Personal Office Preferences:

Full Report and Detailed Analysis

Sponsored by:

Herman Miller and Workplace Trends

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Contents

Summary

The debate on open plan versus enclosed offices rages on, but workplace design is not a such a simple dichotomy. Furthermore, office occupants clearly have different workplace preferences depending on factors like personality, personalisation, flexibility and sense of belonging etc. Herman Miller and Workplace Trends sponsored Workplace Unlimited to conduct a short on-line survey to help unravel some of the more personal factors underlying preferences in the modern office that are often forgotten or ignored.

Approximately 700 survey responses were received, equivalent to a response rate of approximately 15%, which whilst appearing low is nevertheless good for an unsolicited survey of this nature. Approximately two-thirds (68%) of the respondents are based in the UK. One-half consider their role as management and a further one-quarter as technical, including design.

The participants were asked to rate their preference for a number of office solutions. Landscaped offices and agile working were more highly preferred than open plan and, surprisingly, private offices. Home-working was rated fairly high whereas hot-desking is rated low as a preferred option. Open plan and private offices are not the only design options available, and least preferred. Landscaped offices and agile working, which are both types of "open plan", appear to be more agreeable options.

When considering the current primary workplace of the respondents, those in private offices prefer private offices, whereas those in open plan prefer open plan. It therefore appears that those who have not actually experienced open plan are more opposed to it, supporting the often observed "fear of the unknown". Similarly, home-workers prefer home-working. Furthermore, those with allocated desks have a higher preference for private offices and least prefer home-working, hot-desking and agile working compared to those who already hot-desk.

Preferences were found to differ by personality. Introverts are more in favour of private offices and least prefer open plan, agile working and hot-desking compared to extroverts. Interestingly, there is little difference between introverts and extroverts in the preference for home-working; both groups rate home-working relatively high. There were fewer differences for those more neurotic and less emotionally stable.

Preferences were found to differ by some socio-demographic factors. Those in the UK rated open plan and landscaped offices higher than elsewhere. In contrast, Eastern Europeans and North Americans rated open plan offices low and private offices the highest. No significant differences in office preferences were found for tenure or age group. So, previously reported differences in expectations of millennials etc are not supported. However, researchers have a preference for private offices, which could influence their studies of open plan and resulting recommendations on office design.

The participants were asked to rate how important they consider 26 different workplace conditions. For example, flexibility over work hours and place of work, having a social workplace, being able to personalise the workspace and not being overheard or overlooked by colleagues. For all the respondents, the most important workplace conditions relate to flexibility. For those currently accommodated in private offices, concentration and windows are also considered important. Those who rate private offices as their preferred workplace, consider personal desk conditions, like personalisation and privacy, to be most important. In contrast, such personal conditions are negatively correlated with those who have a higher preference for agile working and desk-sharing. For those who prefer landscaped offices and home working, flexibility and connectedness are more important. For those who prefer open plan, connectedness is important and for home-workers flexibility is key. These observed conditions could be used as motivators in workplace change management programmes.

1.0 Introduction

1.1 Background

The assault on open plan offices rages on in the press e.g. *Guardian* (2018), *Inc* (2018) and *Entrepreneur* (2019). Such articles are fuelled by a number of research studies which supposedly demonstrates that open plan is results in poor interaction, performance and health.

Studies such as that by Danish researcher Pejtersen *et al* (2011) who found that the average reported sickness absence of 2,403 Danish workers was higher in open plan working environments (8.1 days) compared to private single offices (4.9 days). Or that of Australian researchers Kim and de Dear (2013) who reanalysed U.S. survey of 42,764 respondents and concluded "our results categorically contradict the industry-accepted wisdom that open-plan layout enhances communication between colleagues… This study showed that occupants' satisfaction on the interaction issue was actually higher for occupants of private offices". More recently, after studying an organisation who moved to open plan, Bernstein & Turban (2018) report that "Contrary to common belief, the volume of face-to-face interaction decreased significantly (approx. 70%) … open architecture appeared to trigger a natural human response to socially withdraw from office mates".

However, as pointed out by Oseland (2013, 2018) these studies have several flaws. For example, the Danish study did not control for variables such as autonomy, job role and seniority when comparing those in private offices with those in open plan. They also report that noise, viruses, ventilation, privacy were the key factors, which may be related to some open plan environments but can occur in other workplaces too. In the Australian study, only 6.7% of the respondents work in "true open plan" whereas 60% reside in cubicles. The study actually showed that overall satisfaction, interaction and sound privacy was better in in open plan than cubicles. They also found that the "amount of space" explained the variation in responses, indicating that density is a confounding variable when exploring open plan offices. Bernstein & Turban had their participants wear a sociometric badge which included a microphone, infrared sensor, accelerometer and location tracker, which most likely affected the behaviour of the participants and their colleagues. Furthermore, the interaction prior to the move was 5.8 hours per day prior, or circa 73% of the working day, and post-move was reduced to 1.7 hours per day, or approximately 22% which seems more practical.

In addition to the above oversights, the most significant common to all studies is that the "open plan" environment is not fully described. Workplace design is not a simple dichotomy of private offices versus open plan, there are a range of offices types and open plan designs, some of which are poor and some of which are very good. In particular, open plan environments vary by density, with some having a high number of desks in the same space with few facilities, and by the level of partitions, with some having none at all and others being broken up occasionally by screens, planting, storage, quiet pods and meeting spaces.

