as well as on studies on flexibility pointing to humanization (e.g. Desombre *et al.*, 2006), we argue that employees' feeling of being dehumanized by their organization may explain the recently observed negative effects of office designs. Adopting a mixed methods approach, combining quantitative and qualitative data collection (e.g. Stich *et al.*, 2017), this basic assumption was examined through a two-step process. First, we suggest that by thwarting basic socio-emotional human needs in varying degrees the three office designs under study in this research (i.e., cell, open-plan, and flex offices) should produce different levels of organizational de-

humanization among employees experiencing them. Further, because organizational de-humanization has been found to impact employees' well-being, attitudes and behaviours at work, we expect that this effect will carry over to employees' psychological strains, job satisfaction, affective organizational commitment, extra-role performance, and turnover intentions. These hypotheses were empirically tested through a field study conducted via questionnaires. Second, semi-structured interviews were conducted in order to inductively observe how and why de-humanization was experienced by employees working in the different kinds of office designs under investigation.

This research contributes to two literatures that have developed largely independently of each other. On the one hand, we consider the workplace flexibility literature in management, which regards office designs as part of flexible working arrangements explaining the broad organizational performance. We contribute to this literature by proposing and empirically testing an underlying mechanism of the negative effects of office designs. On the other hand, we consider the emerging literature on de-humanization in the workplace. Our work will add to the burgeoning literature on this recent construct that is organizational de-humanization by exploring its nomological network in the context of specific managerial practices.

The effects of office designs

Flexible workplace often evokes a common willingness to break with the rigid and bureaucratic way of organizing work (Felstead, Jewson and Walters, 2003; Kelliher

and Richardson, 2012; Kingma, 2018). While it may be referred to as a homogeneous set of practices, we focus here on spatial flexibility and refer to cell offices (i.e. an individual office), open-plan offices (i.e. a collective office, with personalized workstations) and flex offices (i.e. a collective and shared workspace) (Bodin Danielsson *et al.*, 2014).

Organizations that engage in office redesigns are interested in saving money through the reduction of space and associated real estate costs (Baldry and Barnes, 2012). But other motivations also lie in the expected positive effects of such office designs on employees' productivity, well-being, job satisfaction, organizational commitment, and retention (e.g. Gajendran and Harrison, 2007; Golden and Veiga, 2005; Sanchez *et al.*, 2007). Moreover, open-plan and flex offices are also implemented with the aim to improve the quality and the quantity of communication and collaboration (Brennan, Chugh and Kline, 2002; Ornstein, 1989; Zalesny and Farace, 1987). By suppressing the physical barriers, these authors show that open-plan offices increase feedbacks and information sharing, what leads to better social relationships within organization and contributes to the workers' productivity, satisfaction and motivation. In terms of well-being, for example, Jancey *et al.* (2016) show that flex offices contribute to the increase of employees' physical activity, reducing the sedentariness associated with the traditional cell and open-plan office.

However, more critical research also points out less optimistic effects of office designs, especially when considering organizational spaces as experience (Taylor and

Spicer, 2007). In the context of flex offices, for example, authors found higher levels of stress and dissatisfaction at work (Baldry and Barnes, 2012) or reduced social cohesion and higher coercion (Kingma, 2018), similarly to what Gold and Mustafa (2013) observed among freelancers. Hirst (2011) reported tensions in flex-deskers' organizational commitment, revealing the role of the shifts in the ownership of space. Collins, Hislop and Cartwright (2016) reported social disconnection between teleworkers and office-based staff in investigating further the social relationships' deterioration Hislop and Axtell (2007) revealed earlier. Managerial control of workspace may be associated with feelings of physical and psychological discomfort in the office as well as with lower levels of organizational identification, as suggested by Knight and Haslam (2010). Therefore, office redesigns have the potential to profoundly reconfigure the relationship and meaning of work, affecting the identity dimension—an issue which is at the heart of emerging contemporary critical studies drawing on notions such as socio-materiality and embodiment (see e.g. Beyes and Steyaert, 2011; Stang-Valand and Georg, 2018). This led Costas (2013) to point out alienation when studying mobility patterns and the use of 'non-places', while Siebert et al. (2018) describe how emplacement and isolation, that are specific to the re-organization of the organizational space they investigate in a hospital, produce deprofessionalization. This recent dissonance led us to consider the feeling of de-humanization as a potential key to understand the dark side of office redesigns.

Organizational de-humanization

Emanating from the literature in social psychology (e.g., Haslam, 2006), the term de-humanization refers to a psychological phenomenon whereby people deny human characteristics of others. Precisely, Haslam (2006) suggested that, depending on how humanity is denied, there would be two forms of de-humanization: *animalistic* and *mechanistic* de-humanization. While the former occurs when characteristics that differentiate humans from animals (e.g., rationality) are denied, the latter results from situations where individuals are viewed as non-human objects that do not possess characteristics that define human nature (e.g., agency) and are thus interchangeable.

While political and social sciences have long considered the modern workplace to have a de-humanizing effect on the human subject (e.g., Marx, 1844; Weber, 1905), organizational de-humanization has only recently been studied and appropriately operationalized. While both forms of de-humanization must exist in the workplace, scholars have suggested that the mechanistic form is probably more likely to occur in organizational settings (Bell and Khoury, 2011; Christoff, 2014). Accordingly, Bell and Khoury (2016, p. 170) defined “organizational de-humanization” as the experience of a worker who “feels objectified by his/her organization, denied personal subjectivity, and made to feel like a tool or instrument for the organization’s ends”. As recently stated by Caesens et al. (2017, p. 528), “characterized by an ever-advancing technological development, repeated restructurations reducing the size of the workforce while the workload remains stable, and impersonal organizations where personal agency is

frustrated by formal bureaucratic procedures, today's workplace often considers the employee as a robot or tool that is the property of and is used by the organization for its own purposes". This phenomenon of feeling organizationally de-humanized is considered a common experience for many workers in modern work settings (e.g., Christoff, 2014).

As shown by a scarce number of studies, this organizational dehumanization has important consequences for the individual who experiences this treatment. Baldissarri and colleagues (2014) found that employees who felt treated like an instrument by their supervisor, are more likely to go through a burnout, and to finally internalize these objectifying perceptions. In the same vein, Caesens *et al.* (2017) recently showed that organizational de-humanization is negatively associated with employee well-being as measured through job satisfaction, emotional exhaustion, and physical strains (see also Nguyen & Stinglhamber, in press). Further, recent research findings indicate that, above and beyond employee well-being, employees' attitudes, intentions and behaviors toward the organization (i.e. affective commitment and turnover intentions) are also impacted by organizational de-humanization (Bell & Khoury, 2016; Caesens, Nguyen, & Stinglhamber, in press).

Given its important consequences, research has also focused on identifying the determinants of organizational de-humanization. Andrighetto, Baldissarri, and Volpato (2016) showed that work-related factors (e.g., repetitiveness of movements and dependence on the machine) increase employees' perceptions that the organization treats

them as an instrument. Results of Bell and Khoury's (2016) and Caesens et al.'s (2017) research indicated that organizational factors such as procedural justice and perceived organizational support, respectively, reduced employees' organizational de-humanization perceptions. Very recently, Caesens et al. (in press) showed the impact of variables related to the supervisor's action (i.e. abusive supervision) on organizational dehumanization.

While work-, organization- and supervisor-related factors have thus been identified as important predictors of organizational de-humanization, little is known on the environmental characteristics that may contribute to this de-humanization experience. Filling this gap, we first assume that the three office designs under study in this research (i.e., cell, open-plan, and flex offices) should produce different levels of organizational de-humanization among employees experiencing them. Indeed, several scholars have recently suggested that a workplace environment thwarting employees' fundamental needs should increase employees' perceptions of organizational de-humanization (e.g., Bell and Khoury, 2016; Caesens *et al.*, 2017; Christoff, 2014). In particular, in line with the optimal distinctiveness theory (Brewer, 1991), we believe that office designs might undermine the optimal balance that individuals seek between their need for inclusion or assimilation on the one hand, and their need for distinctiveness or differentiation on the other hand. Brewer notes that individuals indeed derive their social identity from a tension between human needs for similarity to others and a countervailing need for uniqueness. As a way to reconcile these two opposite needs, they would seek an optimal equilibrium

between assimilation and differentiation. Association with groups that are too inclusive should thus lead individuals to seek greater differentiation of the self, while too much personal distinctiveness should lead the individual to seek inclusion in a larger collective.

In line with this perspective, we argue here that, by pointing to identity issues like the feeling of the loss of the property of space (Hirst, 2011), psychological discomfort and lower levels of organizational identification (Knight and Haslam, 2010), or alienation and anonymity (Costas, 2013), open-plan and even more flex offices should tilted the balance in favor of assimilation at the expense of employees' basic human need of distinctiveness. Accordingly, in comparison with employees working in cell offices, employees working in open-plan and, to a greater extent, those working in flex offices, where differentiation through the personalization of workspace is prohibited, should feel higher levels of de-humanization.

Hypothesis 1. Office design has an impact on the extent to which employees experience a feeling of de-humanization. Cell offices should induce the lowest levels of de-humanization, followed by open-plan offices and, finally, by flex offices.

Above and beyond examining the effect of office designs on de-humanization, we go one step further by suggesting that organizational de-humanization may mediate the effects of office designs on outcomes. In doing so, we suggest that organizational dehumanization may help to better understand the complex and intriguing effects of office designs by explaining their influence on the meaning and experience of work, as reported

by critical management and labour process studies. Drawing on recent empirical evidence showing that de-humanization is detrimental for employees' well-being, attitudes and behavioural intentions toward the organization (Bell and Khoury, 2016; Caesens et al., in press; Caesens *et al.*, 2017; Nguyen & Stinglhamber, in press), we hypothesize that the effect of office designs on organizational de-humanization will carry over to several outcomes. Not surprisingly, de-humanization should indeed be harmful for both employees and organizations by reducing employees' subjective well-being (i.e., increased psychological strains and decreased job satisfaction), employees' favorable attitudes towards their organization and their jobs (i.e., decreased affective organizational commitment), and employees' favorable behaviours and behavioural intentions (i.e., decreased in-role and extra-role performance and increased turnover intentions).