In contrast to the above studies, case studies presented at conferences and occupant feedback surveys, like the *Leesman Index* (Leesman, 2019), often highlight the benefits of *good* open plan workplaces. These are usually agile or landscaped offices specifically designed for the occupants with an accompanying change management process. Mixson (2019) highlights how an open plan office layout can improve collaboration and spark creative thinking as well as reduce occupancy costs. However, she explains to achieve this the vision needs to be fully communicated, the culture aligned with, acoustics are considered and a range of spaces provided. Brem (2019) points out that it is not so much the space but how open plan offices are managed and used that causes problems.

Nevertheless, the authors personal experience is that whilst most occupants are satisfied with open plan, some simply do not cope well with it, they object to it at several levels and fear moving into it. The reasons and rationale for their opinion are not always apparent.

1.1 Objective

A wide range of modern workplace design solutions are now available such as the landscaped office and activity-based working. Furthermore, office occupants clearly have different workplace preferences. The workplace industry needs to understand what drives these individual preferences. Is it factors like personality, personalisation, flexibility, sense of belonging or familiarity that affect where people prefer to work?

Herman Miller and Workplace Trends sponsored Workplace Unlimited to conduct a short on-line survey to help unravel some of the more personal factors underlying preferences in the modern office. Such factors are often ignored or forgotten in design, research and regular surveys.

2.0 Approach

2.1 Respondents

Invitations to participate in the survey were emailed to 4,900 Herman Miller and Workplace Trends contacts (possibly with some overlap), in addition the survey was highlighted on the Workplace Trends social media groups. Some 700 survey responses were received, equivalent to a response rate of approximately 15%, which whilst appearing low is nevertheless considered good for an unsolicited survey of this nature.

Approximately two-thirds (67.6%) of the respondents are based in the UK and Ireland with a further 9.9% from North America, 5.8% from Central/Southern Europe, 5.7% from Northern Europe and 3.4% based in Eastern Europe.

One-half (49.5%) consider their role as management and a further one-quarter (25.4%) as technical. The respondents with a technical role included designers, engineers and consultants in the workplace industry. A further, 14% worked in business, 2.9% in sales and 2.7% in admin. The respondents also included a small (4.5%) group of researchers.

The sample consisted of a range of ages. The majority (60.9%) were born 1961-80 (Generation X), but 10.4% were born 1945-60 (Baby Boomers) and 26.0% were born 1981-95 (Millennials). Tenure, the time with the organisation also varied: 15% have worked <1 year, 25.9% 1-3 years, 31.3% 4-10 years and 27.1% >10 years.

2.2 Rating scales

Various subjective rating scales were used in the survey. For example, participants rated their preference for various office designs and practices on 7-point semantic differential scales labelled "not at all preferred" (1) to "very much preferred" (7). The participants were also asked to rate how important they consider 26 different workplace conditions on a 5-point Likert scale labelled: "disagree strongly"(1), "disagree a little" (2), "neither agree nor disagree" (3), "agree a little" (4), "agree strongly" (5).

2.3 Personality types

The respondents completed part of the Big Five Personality Inventory (John, Naumann & Soto, 2008) specifically the Extroversion and Neuroticism scales. Extroverts tend to be more social animals, thrill-seekers and risk-takers who speak off-the-cuff whereas introverts prefer the quieter life, are happier spending time on their own, and tend to mull things over and think before speaking. Neuroticism, the opposite to emotional instability, refers to the tendency to experience and dwell on negative emotions, and to experience anxiety and apprehension. The sample was grouped into those scoring higher on introversion and higher on extroversion, with the remainder classed as ambiverts. The authors full database (Oseland & Paige, 2017) was used to determine the upper levels of introversion and extroversion based on one standard

deviation from the mean scores. Similarly, the respondents were grouped into those rated higher on neuroticism and emotional stability.

2.4 Analysis

The sample size is sufficient to provide statistically robust and significant results. The data was analysed using SPSS and only the statistically significant results are presented here. The size of the effect, sometimes referred to as practical significance, was also computed using η^2 (η^2) for tests of differences. An η^2 of 0.01 is considered a small effect, 0.06 a medium effect and 0.14 a large effect. For correlations, r^2 was used as an indicator of the size of effect, where 0.02 is considered small, 0.13 medium and 0.26 large. The size of effect was found to be medium in many statistical tests, and large in a few tests, indicating that the research findings are of practical relevance.

3.0 Results

3.1 Office preferences and primary workplace

Six office designs were rated by the participants on a 7-point semantic differential scale: open plan, private office, landscaped office, agile working, hot-desking and home-working. Note that those in single offices and paired offices were grouped into "private offices", similarly those in open plan with 3-12 or 13-30 desks were considered small (3-30 person) open plan, and those with 31-90 or 90+ desks were classed as large (31+ person) open plan. Furthermore, the "landscaped office" option was described as "hybrid office (open plan but broken up with semi-partitions, pods, meeting rooms etc), "agile working" included "agile/flexible/smart/activity-based working" and "hot-desking" was also referred to as "desk-sharing".