Hypothesis 2. Organizational de-humanization mediates the relationships between office designs and employees' (a) psychological strains, (b) job satisfaction, (c) affective organizational commitment, (d) in-role and (e) extra-role performances, and (f) turnover intentions.

So far, we thus assume that the type of office might induce a feeling of organizational de-humanization among employees with consequences for their well-being, attitudes and behaviours at work. Part of our research therefore consisted of adopting a hypothetical-deductive approach and testing our two a priori hypotheses. However, as explained earlier, these assumptions relied on the *a priori* that office designs

may thwart basic socio-emotional human needs. In order to deeply understand the potential role of de-humanization, another step of our approach consisted in not limiting our view to this *a priori* explanation (or even giving us the opportunity to reconsider it) by exploring the reasons why the employees would report feelings of de-humanization in the context of office designs. Accordingly, we complemented our hypothetico-deductive approach by a more exploratory investigation.

Research question. Why office designs may induce feelings of de-humanization?

Overall, the present study investigates whether office designs may induce a feeling of de-humanization, the consequences of this and the reasons why this phenomenon would be observed.

Method

In order to test our hypotheses and to respond to our research question, we decided to conduct two complementary investigations. The first part of our research was designed to test empirically the two hypotheses that we posited. To examine whether office designs might induce a feeling of organizational de-humanization among employees with then consequences for their well-being, attitudes and behaviours at work, we used a quantitative research design and collected data among employees of three different organizations via a questionnaire. The second part of our approach consisted in responding to our research question. In order to understand what, in the specific context of (flexible) office designs, may produce a feeling of de-humanization, we decided to

proceed to a more comprehensive investigation. To do so, we deployed an inductive qualitative approach based on semi-structured interviews to investigate the way people experienced such office designs, in the same organizations as those surveyed through the quantitative approach. We defined this mixed method research design and proceeded to the operationalization of its two components simultaneously—practically, the qualitative investigation started before the questionnaire was administered, but the analyses took place at the same time.

Quantitative approach

Sample and procedure. In order to collect data from employees experiencing the different office designs of interest, we contacted three multinational organizations located in Belgium. The first company is active in the insurance sector and employs over 4,000 employees who are mostly qualified. The second one is a building materials company and counts more than 1,000 workers who are mainly blue-collar workers, while the third one is active in the mining sector and employing 500 people in Belgium, in management, administrative (headquarter), and exploitation (quarries). The participants under our scope were all white-collar workers whose main job consisted in administrative, professional, or managerial work. Employees of these organizations were invited to participate in the study via personal e-mails or newsletters sent by the HR managers. The participants were assured of both the anonymity and the confidentiality of the study. The survey was administered in April-May 2016. After excluding participants who partially

completed the questionnaire, our final sample consisted of a total of 534 participants. Among these participants, 40.6% were females, 58.8% were males, and 3 participants did not provide the information. The sample had an average age of 47.35 years ($SD = 9.03$) and had been employed by their organization for an average of 18.55 years ($SD = 11.07$). With regard to the office designs, 17.4% worked in cell offices, 32.8% worked in open-plan offices, and 49.8% worked in flex offices.

Measures.

Office design. Participants were invited to indicate in which office they worked (i.e., cell, open-plan, or flex offices).

Organizational de-humanization. In order to assess employees' perceptions of organizational de-humanization, we used an 11-item scale developed and validated by Caesens *et al.* (2017) (e.g., “*My organization considers me as a number*”); the full list of items is available in Appendix 1) (Cronbach's alpha = .96). Unless otherwise specified, the response scale ranged from 1 (*Strongly disagree*) to 7 (*Strongly agree*) for this measure and the following ones.

Psychological strains. Participants evaluated the frequency with which they experienced 7 psychological strains (e.g., “*At work, I feel frustrated*”) from 1 (*Never*) to 7 (*Always*). The scale was initially developed by Van Katwyk and colleagues to measure the levels of positive and negative emotional reactions employees experience in their

work (Van Katwyk, Fox, Spector and Kelloway, 2000). The items showed a high internal consistency (Cronbach's alpha = .91).

Job satisfaction. We used the 4- item scale of Eisenberger, Cummings, Armeli, and Lynch (1997) (Cronbach's alpha = .91). A sample item is "*All in all, I am very satisfied with my current job*".

Affective commitment. The construct of affective commitment refers to employee's affective attachment to his/her organization (Meyer, Allen and Smith, 1993). We used 3 items from the original scale developed by Meyer *et al.* (1993). A sample item is "*This organization has a great deal of personal meaning for me*". The items showed a high internal consistency (Cronbach's alpha = .87).

In-role performance. Participants evaluated the extent to which they complete the tasks and requirements as described in the job description using 3 items from Williams and Anderson (1991). A sample item is "*I fulfill responsibilities specified in my job description*". The items showed a satisfactory internal consistency (Cronbach's alpha = .69).

Extra-role performance. Participants evaluated their extra-role performance using 3 items from Eisenberger *et al.* (2010) (Cronbach's alpha = .86). A sample item is "*I look for ways to make my organization more successful*".

Turnover intentions. We measured intentions to leave using 3 items from Jaros (1997) (Cronbach's alpha = .93). A sample item is "*I intend to leave my organization in a near future*".

Control variables. We initially measured age, gender, education, and organizational tenure as control variables. As recommended by Becker (2005), the empirical relationships between these socio-demographic variables and the dependent variables in this study (i.e., organizational de-humanization, psychological strains, job satisfaction, affective commitment, in-role and extra-role performance, and turnover intentions) were examined. Table 4 shows that gender was correlated with extra-role performance, that education was associated to in-role and extra-role performance and to turnover intentions, and finally that organizational tenure was related to organizational de-humanization. As recommended by Becker and his colleagues (2005, 2016), we conducted our statistical analyses with and without these control variables. Since the findings results were essentially identical, the results reported here are those without control variables to reduce the complexity of the model (Spector and Brannick, 2011).

Data analyses. As office design is a categorical variable, we created orthogonal Helmert contrasts (Judd and McClelland, 1989) to assess variation on the different variables across the different office designs. The first contrast was designed to test the variation between cell and open-plan offices (coded -0.33) versus flex offices (coded 0.67) and assesses the variation between personalized offices and non-personalized or

anonymous offices. The second contrast compared employees in cell offices (coded -0.5) with those in open-plan offices (coded 0.5). We then introduced these contrasts in structural equation models with robust maximum likelihood estimation (MLR) using MPlus 8. Mediation analyses were performed using bootstrap techniques to compute confidence intervals around indirect effects (10,000 bootstrap samples; Hayes, 2013).

Qualitative approach

Research context and sample. The guiding principle for this research phase was to explore the relationship between workspace and the feeling of de-humanization by focusing on the meanings and behaviours that are produced and adopted in such workspaces, and their potential relationship with de-humanization. In order to access these significations, and to question the material and symbolic dimensions associated with the appropriation of space (Dale and Burell, 2008), 12 semi-structured interviews were conducted among people working within office designs of interest: 3 worked in open-plan offices, and 9 in flex offices. Respondents came from two of the three organizations surveyed.

Insert Table 1 about here

The interview process. We developed an interview guide with 7 general themes questioning *people's experience* of the office design, its *appropriation* as well as the *personal* and *organizational issues* that it raises. Since we engaged in an inductive exploratory approach, we did not ask about the feeling of de-humanization as such (except in the last question) in order to spontaneously bring out the meanings associated with the office designs under investigation. The interviews, ranging from 33 to 67 minutes in length (average of 47 minutes), were conducted between December 2015 and January 2016, were recorded and fully transcribed. To ensure respondents' anonymity, we have given them a pseudonym and chose to keep the information provided about the organizational context vague. The interviews were conducted in French, the translations are ours.

Analysis of the interviews. An initial reading of the interviews immediately showed the strong emphasis that the interviewees placed on the influence of office layout on the way they do their job. Our thematic analysis led us to identify themes like comfort, depersonalisation, remoteness, socialisation, and control (see Table 2). Thematic content analysis is a descriptive approach allowing data reduction by developing themes based on the main elements addressed by respondents during the interviews (Ryan and Bernard, 2003). It is therefore a rather descriptive approach that nevertheless allows to gather general information from all the data collected, with regard to the dimensions questioned

through the interview guide. In this way, we have carried out a manual thematic analysis for all the interviews, separately for each type of office design.

Insert Table 2 about here

After giving full and fair consideration to the different themes we identified, both within the same interview and between interviews, we identified more theoretical “categories” (Paillé and Mucchielli, 2016) or “second-order themes” (Van Maanen, 1979) which refer to different justifications of the feeling of de-humanization in the context of open-plan and flex offices. Categories are used to make sense of the phenomena identified by the researcher, from the corpus itself (see Table 3) and is the result of a back-and-forth between the empirical material and the literature on organizational de-humanization and critical approaches to office designs.

Insert Table 3 about here

Results of the quantitative investigation

Confirmatory factor analyses. We conducted CFAs to test the distinctiveness of the seven variables included in our analyses (i.e., organizational de-humanization, psychological strains, job satisfaction, affective commitment, in-role and extra-role performance, and turnover intentions). The analyses showed that the seven-factor model fitted the data well ($\chi^2(504) = 1548.07$; RMSEA = .06; CFI = .91; SRMR = .06) and was significantly superior to all more constrained models. Error terms of 2x2 organizational de-humanization items were freed to correlate as they were likely to share common variance due to their similar wording (i.e., “*My organization considers me as a tool [to use for its own ends/devoted to its own success]*”; “*My organization treats me as if I were [a robot/an object]*”; see Appendix 1). All the indicators loaded reliably on their predicted factors, with standardized loadings ranging from .62 to .91 for organizational de-humanization, .73 to .81 for psychological strains, .78 to .92 for job satisfaction, .76 to .93 for affective commitment, .51 to .87 for in-role performance, .74 to .94 for extra-role performance, and .87 to .94 for turnover intentions. Therefore, the seven variables were considered as separate constructs in the following analyses.

Insert Table 4 about here

Descriptive statistics and correlations among variables. Means, standard deviations, and correlations among variables are shown in Table 4.

Structural model. We tested a structural equation model in which organizational de-humanization fully mediates the relationships between the two contrasts created to capture the different office designs (which were treated as observed variable and not latent ones), and psychological strains, job satisfaction, affective commitment, in-role and extra-role performance, and turnover intentions. Because our six outcomes were mostly correlated to each other and these correlations can be explained by factors not included in our model (Kline, 2010), the disturbance terms associated with these endogenous variables were freed to correlate. The hypothesized model showed a good fit with the data ($\chi^2 (570) = 1669.60$; RMSEA = .06; CFI = .91; SRMR = .05). However, an alternative model that adds direct paths between the two contrasts and turnover intentions ($\chi^2 (568) = 1655.70$; RMSEA = .06; CFI = .91; SRMR = .05) was superior to the hypothesized model (MLR $\Delta\chi^2 (2) = 15.58, p < .001$). Hence, we retained this alternative model as the best description of the data. Standardized parameter estimates of the alternative model are shown in Figure 1.

Insert Figure 1 about here

The results showed that the two contrasts have a significant effect on organizational de-humanization ($\gamma = .21, p < .001$ and $\gamma = .09, p < .05$, respectively), supporting Hypothesis 1 which suggests that different office designs are associated with different levels of

organizational de-humanization (see also Figure 2 for a graphic representation of this effect). The two contrasts were also found to have a direct impact on turnover intentions ($\gamma = -.08, p < .05$ and $\gamma = -.13, p < .001$, respectively). Findings indicated that organizational de-humanization is, in turn, positively related to psychological strains ($\beta = .54, p < .001$) and turnover intentions ($\beta = .52, p < .001$) and negatively related to job satisfaction ($\beta = -.57, p < .001$), affective commitment ($\beta = -.66, p < .001$), and extra-role performance ($\beta = -.22, p < .001$). In contrast with the other outcomes, no significant effect of organizational de-humanization on in-role performance was found ($\beta = .02, n.s.$). In addition, except for in-role performance, the indirect effects of the two contrasts on the five remaining outcomes via organizational de-humanization were significant (at least marginally) using bootstrapping analyses (see Table 5).

Insert Figure 2 about here

In line with Hypothesis 2a, b, c, e, f, these findings suggested that organizational de-humanization fully mediated the relationship between office designs and psychological strains, job satisfaction, affective commitment, and extra-role performance and partially mediated the relationship between office designs and turnover intentions. On the contrary, Hypothesis 2d is not supported since no relationship was found between

our mediating variable and the outcome at stake in this hypothesis, i.e. in-role performance.

Insert Table 5 about here

Overall, these findings thus support our two *a priori* hypotheses by showing on the one hand that cell offices induce the lowest levels of de-humanization, followed by open-plan offices and finally by flex offices, and on the other hand that organizational de-humanization mediates the link between office designs and most of the outcomes under study. A methodological limitation of our quantitative approach however lies in a sort of confound effect between office designs and organizations. Most of the respondents working in flex offices come from a specific organization (79%) whereas most of the participants who work in cell offices come from another one (68%). Therefore, it could be argued that the organization rather than the office designs predicts our dependent variables. In particular, the effect on organizational dehumanization may be due to other job conditions or organizational variables (e.g., other HR practices and policies) than to the office design participants work in.

In order to tackle this limitation, we replicated our quantitative investigation with a second sample composed of 249 participants coming from a variety of jobs and

organizations. The results of this additional study confirmed our hypotheses with a more diverse sample, providing further evidence towards the generalizability of our quantitative results. Precisely, the findings of this second quantitative study showed the effect of office designs on the extent to which employees experience a feeling of organizational dehumanization (supporting Hypothesis 1). Furthermore, the results confirm the mediating role of organizational dehumanization in the relationships between office designs and most of the outcomes under our scope (supporting Hypothesis 2). Although these findings are totally in line with the results of the quantitative survey reported here by clearly indicating that the effect of office designs on organizational dehumanization is not attributable to the organization but to the office design itself, we did not include this second sample in the present manuscript for readability purposes and to maintain a logical and coherent integration with our qualitative investigation. Full details regarding this second quantitative survey are however presented in the Supplementary Materials associated with this manuscript.

Results of the qualitative investigation

Unsurprisingly, most of the interviewees experience the traditional pros and cons associated with flexible workspaces.

Workspace experience. Most of the interviewees appreciate their working comfort: open-plan and flex offices are known to promote communication, teamwork and

collaboration as well as to offer many friendly spaces to chat, meet and work in different atmospheres. Broadly speaking, all agree that it is important to work in a pleasant place.

But collective workspaces also cause some troubles. First, they are noisy and require discipline from their occupants. Second, and in connection with this, such open spaces make people “transparent” to others and some mention the lack of intimacy.

But when you have colleagues on the phone and it starts to last, it's true that with some it's quite noisy and it can be quite disturbing. (Hugh)

Basically, we do not tend to fall asleep in an open space probably because we know that others are watching us (laughs) (James)

Finally, most of the time, collective workspaces prevent any personalization, which can also be difficult for workers to experience.

Personally, it was difficult for me to move from a place of comfort where you have your office with your little pictures, your personality, where you don't need to move, where you know where to find people. For me, it was comfortable, and going to clean desks, without personality, without knowing where the people are, without having to take care of them, for me it was and it remains difficult. (Theresa)

Personal organization. Of the 12 employees we interviewed, 9 were used to telework (the remaining three worked on an open-plan office). This confirms a general observation: once collective workspaces are implemented, it is allowed—if not

encouraged—to telework. The use of teleworking is considered, by the workers we met, as a way of balancing work and private duties. In this regard, many workers report they appreciate being able to telework in order to reduce their commuting time and allow more time for their children. Some also express the fact that teleworking allows them to perform tasks that require more concentration or to save time from their regular work schedule—thus being able to achieve more during the day. Telework also appears to be the solution to the noisy workplace.

For me personally it is a comfort in privacy that is of great value, it allows to take the time to take my children to school, to pick them up, to do something, to do a little shopping at lunch. (Claire)

We can see that social regulations are set up to respond to the discomfort of the collective office: people telework in order to focus on specific tasks, but they also adopt self-control mechanisms in order to signal themselves when working at home (by reacting fast, as reported elsewhere, see Taskin and Edwards, 2007).

Relationships. Although flex offices grant workers freedom in choosing their place at work, it seems more problematic for newly hired or temporary workers. In this respect, it is mentioned that these workers socialize less rapidly and easily with the working (but dispersed) community.

The new ones are really in trouble. When a new colleague joins, s/he finds it cool. That's freedom. But, quickly, s/he feel lost and say "Actually, I do not know who to ask my questions to" (Claire)

But this intra-organizational nomadism, although it creates new flows leading people to meet, combined to teleworking, also generates a feeling of remoteness which is detrimental to group cohesiveness. They finally lose sight and have learned to ignore where colleagues are seated, or who is there.

On the other hand, it is true that the colleague I was with before, every day, now I see her maybe once or twice a week, so we don't really have the same relationship as before. I feel like I know more people, but not as well. (Hernando)

As highlighted in previous studies, the benefits of flexible workspaces on outcomes like performance, satisfaction or well-being are counterbalanced by *the way* it is introduced and by organizational—and institutional--contexts. However, de-humanization is an outcome of a different nature and, so far, we did not grasp any new evidence to understand the high levels of organizational de-humanization we observed earlier —except that of depersonalization. That is why we engaged in a second level of analysis, which led us to identify categories related to the notion of de-humanization and the critical outcomes of open-plan and flex offices.

Dispossession. The feeling of dispossession we identified is threefold: first, it means being kept "apart" from decisions relating to the project of flexible workspaces

itself; second, it refers to a form of dispossession of the worker's professional mastery: the proposed working environment no longer allows certain activities that are valued and valorizing in the profession to be carried out; third, this dispossession affects the workspace. Indeed, workers feel "excluded" from "their" workspace, becoming "invisible", unable to "appropriate" a space to work, a "place" in the company's business –they claim the right to exist, to be visible, to occupy the workspace. This triple sense of dispossession reflects a *loss* felt in the specific context of flexible workspaces.

I think people want to be anchored. They need to have space for themselves (...) to know "this place, I like it, I like to stay there, I like to put my stuff there and I like to be close to this person". (Suzanne)

In fact, we were once told that we had to move every day, that we may start our day in one place and then go elsewhere. Well, that's not exactly what happened. And ah ... sometimes we get general e-mails that tell us a little bit about what went well, what went wrong. What went wrong, for example, is that everyone sits in the same place and doesn't really want to optimize space ... (Hernando)

Abandon. Beyond feelings of dispossession (of personal space, decision, or professional mastery), others experience a feeling of abandonment and isolation. The workspace became the witness of the abandonment, by the management and the manager, of part of their responsibilities. To some extent, employees feel they have to organize their working day, their work itself, including from where to work...and some of them

believe that this is the concern of managers. Abandonment is also synonymous with social isolation: feeling abandoned by others who no longer care for each other produces isolation that may, in turn, foster invisibility.

And then, once, I came to this colleague who was down and he told me « anyway, nobody comes to say hello or visits me in my bubble and I stay alone, everybody leaves me alone ». (Marc)

Injunction to modernity. A last feeling appears in the analyses: that of being obliged to do what is expected—i.e. to use spaces as it is prescribed, without the capacity for appropriation, reflection, or questioning the logic behind nor the practice itself.