Figure 1 shows the mean ratings with the standard deviation of the six office designs. The chart shows that the order of preferences is: landscaped office, agile working, home-working, open plan, desk-sharing (hot-desking) and private offices. Paired t-tests confirmed that the differences between the mean ratings of each office type are all statistically significant (p<0.001), except for the ratings between landscaped office and agile working.
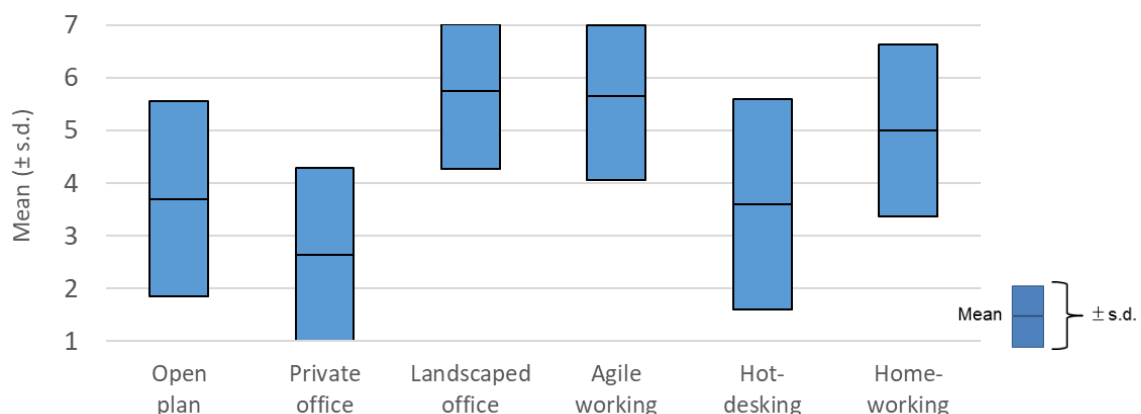

Figure 1 Mean ratings (and standard deviation) of office designs and practices

The mean office preferences were compared with the current primary workspace of the respondents. Figure 2 shows that those currently in single or paired offices (blue) have a significantly higher preference for private offices compared to those already located in open plan (orange and red) or other office types (df=4,576, F=13.49, p<0.001, η^2=0.086). In contrast, those already in single or paired offices have a significantly higher preference for private offices compared to those in small or large open plan (df=4,576, F=7.64, p<0.001,

η^2=0.050). So, the respondents prefer what they know and have experienced. Furthermore, those in single or paired offices have the lowest preference for agile working (df=4,576, F=9.79, p<0.01, η^2=0.028) and hot-desking (df=4,576, F=9.43, p<0.001, η^2=0.061).
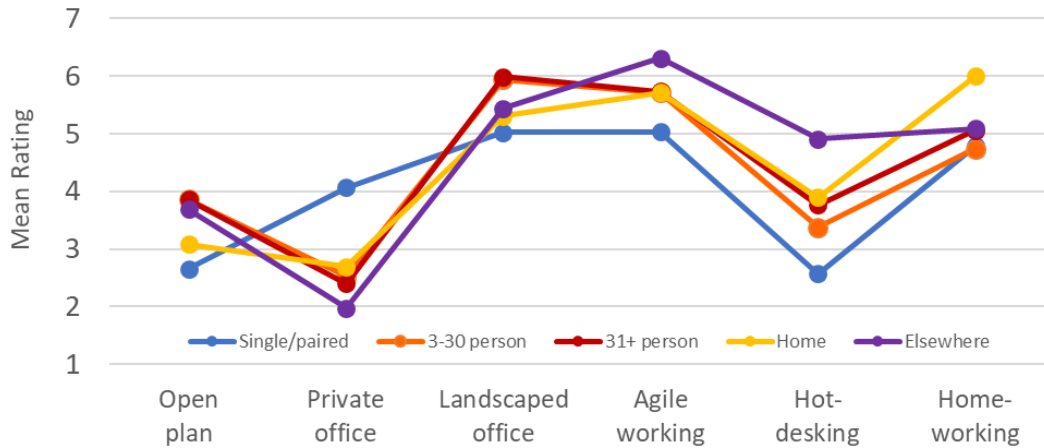

Figure 2 Mean rating of office preferences by current primary workspace

As expected, those who work from home have the highest preference for home-working (df=4,576, F=9.09, p<0.001, η^2=0.059) and those who mostly work "elsewhere", in and outside the office, rate agile working and hot-desking higher.

There is little difference between the preferences of those in small or large open plan offices. Whilst there are statistically significant differences for the preference of landscaped offices between the current primary workspace, it is less marked than for the other office preferences (df=4,576, F=8.29, p<0.001, η^2=0.054) and is rated high by all groups.

Percentages are often easier to follow than mean ratings. Table 1 shows the percentage of respondents who rated each office type as 5, 6, or 7 on the preference scale. The percentages are broken down by the current primary workspace; note a combination of the preferences in both small and large open plan is also included in the table.

Current primary office	Open plan	Private office	Landscaped office	Agile working	Hot-desking	Home-working
Single or paired office	16.3	45.9	65.6	72.2	21.4	59.1
Small (3-30 person) open plan	41.6	13.4	87.2	79.9	30.6	60.3
Large (31+ person) open plan	43.5	12.6	91.8	79.7	38.2	66.1
All (3+ person) open plan	42.5	12.9	89.4	79.8	34.3	63.2
Home-worker	26.4	18.1	76.3	83.4	45.8	68.8
Elsewhere (in and out of office)	43.8	16.5	75.1	93.8	68.8	66.7

Table 1 Percentage of high office preference by primary workspace

As with the mean ratings shown in Figure 1, the table highlights that a higher percentage of respondents in private (single or paired) offices prefer private offices, and more of those already in open plan have a preference for open plan. Whilst private offices may be more preferred than open plan or vice versa, depending on the current workspace, the proportion rating it a high preference (5-7 on the response scale) is still less than 50%. In contrast, the table shows high preferences for landscaped offices (>65%) and agile working environments (>72%); and these office solutions are also rated highly by those in private offices. There appears to be equal preference for home-working across the different current workspaces – highly preferred by around two-thirds of the respondents.