In fact, management wants us to adopt all these new habits. We come in the morning and sit somewhere and maybe one hour later we move to another place to do something else, and again in the afternoon we find another place to work...That's what they have in mind and what we need to do because the future of work is such. (Claire)

We think we have no choice, that's how things evolve. Someone told me I had to adapt, it's not pleasant because we feel a little bit...I don't know how to explain...we're no longer considered a person, we no longer have a personality (...) it's like that, and it's not worth being sick for that because it will be like that in the future. (Theresa)

Theresa's fear is to be considered as 'obsolete' because she does not adopt the new and expected behaviour. This injunction classifies workers into two categories: those who are flexible and adaptable, and those who are "has been". For some of the employees we met, this "injunction" or obligation to adopt the rules of the clean desk may be perceived as a form of violence. Indeed, obsolescence is different from denial, this is a feeling that questions more than the space the employee occupies, but well if there is still a place for him/her. This is related to identity.

Discussion

Research on flexible working arrangements now shows evidence of the possible negative relationship flexible office designs like open-plan and flex offices may have on well-being, attitudes and behaviours at work. The aim of this article has been to provide an in-depth analysis of this relationship, by considering the role of organizational de-humanization, as recently operationalized in the field of organizational psychology. With regards to this aim, this article makes four key contributions that will now be discussed with relation to the extant literature.

First, the findings presented here complement the existing knowledge on office designs and organizational de-humanization in several ways. As a whole, by combining a qualitative and a quantitative investigation, our findings indicate that (a) the more the office is anonymous (through the evolution to a collective, shared and depersonalized workspace), the more employees feel de-humanized; (b) these results are explained by a

triple feeling of dispossession, a feeling of abandon, and the injunction to adopt a modern behaviour; (c) this effect of office design on de-humanization carries over to several outcomes capturing employees' well-being, attitudes, intentions and behaviours. By showing this, the present article contributes to the literature on new ways of working and, singularly, on office designs by examining a new underlying mechanism of their intriguing effects on several organizational and individual outcomes. In particular, it contributes to explain the “dark side” of such working arrangements by drawing on an original literature on de-humanization and its operationalization. Yet, previous work pointed out invisibility and the “non-places” issue we also raised (Costas, 2013; Hirst, 2011). But, while invisibility and de-personalization were considered as isolated effects or levers for action, this research reveals that they are part of something bigger and more fundamental for organizations and their management: organizational de-humanization. In this way, our work also contributes to the growing literature on de-humanization applied to the workplace by further examining its nomological network, i.e. by studying whether environmental factors may contribute to this feeling and its consequences for both employees and organizations.

Second, the optimal distinctiveness theory (Brewer, 1991) we drew on in order to justify Hypothesis 1 finds here an interesting illustration. As previously explained, individuals seek according to Brewer to balance their need for inclusion and their need for distinctiveness. We argued that this could help to understand why we expected de-

humanization to be higher and higher as employees faced an anonymous workspace fully satisfying their need of inclusion at the expense of their need for distinctiveness. The quantitative survey confirmed that employees feel more de-humanized as their office is anonymous, while the qualitative investigation offered evidence regarding the rationale proposed for understanding this result. Quotes from Hernando, Suzanne and Theresa clearly point out this disequilibrium in that relationship between assimilation and differentiation. Their balance was not met since they complain about the anonymity of the flex office. Does it mean the optimal distinctiveness point cannot be reached in open-plan or flex offices? Probably not, provided that the consideration of office is broad. If the 'office' is limited to the workstation at which an employee is sited, the only way to balance their needs is to find ways to re-personalize it, by ignoring prohibitions and usages—a strategy that Sewell and Taskin (2015) named 're-territorialization' in the context of teleworking. Since the overall principle of the open-plan (i.e. collective, inclusive) or flex office (i.e. anonymous, exclusive) remains, this will lead to an exhausting and precarious balance to be recreated every day. But the office may also include other workspaces, like home or a variety of working spaces inside (and outside) the organization's premises. In the case of home, employees will value teleworking in order to rebuild distinctiveness (feeling working in their own home, drinking the tea they like, etc.). Hence, the uniqueness does not come from the single and sizeable workstation one occupies, but well from the unique sequence of workstations' occupation (e.g. a

bubble, a meeting room, a flex office and, finally, a creativity room). In doing so, workers re-balance their needs of differentiation and inclusion, by re-appropriating space via strategies that could be assimilated to micro-emancipation (Alvesson and Willmott, 1992).

Third, this article illustrates the usefulness—and heaviness—of mixed methods by proposing an original research design which draws on the complementarities of quantitative and qualitative research. Mixed methods research is a “*type of research in which a researcher or team of researchers combines elements of quantitative and qualitative research approaches (e.g., use of quantitative and qualitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration.*” (Johnson, Onwuegbuzie and Turner, 2007, p. 123). Our research design follows Tashakkori and Teddlie’s (2010) recommendations in proposing an overarching research question (i.e. “How to better understand why office designs may have negative effects?”) and then expanding on this through two a priori hypotheses that appeal for a quantitative approach (i.e. “Office designs has an impact on the extent to which employees experience a feeling of de-humanization”, “Organizational de-humanization mediates the relationship between office designs and several outcomes”) and a research question calling for a qualitative approach (i.e. “Why office designs may induce feelings of de-humanization?”). This article gives a contemporary illustration of the usefulness and circular contribution between methods in the search of

understanding an organizational phenomenon. In addition, the research design also echoes the multi-disciplinary character of our investigation. Drawing on literatures in organizational psychology and management, this article contributes to build bridges across two distinct—but complementary—fields of research, in a time of “sub-disciplinization” (Kueffer, Hadorn, Bammer, van Kerkhoff and Polh, 2007).

Fourth, the findings we reported from the qualitative investigation pave the way for a comprehensive and extended consideration of de-humanization in organization and critical management studies. *First*, in the study of flexible working arrangements, by identifying the reasons why office designs may induce feelings of de-humanization, we also provide a more comprehensive analysis of the mechanisms at work in the production of a feeling of de-humanization. This contributes to a growing body of critical research on new ways of working and politics of workplace (see e.g. Courpasson, Dany and Delbridge, 2017; Sewell and Taskin, 2015). Especially, that calls for investigating further the actions that these de-humanized workers will take (in reaction to their experience of de-humanization), offering here a promising field for inquiry on alienation, work degradation but also resilience. *Second*, on the use of the concept of de-humanization in organization studies, this research opens the way towards an extension of the forms of organizational de-humanization. Indeed, both mechanistic and animalistic forms of de-humanization assume a *real* person is reduced to a *real* tool or a *real* animal. While denying the human character of the person, they still exist—but as a non- or less-human

being. But what we partly observed here deals with the denying of the body itself: the employee does not exist anymore on the flex desk, s/he has just disappeared, s/he is invited not to mark the workstation when at the office. This certainly calls for further attention in the near future.

Limitations and perspectives for future research

While this research has important methodological (e.g. mixed methods) and theoretical (e.g., de-humanization as a new mechanism explaining negative effects of office designs) strengths, some limitations should be acknowledged. First, the cross-sectional nature of our quantitative investigation rules out conclusions about the causal direction among the variables included in our research. Research based on longitudinal designs with repeated measures would be needed in the future to establish cause-and-effect relationships .

Second, the variables included in our quantitative survey were measured from a single source (i.e., the focal employee), which may raise concerns that the common method variance bias may have influenced our findings (Podsakoff, Mackenzie, Lee and Podsakoff, 2003).

Overall, we think that future research would benefit from testing, through a new quantitative investigation, a global model which takes into account the findings of the qualitative part of our research. In particular, it would be worthwhile to integrate the feeling of dispossession (of space, voice and professional mastery), the feeling of abandon

and this injunction to adopt a modern behaviour that were reported by our participants as mediators in the relationships between office designs and organizational de-humanization. Similarly, further qualitative research and theoretical developments would be required to study what emerged from our qualitative investigation regarding the disappearance of the body as a new kind of de-humanization.

Practical implications

Several recommendations for practitioners emerge from the present findings. Overall, our results suggest that the more the office design is anonymous, the more the worker feel de-humanized by his/her organization. Yet, this experience of being de-humanized appears to have important implications in terms of employee's well-being (i.e. more psychological strains and less job satisfaction), work attitudes (i.e., less affective commitment) and behaviours (i.e. less extra-role performance and more turnover intentions). As a radical solution, we may therefore recommend to organizations to renounce these office designs inducing anonymity.

A maybe more realistic recommendation would be to encourage organizations to restore the possibility to appropriate and personalize (some of the) workspace for employees who value it. Such a process may help employees to regain humanity through their membership and their identification to a specific workgroup.

Finally, as previously suggested and in order to still allow an individual appropriation of space, organisations should definitely propose a variety of workstations

inside the organization. It is through the sequence of workstations that is chosen by employees on a day or a week that the balance between assimilation and distinctiveness may be finally respected and de-humanization reduced.

References

- Alvesson, M. and H. Willmott (1992), 'On the Idea of Emancipation in Management and Organization studies', *Academy of Management Review*, 17, 432–64.
- Andrighetto, L., Baldissarri, C. and C. Volpato (2016), '(Still) Modern Times: Evidence of objectification within working domain', *European Journal of Social Psychology*, 47, 25-35.
- Baldry, C. and A. Barnes (2012), 'The open-plan academy: Space, control and the undermining of professional identity', *Work, Employment and Society*, 26, 228-245.
- Becker, T. (2005), 'Potential problems in the statistical control of variables in organizational research: A qualitative analysis with recommendations', *Organizational Research Methods*, 8, 274-289.
- Becker, T., Atinc, G., Breugh, J., Carlson, K., Edwards, J. and P. Spector (2016), 'Statistical control in correlational studies: 10 essential recommendations for organizational researchers', *Journal of Organizational Behavior*, 37, 157-167.
- Bell, C. and C. Khoury (2011), 'De-humanization, deindividuation, anomie and organizational justice'. In S. Gilliland, D. Steiner and D. Skarlicki (eds), *Emerging Perspectives on Organizational Justice and Ethics*, *Research in Social Issues in Management*, Vol. 7, 169–200. Greenwich: Information Age Publishing.

- Bell, C. and C. Khoury (2016), 'Organizational powerlessness, de-humanization, and gendered effects of procedural justice', *Journal of Managerial Psychology*, 31, 570-585.
- Beyes, T. and C. Steyaert (2012), 'Spacing Organization: Non-representational Theory and Performing Organizational Space', *Organization*, 19, 45–61.
- Bodin Danielsson, C., Singh Chungkham, H., Wulff, C. and H. Westerlund (2014), 'Office design's impact on sick leave rates', *Ergonomics*, 57, 139-147.
- Brennan, A., Chugh, J. and T. Kline (2002), 'Traditional versus Open Office Design: A Longitudinal Field Study', *Environment and Behavior*, 34, 279–299.
- Brewer, M. (1991). 'The social self: On being the same and different at the same time', *Personality and Social Psychology Bulletin*, 17, 475–82.
- Caesens, G., Nguyen, N. and F. Stinglhamber (in press), 'Abusive Supervision and Organizational Dehumanization', *Journal of Business and Psychology*.
- Caesens, G., Stinglhamber, F., Demoulin, S. and M. De Wilde (2017), 'Perceived Organizational Support and Employees' Well-Being : The Mediating Role of Organizational De-humanization', *European Journal of Work and Organizational Psychology*, 26, 527–540.
- Christoff, K. (2014), 'De-humanization in organizational settings: Some scientific and ethical considerations', *Frontiers in Human Neuroscience*, 8, 1–5.

- Collins, A., Hislop, D. and S. Cartwright (2016), 'Social support in the workplace between teleworkers, office-based colleagues and supervisors', *New Technology, Work and Employment*, 31, 161–175.
- Courpasson, D., Dany, F. and R. Delbridge (2017), 'Politics of place: The meaningfulness of resisting places', *Human Relations*, 70, 237–59.
- Costas, J. (2013), 'Problematizing Mobility: A Metaphor of Stickiness, Non-Places and the Kinetic Elite', *Organization Studies*, 34, 1467–1485.
- Dale, K. and G. Burrell (2008), *The Spaces of Organisation and the Organisation of Space: Power, Identity and Materiality at Work*. New York: Palgrave Macmillan.
- Desombre, T., Kelliher, C., Macfarlane, F. and M. Ozbilgin (2006), 'Re-Organizing Work Roles in Health Care: Evidence from the Implementation of Functional Flexibility', *British Journal of Management*, 17, 139-151.
- Eisenberger, R., Karagonlar, G., Stinglhamber, F., Neves, P., Becker, T., Gonzalez-Morales, M. and M. Steiger-Mueller (2010), 'Leader-member exchange and affective organizational commitment: the contribution of supervisor's organizational embodiment', *The Journal of Applied Psychology*, 95, 1085–1103.
- Felstead, A. and G. Henseke (2017), 'Assessing the growth of remote working and its consequences for efforts, well-being and work-life balance', *New Technology, Work and Employment*, 32, 195-212.

- Felstead, A., Jewson, N. and S. Walters (2003), 'Managerial Control of Employees Working at Home', *British Journal of Industrial Relations*, 41, 241–264.
- Frost, N., Nolas, S., Brooks-Gordon, B., Esin, C., Holt, A., Mehdizadeh, L. and P. Shinebourne (2010), 'Pluralism in qualitative research: The impact of different researchers and qualitative approaches on the analysis of qualitative data', *Qualitative Research*, 10, 441–460.
- Gajendran, R. and D. Harrison (2007), 'The good, the bad, and the unknown about telecommuting: Meta-analysis of psychological mediators and individual consequences', *Journal of Applied Psychology*, 92, 1524–1541.
- Gold, M. and M. Mustafa (2013), "Work always wins": Client colonization, time management and the anxieties of connected freelancers, *New Technology, Work and Employment*, 28, 197-211.
- Golden, T. and J. Veiga (2005), 'The Impact of Extent of Telecommuting on Job Satisfaction: Resolving Inconsistent Findings', *Journal of Management*, 31, 301–318.
- Haslam, N. (2006), 'De-humanization: An integrative review', *Personality and Social Psychology Review*, 10, 252–264.
- Hayes, A. (2013), *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-based Approach*. New York: The Guilford Press.

- Hirst, A. (2011), 'Settlers, vagrants and mutual indifference: unintended consequences of hot-desking', *Journal of Organizational Change Management*, 24, 767–788.
- Hislop, D. and C. Axtell (2007), 'The neglect of spatial mobility in contemporary studies of work: The case of telework', *New Technology, Work and Employment*, 22, 34–51.
- Jancey, J., McGann, S., Creagh, R., Blackford, K., Howat, P. and M. Tye (2016), 'Workplace building design and office-based workers' activity: a study of a natural experiment', *Australian and New Zealand Journal of Public Health*, 40, 78–82.
- Jaros, S. (1997), 'An Assessment of Meyer and Allen's (1991) Three-Component Model of Organizational Commitment and Turnover Intentions', *Journal of Vocational Behavior*, 51, 319–337.
- Johnson, R., Onwuegbuzie, A. and L. Turner (2007), 'Toward a definition of mixed methods research', *Journal of Mixed Methods Research*, 1, 112–133.
- Judd, C. and G. McClelland (1989), *Data analysis: A model comparison approach*. New York: Harcourt Brace Jovanovich.
- Kelliher, C. and J. Richardson (2012), *New ways of organizing work*. London: Routledge.
- Kingma, S. (2018), 'New ways of working: work space and cultural change in virtualizing organizations', *Culture and Organization*, 1-24

- Knight, C. and A. Haslam (2010), 'Your place or mine? Organizational identification and comfort as mediators of relationships between the managerial control of workspace and employees' satisfaction and well-being', *British Journal of Management*, 21, 717-735.
- Kueffer, C., Hadorn, G., Bammer, G., van Kerkhoff, L. and C. Polh (2007), 'Towards a publication culture in transdisciplinary research', *GAIA*, 16, 22–26.
- Marx, K. (1844), *Les Manuscrits économique-philosophiques de 1844*. Paris: Vrin.
- Meyer, J., Allen, N. and C. Smith (1993), 'Commitment to organizations and occupations: Extension and test of a three-component conceptualization', *Journal of Applied Psychology*, 78, 538–551.
- Miles, M. and A. Huberman (2003), *Qualitative data analysis: An expanded sourcebook*. London: Sage.
- Nguyen, N. and F. Stinglhamber (in press), 'Emotional labor and core self-evaluations as mediators between organizational dehumanization and job satisfaction', *Current Psychology*.
- Ornstein, S. (1989), 'The hidden influences of office design', *Academy of Management Executive*, 3, 144–147.
- Paillé, P. and A. Mucchielli (2012), *L'analyse qualitative en sciences humaines et sociales*. Paris: Armand Colin.

- Peters, P., Poutsma, E., Van der Heijden, B., Bakker, A. and T. de Bruijn (2014), 'Enjoying new ways to work: an HRM- Process approach to study flow', *Human Resource Management*, 53, 271-290.
- Podsakoff, P., MacKenzie, S., Lee, J. and N. Podsakoff (2003), 'Common method biases in behavioral research: A critical review of the literature and recommended remedies', *Journal of Applied Psychology*, 88, 879–903.
- Putnam, L., Myers, K. and B. Gailliard (2014), 'Examining the tensions in workplace flexibility and exploring options for new directions', *Human Relations*, 67, 413-440.
- Richardson, J. and S. McKenna (2014), 'Reordering spatial and social relations: A case study of professional managerial flexworkers', *British Journal of Management*, 25, 724-736.
- Ryan, G. and H. Bernard (2003), 'Techniques to identify themes', *Field Methods*, 15, 85–109.
- Sanchez, A., Pérez, M., De Luis Carnicer, P. and M. Vela Jiménez (2007), 'Teleworking and workplace flexibility: A study of impact on firm performance', *Personnel Review*, 36, 42–64.
- Sewell, G. and L. Taskin (2015), 'Out of Sight, Out of Mind in a New World of Work? Autonomy, Control, and Spatiotemporal Scaling in Telework', *Organisation Studies*, 36, 1507–1529.

Siebert, S., Bushfield, S., Martin, G. and B. Howieson (2018), 'Eroding 'respectability': Deprofessionalization through organizational spaces', *Work, Employment and Society*, 32, 330–347.

Spector, P. and M. Brannick (2011), 'Methodological urban legends: The misuse of statistical control variables', *Organizational Research Methods*, 14, 287–305.

Stang-Våland, M. and S. Georg (2018), 'Spacing identity: Unfolding social and spatial-material entanglements of identity performance', *Scandinavian Journal of Management*, 34, 193-204.

Stich, J.-F., Tarafdar, M., Cooper, C. and P. Stacey (2017), 'Workplace stress from actual and desired computer-mediated communication use: A multi-method study', *New Technology, Work and Employment*, 32, 84-100.

Tashakkori, A. and C. Teddlie (2010), *Sage handbook of mixed methods in social and behavioral research* (2nd ed.). Thousand Oaks: Sage.

Taskin, L. and P.K. Edwards (2007), 'The possibilities and limits of telework in a bureaucratic environment: Lessons from the public sector', *New Technology, Work and Employment*, 22, 195-207.

Taylor, S. and A. Spicer (2007), 'Time for space: A narrative review of research on organizational spaces', *International Journal of Management Reviews*, 9, 325-346.