Nearly two-thirds (61.3%) of the sample have allocated desks with the remainder hot-desking. Those who hot-desk have a higher preference for agile working (df=2,579, F=20.02, p<0.001, η^2=0.065) and hot-desking (df=2,579, F=56.54, p<0.001, η^2=0.163) compared to those with allocated desks. So, again those who have experienced non-traditional ways of working rate it higher. In contrast, compared to the hot-deskers those with allocated desks have a higher preference for private offices (df=2,579, F=14.49, p<0.001, η^2=0.048). There are no significant differences for open plan, landscaped offices or home-working.

3.2 Office preferences and personality

Figure 3 shows a comparison of those scoring high on Extroversion (blue) compared with those scoring high on Introversion (red); the ambivert mean ratings have been omitted on the chart. The introverts have a higher preference of private offices compared to extroverts (df=2,573, F=4.31, p<0.05, η^2=0.015). In contrast, introverts rate open plan (df=2,573, F=6.88, p=0.001, η^2=0.023), agile working (df=2,573, F=6.50, p<0.01, η^2=0.022) and hot-desking lower (df=2,573, F=7.39, p=0.001, η^2=0.025). Interestingly, there is little difference in the preference for home-working and landscaped office between introverts and extroverts.
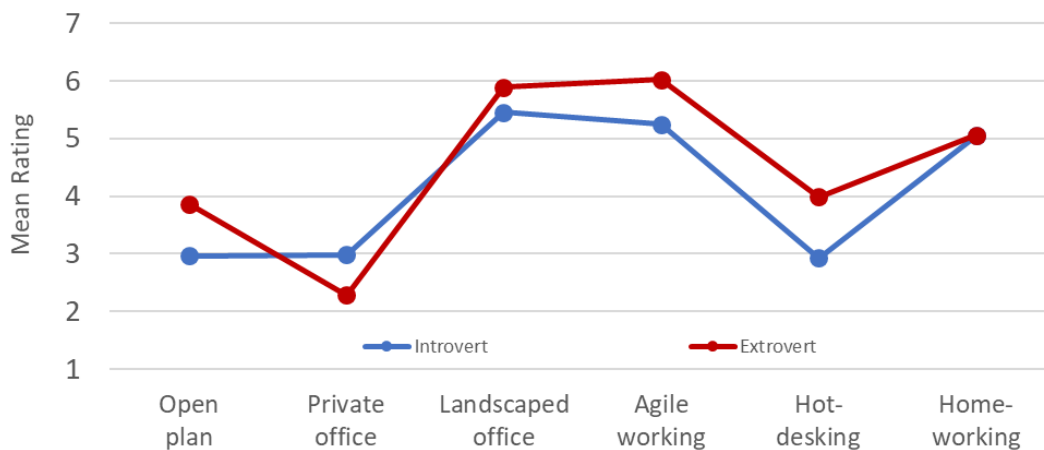

Figure 3 Mean rating of office preferences by extroversion

In terms of percentages of preferences rated 5 and above, a much higher proportion of extroverts to introverts preferred open plan (42% and 22% respectively), hot desks (46% versus 25%) and to some extent agile working (86% versus 72%). In contrast, private offices are preferred by a higher proportion of introverts (22%) to extroverts (12%).

Unexpectedly, there were few differences between office preferences for those more neurotic (i.e. anxious, apprehensive) compared to the emotionally stable. The only statistically significant difference found is that the more neurotic respondents have a much lower preference for hot-desking (df=2,571, F=4.21, p<0.05, η^2=0.015).

3.3 Most important workplace conditions

Various workplace conditions ranging from personalising desks to not feeling isolated, were rated by the participants on a 5-point Likert scale. Table 1 shows the highest and lowest rated conditions (mean rating and ranking) for all respondents. Cohen's D was used to test the size of effect and there is an intermediate effect for mean ratings with a 0.5 or more difference.

The highest rated workplace conditions (shown in green) all relate to flexibility, closely followed by conducting focussed work. The lowest rated conditions (in red) are technology, status and regular routine/hours, closely followed by no one else sitting at the respondent's desk and

sitting near a manager. Conditions related to noise and distraction are ranked mid-table, as is personalisation and being near colleagues.

It is imporant to me that …	Rank	Mean Rating
… I can choose to work from home occasionally	1	4.5
… I have flexibility over my work hours	2	4.4
… I have the flexibility to choose where I work	3	4.2
… I can conduct focused work requiring concentration	4	4.2
… my role involves lots of interaction	5	4.1
… my workplace is sociable	6	4.1
… I do not spend every day in the office	7	4.1
… I am near a window	8	4.0
… my role is not purely desk-based work	9	4.0
… my workplace gives me a sense of belonging	10	4.0
… I do not feel isolated during work hours	11	3.9
… my colleagues are sat nearby	12	3.8
… I do not have to commute at peak hours	13	3.6
… I am not distracted by office noise	14	3.3
… I can sit at the same desk each day	15	3.2
… I like the familiarity/routine of sitting at the same desk	16	3.1
… I can personalise my desk space	17	3.0
… I am not overlooked/overheard by my colleagues	18	3.0
… I am not interrupted by my colleagues	19	3.0
… I have my own private workspace	20	2.9
… I can leave my papers out on the desk (overnight)	21	2.8
… my manager is sat nearby	22	2.6
… no one sits at my desk	23	2.5
… my work involves a regular routine and fixed hours	24	2.4
… my workspace reflects my status	25	2.3
… I am dependent on the technology fixed to my desk	26	2.2

Table 1 Mean rating and ranking of office conditions

It is imporant to me that …	All Participants	Single/ Paired Office	Small 3-30 Person Office	Large 31+ Person Office	Home Worker	Elsewhere Worker
… I have flexibility over my work hours	4.4 (2)	4.2 (2)	4.4 (2)	4.3 (2)	4.7 (3)	4.5 (1)
… I can choose to work from home occasionally	4.5 (1)	4.0	4.5 (1)	4.6 (1)	4.8 (2)	4.4
… I have the flexibility to choose where I work	4.2 (3)	4.0	4.1	4.2 (3)	4.8 (1)	4.5 (1)
… I can conduct focused work requiring concentration	4.2	4.3 (1)	4.2	4.1	4.5	4.5 (3)
… I am near a window	4.0	4.1 (3)	4.1	4.0	4.0	3.8
… my workplace is sociable	4.1	3.9	4.3 (3)	4.2	3.8	4.0
… my manager is sat nearby	2.6	2.3 (24)	2.8	2.6	2.1	2.3
… no one sits at my desk	2.5	3.3	2.7	2.4(24)	2.2	1.6 (26)
… my work involves a regular routine and fixed hours	2.4 (24)	2.6 (26)	2.6(24)	2.5	1.8 (25)	2.0
… my workspace reflects my status	2.3 (25)	2.9	2.3 (25)	2.1 (26)	1.9 (24)	1.8 (26)
… I am dependent on the technology fixed to my desk	2.3 (26)	2.5 (25)	2.3 (26)	2.3 (25)	1.8 (26)	1.8 (25)

Table 2 Mean rating of the top and lowest rankings of office conditions by primary workspace

Table 2 shows the *three* highest (green) and lowest (red) rated workplace conditions by the current primary workspace of the respondents. Flexibility is considered key for those in most primary workspaces, but less so for those in private/paired offices. Being able to conduct focussed work and sitting near a window is more important for those in private/paired offices. Status, technology and regular routine are considered the least important regardless of the respondents' primary workspace.

3.4 Office preferences and workplace conditions

Table 3 overleaf shows the correlations between the most important workplace conditions and the preferred office spaces. The stronger correlations (positive and negative) and largest size effect (shown in blue and green) are between the workplace conditions and preferences for private offices, agile working and hot-desking.

It is imporant to me that …	Open plan	Private office	Landscaped office	Agile working	Hot-desking	Home-working
… I can personalise my desk space	-0.107**	0.341**	-0.103**	-0.280**	-0.458**	-0.005
… my workplace gives me a sense of belonging	0.005	0.002	0.120**	0.081*	0.009	-0.073
… I have the flexibility to choose where I work	0.053	-0.194**	0.136**	0.407**	0.383**	0.192**
… I have flexibility over my work hours	-0.012	-0.091*	0.139**	0.170**	0.158**	0.180**
… I can choose to work from home occasionally	-0.001	-0.098*	0.162**	0.268**	0.225**	0.253**
… I can sit at the same desk each day	-0.038	0.343**	-0.043	-0.352**	-0.502**	-0.089*
… my colleagues are sat nearby	0.116**	-0.063	0.122**	0.018	-0.041	-0.224**
… I have my own private workspace	-0.145**	0.462**	-0.138**	-0.311**	-0.414**	0.103**
… my workspace reflects my status	-0.032	0.223**	-0.030	-0.190**	-0.235**	-0.038
… I am not overlooked/overheard by my colleagues	-0.157**	0.241**	-0.100*	-0.090*	-0.115**	0.055
… I am not distracted by office noise	-0.031	0.085*	0.013	-0.002	-0.055	0.049
… I am not interrupted by my colleagues	-0.133**	0.188**	-0.012	-0.025	-0.091*	0.090*
… I can leave my papers out on the desk (overnight)	-0.064	0.255**	-0.097*	-0.298**	-0.410**	-0.052
… I do not have to commute at peak hours	-0.090*	-0.021	-0.067	0.127**	0.097*	0.169**
… my manager is sat nearby	0.103**	-0.006	-0.068	-0.060	-0.093*	-0.166**
… no one sits at my desk	-0.115**	0.344**	-0.127**	-0.311**	-0.493**	-0.042
… I can conduct focused work requiring concentration	-0.060	0.037	0.032	0.077	0.065	0.043
… I am near a window	-0.069	0.031	0.028	0.037	-0.111**	-0.017
… my work involves a regular routine and fixed hours	0.075	0.112**	0.016	-0.214**	-0.264**	-0.112**
… my role is not purely desk-based work	0.004	-0.096*	0.122**	0.156**	0.133**	0.028
… my role involves lots of interaction	0.277**	-0.243**	0.212**	0.229**	0.187**	-0.129**
… my workplace is sociable	0.178**	-0.166**	0.216**	0.222**	0.157**	-0.072
… I do not spend every day in the office	0.014	-0.120**	0.114**	0.270**	0.190**	0.234**
… I do not feel isolated during work hours	0.153**	-0.165**	0.188**	0.106**	0.121**	-0.084*
… I am dependent on the technology fixed to my desk	-0.034	0.202**	-0.041	-0.263**	-0.214**	-0.083*
… I like the familiarity/routine of sitting at the same	-0.069	0.310**	-0.018	-0.340**	-0.535**	-0.067

(* = p<0.05, ** = p<0.01, blue = large effect, green = medium effect, orange = small effect)

Table 3 Correlations between office preferences and workplace conditions

Based on the individual correlations, the negative associations (or barriers to overcome) with agile working and hot-desking are not having a regular allocated desk, not being able to personalise it and not being able to leave papers out overnight. In contrast, flexibility, interaction and sociability are the positive associations.