- Van Katwyk, P., Fox, S., Spector, E. and E. Kelloway (2000), 'Using the Job-Related Affective Well-Being Scale (JAWS) to investigate affective responses to work stressors', *Journal of Occupational Health Psychology*, 5, 219–230.
- Van Maanen, J. (ed.) (1979), *Qualitative methodology*. Beverly Hills: Sage.
- Weber, M. (1905), *L'Éthique protestante et l'esprit du capitalisme*. Paris: Librairie Plon.
- Williams, L. and S. Anderson (1991), 'Job Satisfaction and Organizational Commitment as Predictors of Organizational Citizenship and In-Role Behaviours', *Journal of Management*, 17, 601–617.
- Zalesny, M. and R. Farace (1987), 'Traditional Versus Open Offices: a Comparison of Sociotechnical, Social Relations, and Symbolic Meaning Perspectives', *Academy of Management Journal*, 30, 240–259.

List of Tables

Table 1. Overview of the interviewees.

Name	Gender	Position	Industry	Office design
1. Hernando	M	Case manager	Insurance	Flex
2. Suzanne	F	Expert	Insurance	Flex
3. Louis	M	Manager	Insurance	Flex
4. Claire	F	Case manager	Insurance	Flex
5. Marc	M	Case manager	Insurance	Flex
6. André	M	Manager	Insurance	Flex
7. Daniella	F	Case manager	Insurance	Flex
8. Theresa	F	Trainer	Insurance	Flex
9. Hugh	M	Manager	Mining	Open-plan
10. James	M	Project manager	Mining	Open-plan
11. Hada	F	Project manager	Insurance	Flex
12. Harlan	M	Process engineer	Mining	Open-plan

Table 2. Thematic analysis: description of interviewees' working life in open-plan and flex offices.

Theme	Sub-theme	Description
Work environment and context	Organization and physical workspace	<i>Evidence of the way the organization and workspaces are designed</i>
	Job content	<i>Evidence of the interviewee's job content</i>
Workspace experience	(Un)Comfort	<i>Evidence of perceived workspace (un)comfort</i>
	(De)Personalization	<i>Evidence of perceived (de)personalization associated to the office design</i>
	Lack of intimacy	<i>Evidence of reported lack of intimacy associated to the office design</i>
Personal organization	Telework-WLB	<i>Evidence of the use of telework and associated appreciation regarding work life balance</i>
	(Self-)Control	<i>Evidence of the existence of (self)control and of the way it is exerted</i>
Relationships	Autonomy	<i>Evidence of the use of autonomy at work</i>
	Integration	<i>Evidence of (self and/or other's) integration, in relation to the office design</i>
	Remoteness	<i>Evidence of the feeling of remoteness and/or the way remoteness affects work</i>
	Coping strategies	<i>Evidence of coping strategies developed by workers</i>

Table 3. Categories analysis: comprehensive dimensions related to de-humanization in open-plan and flex offices.

Category	Sub-category	Description
Dispossession	Dispossession of decision	Evidence of the way interviewees feel dispossessed of having a say on office designs
	Dispossession of professional mastery	Evidence of the way interviewees feel losing their professional mastery due to office design
	Dispossession of workspace	Evidence of the feeling of dispossession of workspace due to office designs
Abandon		Evidence of the feeling of abandon associated to office designs
Injunction to modernity		Evidence of the injunction to modernity associated to office designs

Table 4. Descriptive statistics and intercorrelations among variables

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Age	—										
2. Gender	-.11*	—									
3. Education	-.22**	.07	—								
4. Organizational tenure	.68**	-.01	-.12**	—							
5. Org. de-humanization	.09	.00	-.03	.14**	(.96)						
6. Psychological strains	-.01	.07	.08	.08	.50**	(.91)					
7. Job satisfaction	-.07	.04	-.00	-.09	-.55**	-.54**	(.91)				
8. Affective commitment	-.05	-.02	.00	-.06	-.64**	-.46**	.63**	(.87)			
9. In-role performance	.03	.06	.12**	.00	-.06	-.11*	.24**	.13**	(.69)		
10. Extra-role performance	.00	-.16**	.13**	.00	-.19**	-.18**	.32**	.36**	.33**	(.86)	
11. Turnover intentions	-.06	-.01	.15**	-.05	.50**	.51**	-.58**	-.44**	-.05	-.17**	(.93)
M	47.35	1.41	4.23	18.55	4.08	3.12	5.13	4.48	6.01	5.69	2.73
SD	9.03	0.49	0.84	11.07	1.49	1.10	1.32	1.40	0.69	0.87	1.53

Note. Reliability alpha values are on the diagonal. Mean age is in years; mean tenure is in years. Education was coded as the following: 1 = Primary education, 2 = Lower secondary school, 3 = Upper secondary school, 4 = bachelor, 5 = master, 6 = MD or doctoral degree; Gender was coded as 1 = male, 2 = female.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 5. Indirect effects of office designs on outcomes through organizational de-humanization

Outcome	Contrast 1 (Cell and open-plan vs. flex offices)			Contrast 2 (Cell vs. open-plan offices)		
	Indirect effect	S.E.	BS 95% CI	Indirect effect	S.E.	BS 95% CI
Psychological strains	.11***	.03	[.07; .16]	.05*	.02	[.00; .10]
Job satisfaction	-.12***	.03	[-.17; -.07]	-.05*	.03	[-.10; -.01]
Affective commitment	-.14***	.03	[-.20; -.08]	-.06*	.03	[-.12; -.01]
Extra-role performance	-.05**	.01	[-.08; -.02]	-.02†	.01	[-.04; -.00]
Turnover intentions	.11***	.02	[.06; .16]	.05*	.02	[.00; .09]

Note. † $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$. BS 95% CI = 95% confidence intervals from bootstrapping analyses.

Appendix 1. Full list of organizational de-humanization items (Caesens et al., 2017).

Items of organizational de-humanization

1. My organization makes me feel that one worker is easily good as any other
 2. My organization would not hesitate to replace me if it enabled the company to make more profit
 3. If my job could be done by a machine or a robot, my organization would not hesitate to replace me by this new technology
 4. My organization considers me as a tool to use for its own ends
 5. My organization considers me as a tool devoted to its own success
 6. My organization makes me feel that my only importance is my performance at work
 7. My organization is only interested in me when it needs me
 8. The only thing that counts for my organization is what I can contribute to it
 9. My organization treats me as if I were a robot
 10. My organization considers me as a number
 11. My organization treats me as if I were an object
-

Tables and Figures

Table 1. Overview of the interviewees.

Name	Gender	Position	Industry	Office design
1. Hernando	M	Case manager	Insurance	Flex
2. Suzanne	F	Expert	Insurance	Flex
3. Louis	M	Manager	Insurance	Flex
4. Claire	F	Case manager	Insurance	Flex
5. Marc	M	Case manager	Insurance	Flex
6. André	M	Manager	Insurance	Flex
7. Daniella	F	Case manager	Insurance	Flex
8. Theresa	F	Trainer	Insurance	Flex
9. Hugh	M	Manager	Mining	Open-plan
10. James	M	Project manager	Mining	Open-plan
11. Hada	F	Project manager	Insurance	Flex
12. Harlan	M	Process engineer	Mining	Open-plan

Table 2. Thematic analysis: description of interviewees' working life in open-plan and flex offices.

Theme	Sub-theme	Description
Work environment and context	Organization and physical workspace	<i>Evidence of the way the organization and workspaces are designed</i>
	Job content	<i>Evidence of the interviewee's job content</i>
Workspace experience	(Un)Comfort	<i>Evidence of perceived workspace (un)comfort</i>
	(De)Personalization	<i>Evidence of perceived (de)personalization associated to the office design</i>
	Lack of intimacy	<i>Evidence of reported lack of intimacy associated to the office design</i>
Personal organization	Telework-WLB	<i>Evidence of the use of telework and associated appreciation regarding work life balance</i>
	(Self-)Control	<i>Evidence of the existence of (self)control and of the way it is exerted</i>
Relationships	Autonomy	<i>Evidence of the use of autonomy at work</i>
	Integration	<i>Evidence of (self and/or other's) integration, in relation to the office design</i>
	Remoteness	<i>Evidence of the feeling of remoteness and/or the way remoteness affects work</i>
	Coping strategies	<i>Evidence of coping strategies developed by workers</i>

Table 3. Categories analysis: comprehensive dimensions related to de-humanization in open-plan and flex offices.

Category	Sub-category	Description
Dispossession	Dispossession of decision	Evidence of the way interviewees feel dispossessed of having a say on office designs
	Dispossession of professional mastery	Evidence of the way interviewees feel losing their professional mastery due to office design
	Dispossession of workspace	Evidence of the feeling of dispossession of workspace due to office designs
Abandon		Evidence of the feeling of abandon associated to office designs
Injunction to modernity		Evidence of the injunction to modernity associated to office designs

Table 4. Descriptive statistics and intercorrelations among variables

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Age	—										
2. Gender	-.11*	—									
3. Education	-.22**	.07	—								
4. Organizational tenure	.68**	-.01	-.12**	—							
5. Org. de-humanization	.09	.00	-.03	.14**	(.96)						
6. Psychological strains	-.01	.07	.08	.08	.50**	(.91)					
7. Job satisfaction	-.07	.04	-.00	-.09	-.55**	-.54**	(.91)				
8. Affective commitment	-.05	-.02	.00	-.06	-.64**	-.46**	.63**	(.87)			
9. In-role performance	.03	.06	.12**	.00	-.06	-.11*	.24**	.13**	(.69)		
10. Extra-role performance	.00	-.16**	.13**	.00	-.19**	-.18**	.32**	.36**	.33**	(.86)	
11. Turnover intentions	-.06	-.01	.15**	-.05	.50**	.51**	-.58**	-.44**	-.05	-.17**	(.93)
<i>M</i>	47.35	1.41	4.23	18.55	4.08	3.12	5.13	4.48	6.01	5.69	2.73
<i>SD</i>	9.03	0.49	0.84	11.07	1.49	1.10	1.32	1.40	0.69	0.87	1.53

Note. Reliability alpha values are on the diagonal. Mean age is in years; mean tenure is in years. Education was coded as the following: 1 = Primary education, 2 = Lower secondary school, 3 = Upper secondary school, 4 = bachelor, 5 = master, 6 = MD or doctoral degree; Gender was coded as 1 = male, 2 = female.