A Stepwise Regression Analysis was conducted to see which five combined workplace conditions best correlate with the office preferences. Table 4 shows the top five conditions that entered the regression equation and the resulting variance (an indicator of the strength of the relationship). The explained variance (r^2) is highest for hot-desking (df=5,606, F=82.58, p<0.001, r^2=0.405), private offices (df=5,606, F=48.34, p<0.001, r^2=0.298) and agile working (df=5,606, F=47.49,

p<0.001, r^2=0.282). In contrast, the variance was lower for landscaped office (df=5,606, F=13.18, p<0.001, r^2=0.098), open plan (df=5,606, F=14.99, p<0.001, r^2=0.110) and home-working (df=5,606, F=22.17, p<0.001, r^2=0.155).

It is imporant to me that …	Open plan	Private office	Landscaped office	Agile working	Hot-desking	Home-working
… I have my own private workspace	↓ 3	↑ 1	↓ 4	↓ 2	↓ 4	↑ 5
… my role involves lots of interaction	↑ 1	↓ 2	↑ 1	↑ 3		↓ 4
… I can choose to work from home occasionally			↑ 2			↑ 1
… I like the familiarity/routine of sitting at the same desk		↑ 3		↓ 4	↓ 1	
… I have the flexibility to choose where I work				↑ 1	↑ 3	
… I am not overlooked/overheard by my colleagues	↓ 2	↑ 5	↓ 5			
… my colleagues are sat nearby						↓ 2
… I can personalise my desk space					↓ 2	
… I do not feel isolated during work hours		↓ 4	↑ 3			
… I do not spend every day in the office				↑ 5		↑ 3
… my workplace is sociable	↑ 5				↑ 5	
… my manager is sat nearby	↑ 4					
Explained variance (adjusted r^2 x 100%)	**11.0%**	**29.8%**	**9.8%**	**28.2%**	**40.5%**	**15.5%**

(Order variable entered into regression with: ↑ = positive correlation, ↓ = negative correlation)

Table 4 Regression analysis of office preferences by workplace conditions

The combined conditions entered in the regression equations inform design decisions and barriers to change. For example, when implementing hot-desking it is most likely that the flexibility to choose where to work and having a sociable workplace are positive drivers. Further analysis revealed being near to managers, technology, occasional home-working and status to also be drivers. In contrast, sitting at the same desk, personalisation of desks and private workspace are all preferred requirements to be resolved.

Table 4 also shows that having a private workspace and having a role with interaction are good predictors of all office preferences (but a mix of positive and negative). This result supports previous findings that balancing interaction with privacy in open plan offices is a key challenge to designers.

3.5 Office preferences and socio-demographics

No statistically significant differences in office preferences were found for tenure, the time at the organisation. The sample was evenly split between those with the organisation less than or at least five years. Perhaps status and expectations of a private office are less of an issue than in bygone times.

Furthermore, unexpectedly, no significant differences in office preferences were found for age group. Previously reported differences in expectations of millennials etc are not supported in this dataset.

There are, however, statistical differences between mean office preferences for different job roles. For example, unexpectedly, those in management roles (blue) rate private offices the lowest (df=7,550, F=8.82, p<0.001, η^2=0.101), but rate agile working (df=7,550, F=3.88, p<0.001, η^2=0.047) and hot-desking (df=7,550, F=3.17, p<0.01, η^2=0.039) higher than other job roles, but quite similar to technical staff. Those in research roles (yellow) rate the preference for private offices the highest but rate open plan offices (df=7,550, F=3.63, p=0.001, η^2=0.044), landscaped offices (df=7,550, F=3.44, p=0.001, η^2=0.042) and agile working the lowest. The percentage of researchers in our sample was small (4.5%) but nevertheless the results are statistically significant. Therefore, it may be possible that researcher bias for private offices could influence their studies of open plan environments.

Those in business roles (red) rate home-working the highest. Administrators (green) rate open plan the highest compared to other roles, but also rate private offices high. In contrast, those in admin roles rate hot-desking and home-working lower than all other roles.
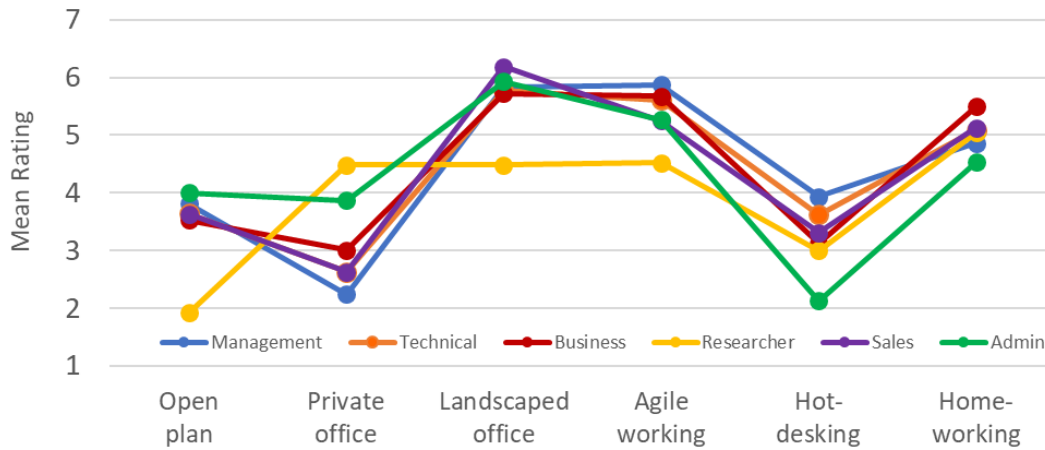

Figure 4 Mean rating of office preferences by job role

Significant differences in mean office preferences were also found for the country (grouped) where the respondents mostly work. For example, Figure 5 shows that those in the UK (blue) rated open plan (df=6,558, F=6.21, p<0.001, η^2=0.063) and landscaped offices (df=6,558, F=4.32, p<0.001, η^2=0.044) higher than elsewhere. Unexpectedly, the respondents in Antipodes and the Far East (orange) rated desk-sharing the lowest (df=6,558, F=2.97, p<0.01, η^2=0.031), possibly due to too mixed grouping. Northern Europeans (yellow) rated private offices (df=6,558, F=2.81, p<0.05, η^2=0.029) the lowest and hot-desking the highest. In contrast, Eastern Europeans (green) rated open plan and landscaped offices the lowest and private offices the highest. North Americans also rated their preference for fully open plan offices as low and rated private offices higher. In our sample, there are little differences in the preference for home-working across countries.
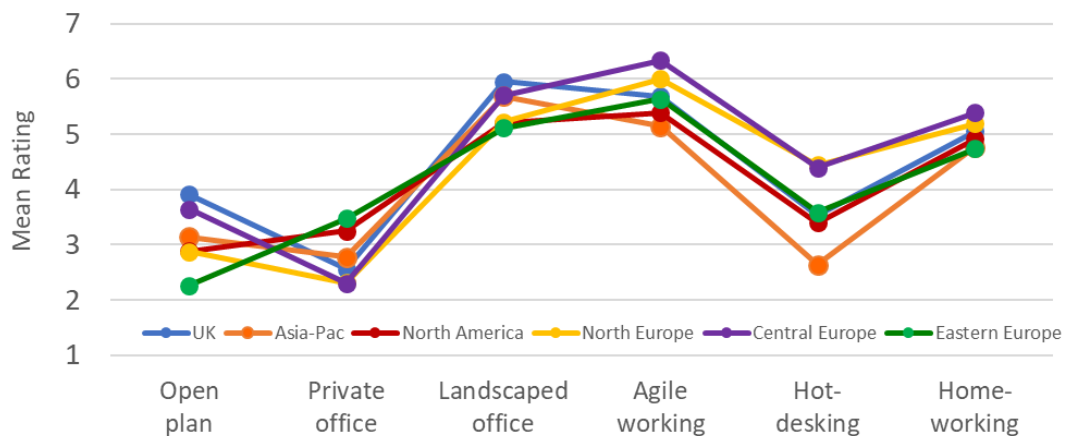

Figure 5 Mean rating of office preferences by grouped country

In terms of travel time to and from the office, there are some significant differences in preferences for landscaped office and home-working. Strangely, those with the shortest (<15 minutes) and longest (120+ minutes) return travel times had a higher preference for home-working (df=5,553, F=3.84, p<0.01, η^2=0.034). In contrast, those with the shortest travel time rated landscaped offices the lowest, whereas those with the longest rated them the highest (df=5,553, F=5.61, p<0.05, η^2=0.023).

3.6 Factor analysis of workplace conditions

Factor Analysis was used to group, find the most related, the workplace conditions. Table 5 shows that the Factor Analysis (actually a Principal Component Analysis with Varimax Rotation) of all 26 conditions created four clear factors: Desk (I), Flexibility (II), Connected (III) and Distraction (IV).

It is imporant to me that …	Factor I Desk	Factor II Flexibility	Factor III Connected	Factor IV Distraction
… I can sit at the same desk each day	0.786			
… no one sits at my desk	0.785			
… I can personalise my desk space	0.779			
… I can leave my papers out on the desk (overnight)	0.705			
… I like the familiarity/routine of sitting at the same desk	0.657			
… I have my own private workspace	0.626			
… my workspace reflects my status	0.441			
… I am dependent on the technology fixed to my desk	0.380			
… I am near a window	0.265			
… I have flexibility over my work hours		0.636		
… I do not spend every day in the office		0.617		
… I have the flexibility to choose where I work		0.598		
… I can choose to work from home occasionally		0.593		
… I do not have to commute at peak hours		0.479		
… my work involves a regular routine and fixed hours		-0.461		
… my role is not purely desk-based work		0.431		
… my workplace is sociable			0.641	
… my colleagues are sat nearby			0.572	
… my role involves lots of interaction			0.524	
… I do not feel isolated during work hours			0.507	
… my workplace gives me a sense of belonging			0.449	
… my manager is sat nearby			0.337	
… I am not interrupted by my colleagues				0.664
… I am not distracted by office noise				0.584
… I am not overlooked/overheard by my colleagues				0.534
… I can conduct focused work requiring concentration				0.482

Table 5 Factor analysis of workplace conditions

The first two factors are personal; Factor I relates to the desk and personal space and Factor II relates to flexibility and personal choice. The latter two factors are more inked to the group experience: Factor III relates to how connected the respondents are to their colleagues and workplace and Factor IV relates to distraction and interruption from colleagues.

The factor weighting of each workplace condition (shown in the table) were used to calculate four indices (overall/combined ratings), one for each factor. Figure 6 shows the correlations (not mean ratings as in the other charts) of the four factors with the ratings of office preferences. The chart clearly shows that Factor I - Desk (blue) correlates most highly with the preference for private offices ($r^2=0.19$). However, Factor I is most negatively correlated with preferences for agile working ($r^2=-0.16$) and hot-desking ($r^2=-0.34$). In contrast, Factor II - Flexibility correlates highly with agile working ($r^2=0.11$) and hot-desking ($r^2=0.09$). Factor III -