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Table 5. Indirect effects of office designs on outcomes through organizational de-humanization

Outcome	Contrast 1 (Cell and open-plan vs. flex offices)			Contrast 2 (Cell vs. open-plan offices)		
	Indirect effect	S.E.	BS 95% CI	Indirect effect	S.E.	BS 95% CI
Psychological strains	.11***	.03	[.07; .16]	.05*	.02	[.00; .10]
Job satisfaction	-.12***	.03	[-.17; -.07]	-.05*	.03	[-.10; -.01]
Affective commitment	-.14***	.03	[-.20; -.08]	-.06*	.03	[-.12; -.01]
Extra-role performance	-.05**	.01	[-.08; -.02]	-.02†	.01	[-.04; -.00]
Turnover intentions	.11***	.02	[.06; .16]	.05*	.02	[.00; .09]

Note. † $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$. BS 95% CI = 95% confidence intervals from bootstrapping analyses.

Figure 1. Standardized estimates for the structural mediation model

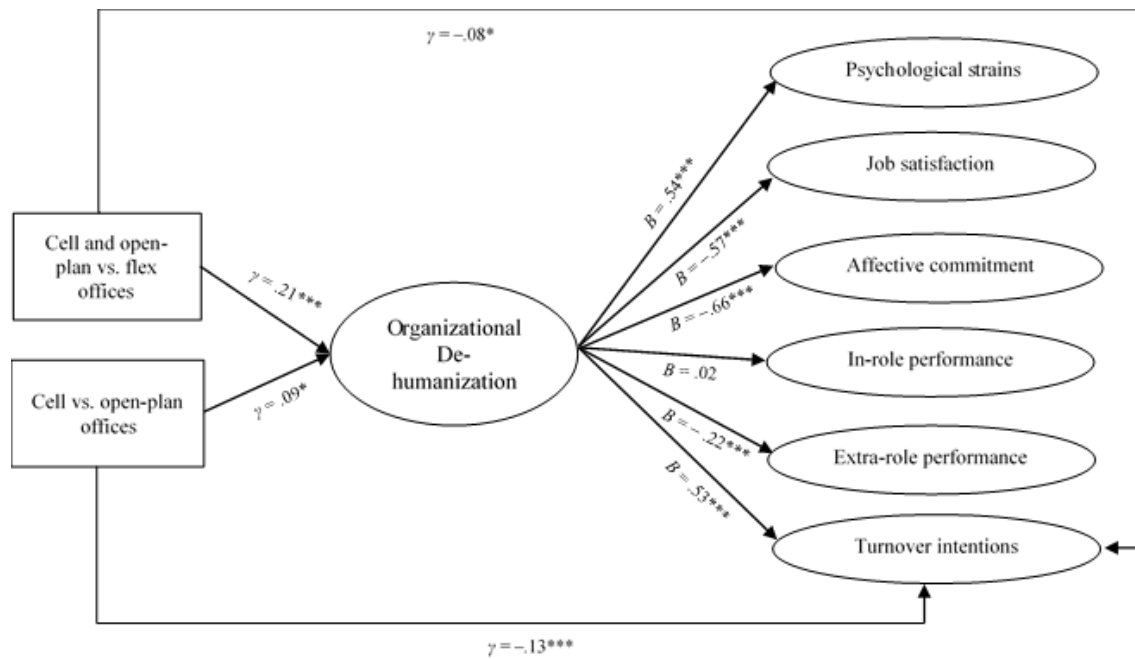
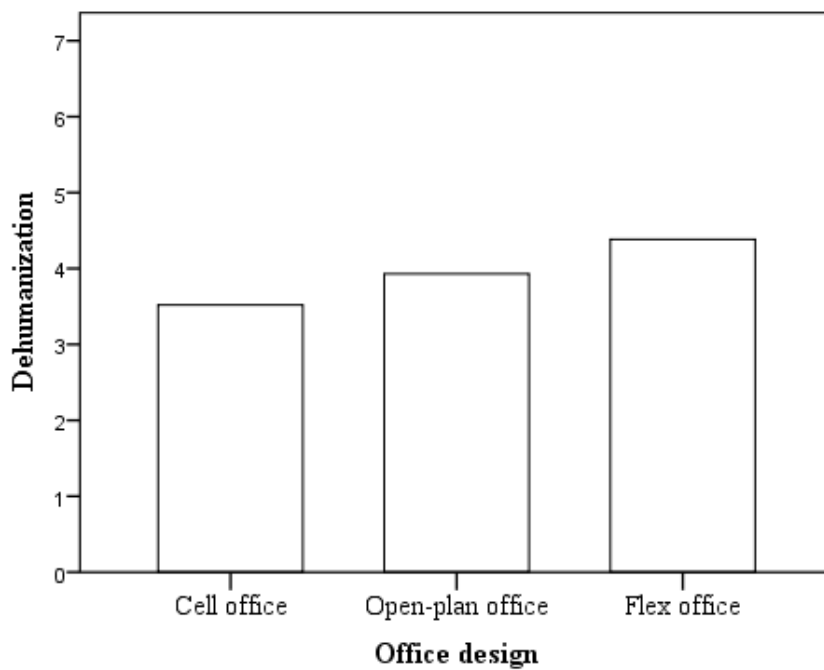


Figure 2. Levels of organizational de-humanization by office design.



Online Supplementary Materials for:

The dark side of office designs: Towards de-humanization

As described in the main manuscript, a methodological limitation of Study 1 lies in a sort of a confound effect between office designs and organizations. Most of the respondents working in flex offices came from a specific organization (79%) whereas most of the participants who worked in cell offices came from another one (68%). Therefore, it might be argued that our findings were attributable to organizational effects (e.g., job conditions, HR practices and policies) rather than to office design effects. In order to tackle this limitation, we conducted a second quantitative investigation among employees from various jobs and organizations. The statistical analyses related to this second quantitative investigation are reported here.

Method

Sample and procedure

In order to replicate the results of Study 1, we collected data from a convenient sample of employees experiencing the different offices designs of interest and coming from a wider range of jobs and organizations. The participants were assured of both the anonymity and the confidentiality of the study. After excluding participants who partially completed the questionnaire, our final sample consisted of a total of 297 participants. Among these participants, 43.8% were females, 41.8% were males, and 43 participants omitted to indicate their gender. The sample had an average age of 43.26 years ($SD = 11.29$) and had been employed by their organization for an average of 12.59 years ($SD = 10.67$). With regard to the office designs,

19.9% worked in cell offices, 55.6% worked in open-plan offices, and 24.6% worked in flex offices. The 5 most represented industry sectors were Accounting and Finance (18.9%), Information Technology (8.4%), Real Estate and Construction (7.7%), Electricity and Energy (5.7%), and Public Services (5.1%).

Measures and Data Analyses

The variables were measured exactly as in the first quantitative investigation. In the same way, the statistical analyses were also conducted as in the first quantitative investigation. We therefore invite the reader to refer to the main manuscript concerning these two points of the methodology.

Results

Confirmatory factor analyses

We conducted confirmatory factor analyses to examine the distinctiveness of the seven constructs included in our analyses (i.e., organizational de-humanization, psychological strains, job satisfaction, affective commitment, in-role and extra-role performance, and turnover intentions). The analyses showed that the seven-factor model fitted the data well ($\chi^2(503) = 1150.81$; RMSEA = .07; CFI = .90; SRMR = .06) and was significantly superior to all more constrained models. Error terms of 3x2 organizational de-humanization indicators were freed to correlate as they were likely to share common variance due to their similar item wording (i.e., “*My organization considers me as a tool [to use for its own ends/devoted to its own success]*”; “*My organization treats me as if I were [a robot/an object]*”; “*My organization would not hesitate to replace me [if it enabled the company to make more profit/if my job could be done by a machine or a robot]*”; see Appendix 1). All the indicators loaded reliably on their predicted

factors, with standardized loadings ranging from .58 to .91 for organizational de-humanization, from .74 to .84 for psychological strains, from .73 to .89 for job satisfaction, from .70 to .84 for affective commitment, from .52 to .95 for in-role performance, from .73 to .92 for extra-role performance, from .83 to .91 for turnover intentions. Therefore, the seven variables were treated as separate constructs in the subsequent analyses. These results are in line with the confirmatory factor analyses conducted as part of the first quantitative investigation (and reported in the main manuscript).

Table S1. Descriptive statistics and intercorrelations among variables

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Age	–										
2. Gender	–.12	–									
3. Education	–.22**	.05	–								
4. Organizational tenure	.71**	–.15*	–.28**	–							
5. Org. de-humanization	.25**	–.10	–.13*	.20**	.96						
6. Psychological strains	.09	.03	–.03	.08	.58**	.92					
7. Job satisfaction	–.13*	–.01	.05	–.01	–.57**	–.61**	.88				
8. Affective commitment	–.09	–.03	.04	.00	–.58**	–.43**	.60**	.79			
9. In-role performance	.05	.16*	.09	.11	–.05	–.10	.21**	.19**	.76		
10. Extra-role performance	–.01	–.19**	.21**	–.06	–.29**	–.16*	.26**	.45**	.24**	.86	
11. Turnover intentions	–.16**	.01	.12	–.21**	.47**	.52**	–.63**	–.53**	–.11	–.19**	.91
<i>M</i>	43.26	1.51	4.48	12.59	3.75	3.42	5.07	4.57	6.05	5.60	3.10
<i>SD</i>	11.29	0.50	0.75	10.67	1.56	1.19	1.32	1.34	0.77	1.06	1.79

Note. Reliability alpha values are on the diagonal. Mean age is in years; mean tenure is in years. Education was coded as follows: 1 = Primary education, 2 = Lower secondary school, 3 = Upper secondary school, 4 = bachelor, 5 = master, 6 = MD or doctoral degree. Gender was coded as 1 = male, 2 = female. * $p < .05$. ** $p < .01$. *** $p < .001$.