Connected correlates most highly with a preference for landscapes offices (r^2=-0.06) and open plan workspaces (r^2=0.05).
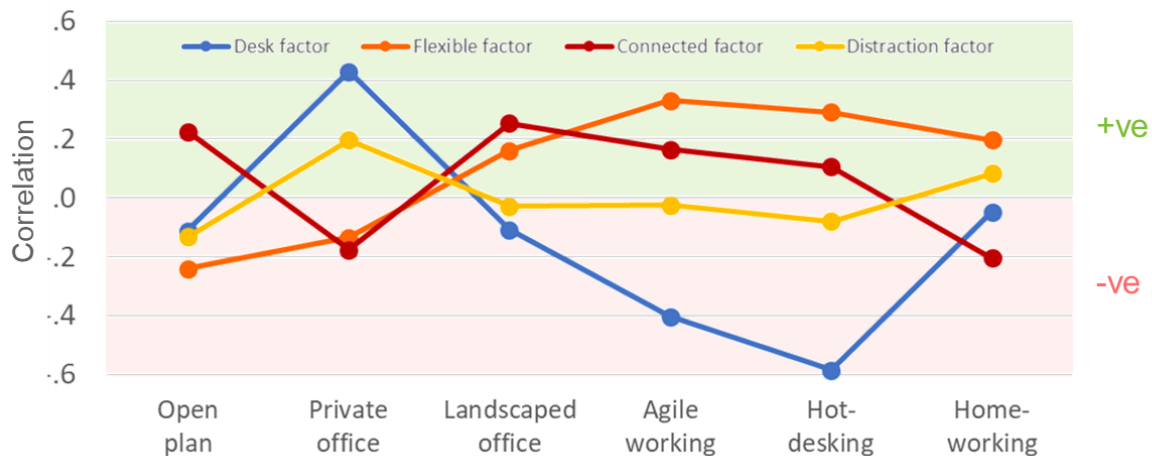

Figure 6 Correlations of factors and office preferences

The four high-level factors and their correlations with office preferences give us a broad indication of the motivators and barriers when implementing change and, in particular, agile working.

4.0 Implications for research and design

Based on the initial analysis, the following key implications are supported:

- For our sample, the landscaped office, agile working and home-working are more preferred than open plan, hot-desking and (unexpectedly) private offices. The preferences for landscaped/hybrid office and agile working environments, both types of "open plan" solution, tend to be excluded from those articles comparing open plan with private offices.

- Our respondents located in single or paired offices have a higher preference for private offices and a lower preference for open plan offices, agile working and hot-desking than those located in other types of office space. It therefore appears that those who have not actually experienced open plan are more opposed to it.

- Introverts prefer private offices compared to extroverts, but they rate open plan, agile working and hot-desking the lowest. As found in previous studies, additional care and change management is required when moving introverts into open plan and desk sharing environments. Unexpectedly, there is little difference in the preference for home-working between the introverts and extroverts in our sample – it's quite popular with both types.

- When asked about 26 different workplace conditions, across all our participants the highest rated conditions all relate to flexibility, closely followed by conducting focussed work. Offering choice, flexibility and autonomy are key to a successful workplace, regardless of the physical office design.

- However, when considering the current primary workspace of the respondents, flexibility is still considered key but less so for those in private/paired offices. Being able to conduct focussed work and sitting near a window is much more important for those located in private/paired offices. Furthermore, having a private workspace and having a role with interaction are good predictors of all office preferences. This supports previous findings that balancing spaces for focussed work against those for interaction is the core challenge for designers of more open plan working environments.

- When implementing hot-desking it is most likely that the flexibility to choose where to work, interaction, a sociable workplace, being near to managers, technology, occasional home-working and status are positive drivers, In contrast, not being able to sit at the same desk, non-personalisation of desks, lack of a private workspace, not having a regular/routine and others sitting at their desk are all barriers that need to be resolved. These drivers and barriers are for consideration in the change management process.

- Further detailed analysis indicated that personal desk space, flexible working and being connected at work appear to be bigger concerns than noise and distraction when considering preferred workplaces. Of course, providing work and workplace flexibility help alleviate noise and distraction.

- No significant differences in office preferences were found for tenure or age group. So, previously reported differences in expectations of millennials etc are not supported.

- However, researchers have a preference for private offices, which could influence their studies of open plan and resulting recommendations on office design.

- Unexpectedly, those in management roles rate private offices the lowest, but rate agile working and hot-desking higher than other job roles. Administrators rate open plan the highest, but also rate private offices high. In contrast, they rate hot-desking and home-working lower than all other roles. These results highlight the difference in requirements for different job roles.

- Differences for office preferences were also found between countries. For example, those in the UK rated open plan and landscaped offices higher than elsewhere. In contrast, Eastern Europeans rated open plan and landscaped offices the lowest and private offices the highest. North Americans also rated their preference for fully open plan offices as low and rated private offices higher.

5.0 Conclusion

As found in previous published articles, our respondents had a low preference for "open plan offices", however they had a high preference for landscaped office and agile working, the new variations of open plan. Furthermore, across all our sample the preference for private offices was rated low. Thus, office design is not a simple dichotomous solution but a range with appealing variations dependent on personal factors.

The current workplace of our respondents, i.e. what they know, and the workplace conditions they consider important, affect their office preferences. Furthermore, personal factors such as their personality, job role and country all affect office preferences. Such variables need to be considered when designing and moving occupants to new offices. Our identified drivers and barriers to agile working and hot-desking should also be considered in the change management process.

Published press and research articles often claim that open plan offices do not work and negatively affect performance and health. In contrast, case studies and occupant feedback surveys often highlight the benefits of _good_ open plan workplaces – usually agile or landscaped offices specifically designed for the occupants with an accompanying change management process. Our survey highlights the personal factors and different perspectives of office design (of occupants and researchers) that may explain the differences in research reports.

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