Descriptive statistics and correlations among variables

Means, standard deviations, correlations among variables, and Cronbach’s alphas are reported in Table S1.

Structural models

We tested a structural equation model in which organizational de-humanization fully mediates the relationships between the two contrasts created to capture the different office designs (where were treated as observed variable and not latent ones), and psychological strains, job satisfaction, affective commitment, in-role and extra-role performance, and turnover intentions. Because our six outcomes were mostly correlated to each other and these correlations can be explained by factors not included in our model (Kline, 2010), the disturbance terms associated with these endogenous variables were freed to correlate. The hypothesized model showed a good fit with the data ($\chi^2(569) = 1245.25$; RMSEA = .06; CFI = .90; SRMR = .06). We compared several competing models that add direct paths between our independent variables (i.e., office designs) and the outcomes (see Table S2). As no alternative model was superior in terms of model fit to the hypothesized model, our hypothesized model was therefore retained as the best description of the data. Standardized parameter estimates of the hypothesized model are shown in Figure S2. These results are similar to those of Study 1 except that the hypothesized model was retained as the best description of the data.

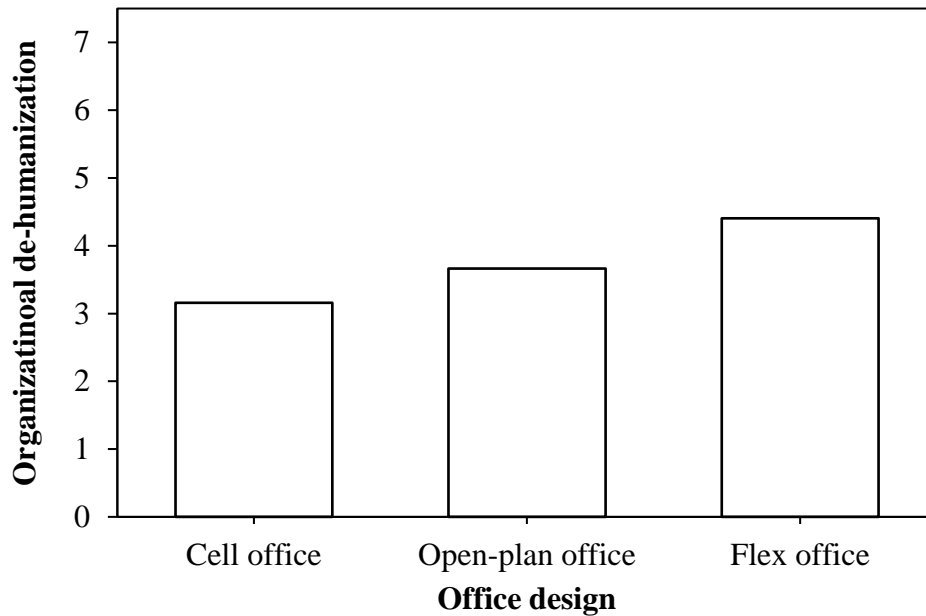
Table S2. Fit of hypothesized and alternative structural models

Models	MLR χ^2 (df)	CFI	RMSEA [90% CI]	SRMR	Δ MLR χ^2 (df)
Hypothesized model	1245.25 (569)	.90	.06 [.06-.07]	.06	–
Alternative 1 (direct paths to strains)	1243.90 (567)	.90	.06 [.06-.07]	.06	1.90 (2)
Alternative 2 (direct paths to job satisfaction)	1243.05 (567)	.90	.06 [.06-.07]	.06	1.26 (2)
Alternative 3 (direct paths to affective commitment)	1243.10 (567)	.90	.06 [.06-.07]	.06	0.93 (2)
Alternative 4 (direct paths to in-role)	1243.43 (567)	.90	.06 [.06-.07]	.06	1.88 (2)
Alternative 5 (direct paths to extra-role)	1243.27 (567)	.90	.06 [.06-.07]	.06	1.85 (2)
Alternative 6 (direct paths to turnover)	1244.08 (567)	.90	.06 [.06-.07]	.06	0.69 (2)

Note. MLR χ^2 = chi-square test of model fit associated with robust maximum likelihood estimator; df = degrees of freedom; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual. * $p < .001$.

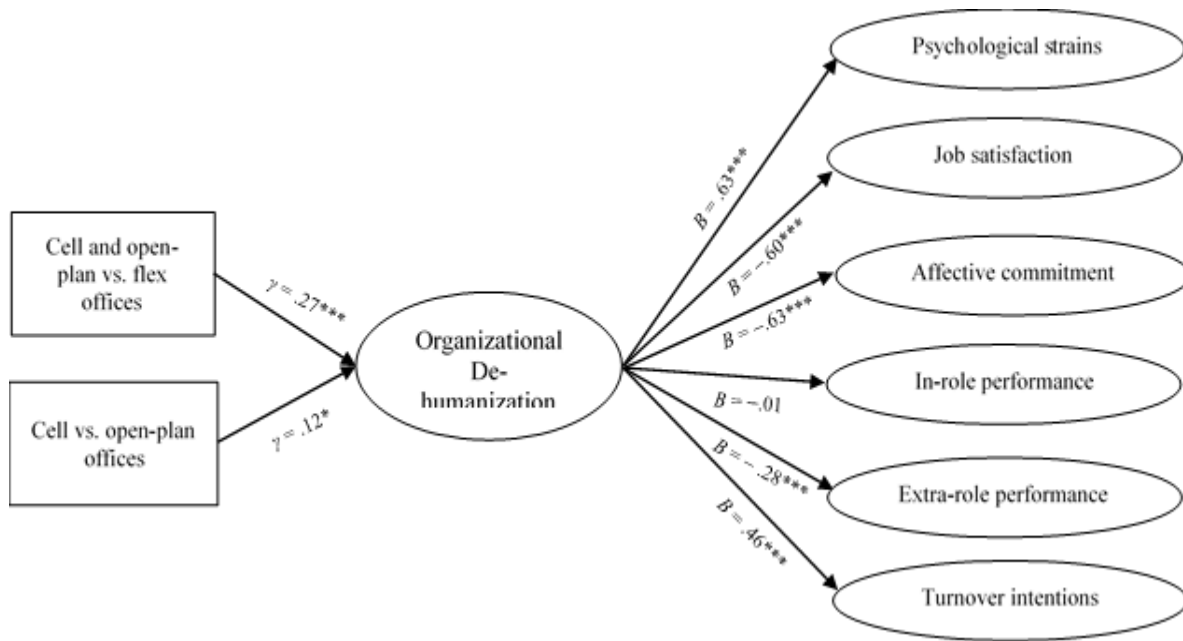
The results showed that the two contrasts have a significant effect on organizational de-humanization ($\gamma = .27, p < .001$ and $\gamma = .12, p < .05$, respectively), supporting Hypothesis 1 which suggests that different office designs are associated with different levels of organizational de-humanization (see also Figure S1 for a graphic representation of this effect). Findings indicated that organizational de-humanization is, in turn, positively related to psychological strains ($\beta = .63, p < .001$) and turnover intentions ($\beta = .46, p < .001$) and negatively related to job satisfaction ($\beta = -.60, p < .001$), affective commitment ($\beta = -.63, p < .001$), and extra-role performance ($\beta = -.28, p < .001$). In contrast with the other outcomes, no significant effect of organizational de-humanization on in-role performance was found ($\beta = -.01, n.s.$). In addition, except for in-role performance, the indirect effects of the two contrasts on the five remaining outcomes via organizational de-humanization were significant (at least marginally) using bootstrapping analyses (10,000 samples; cf. Table S3).

Figure S1. Levels of organizational de-humanization by office design



In line with Hypothesis 2a, b, c, e, f, these findings suggested that organizational de-humanization fully mediated the relationship between office designs and psychological strains, job satisfaction, affective commitment, extra-role performance, and turnover intentions. On the contrary, Hypothesis 2d is not supported since no significant relationship was found between our mediating variable and the outcome at stake in this hypothesis, i.e. in-role performance.

Figure S2. Standardized estimates for the structural mediation model



The results of this second quantitative investigation based on a sample of employees coming from various jobs and organizations bring additional support to the first quantitative investigation that we conducted and is reported in the main manuscript. They indeed show that (a) cell offices induce the lowest levels of de-humanization, followed by open-plan offices and, finally, by flex offices. and (b) organizational de-humanization mediates the link between office designs and the outcomes under study. Overall, these results indicated that the findings reported in the main manuscript cannot be attributable to a confound effect between office designs and organizations.

Table S3. Indirect effects of office designs on outcomes through organizational de-humanization

Outcome	Contrast 1 (Cell and open-plan vs. flex offices)			Contrast 2 (Cell vs. open-plan offices)		
	Indirect effect	S.E.	BS 95% CI	Indirect effect	S.E.	BS 95% CI
Psychological strains	.17***	.04	[.10; .24]	.07*	.03	[.01; .14]
Job satisfaction	-.16***	.04	[-.23; -.09]	-.07*	.03	[-.14; -.01]

Affective commitment	-.17***	.04	[-.25; -.10]	-.07*	.04	[-.15; -.01]
Extra-role performance	-.08***	.02	[-.12; -.04]	-.03†	.02	[-.07; -.00]
Turnover intentions	.12***	.03	[.08; .19]	.05*	.03	[.00; .11]

Note. † $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$. BS 95% CI = 95% confidence intervals from bootstrapping analyses.