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***Personality and Stress in the Modern Office
Environment***

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Abstract

To investigate the differences in experienced stress and how this was moderated by the personality factors of work locus of control (WLOC) and extraversion between open plan-offices and activity based-offices (ABW), a questionnaire was sent out to the employees of nine different offices. 171 participants answered the questionnaire which consisted of five scales that measured perceived stress, distraction, privacy, WLOC, and extraversion. Three hypotheses were stated; there was going to be a difference in how perceived stress and how the stressors (distraction and privacy) were rated in the two office-types, there were going to be main-effects of the personality factors on the perceived stress and stressors, and lastly there were going to be interaction effects between the different personality factors, office-type, and stress and stressors. No support for these hypotheses was found. The only significant result was the effect of WLOC on stress and stressors; these results were not expected, after a discussion on the methodology used in this study, the conclusion is that the questions it has raised serve as a firm base for relevant and fruitful future research.

Keywords: Activity based work, work locus of control, extraversion, personality

Introduction

A global trend has, for the last couple of decades, been that the amount of people in the workforce that are working in offices, have been growing (Seddigh et al., 2014). Sweden is a good example of this. Not many years ago a majority of the workers were doing manual work, and a minority were working in office-environments. According to a report issued by the Swedish Trade Union Confederation (LO), there are a slight majority of

“white-collar” workers in Sweden today (Larsson, 2016). Manual work has taken a step back, and more people work in offices.

The group of people working in offices are as heterogeneous as the rest of the society. They come from different backgrounds, have different values and opinions, and differ on other parameters as well. As different they may be on these factors, as different they are as persons. Some are more sociable and outgoing than others, while some have a bigger need for personal space and are less socially confident. All in all, the persons that work in office environments are characterized by different personality factors and dimensions. This influences how well they will function in a certain setting, as for example an office environment (Ones et al, 2007). Even though personality is such an important factor of the individual outcome when working in an office, it has not been researched to any great extent, and when taking into account the new office concepts that have emerged in the past decades, there is very little research on the combination of office type and personality. Some of the studies that has contributed to this subject have been produced by Danielsson (Danielsson et al. 2015; Danielsson, 2016; Danielsson & Bodin 2009) and Seddigh (Seddigh, 2015, Seddigh et al.; 20014, Seddigh et al., 2016) who both look thoroughly at personality factors tied to personality and different office environments.

Traditionally an office has been a room with a door where a person conducts his or her tasks. This office type, the cell-office, has lost a lot of its old popularity as more and more employees work in open office environments. With the increasing numbers of office workers, it has become economically challenging to give each worker a cell-office and to solve this problem the open-plan office was introduced in a greater scale (Steiner, 2006). An open-plan office, as Danielsson and Bodin (2009) define it, is situated in a room, often of a larger size, where the employees have their designated workstation. The room is not divided by walls and the employees do not have access to individual windows. To keep the noise-levels down and to give the notion of some privacy, some kind of divider is used between the different workstations. A large merit with the open-plan office in contrast to the cell-office is that the open-plan office is very flexible in its

design, if needed they can easily be rearranged without any heavy construction work needed. Among other office types, a non-territorial form of office design has emerged (Kim, et al., 2016). This variant is called the combi-office (Danielsson & Bodin 2009), and the employees is working with flexi-desking (Kim, et al., 2016). While the nomenclature varies with the author, a popular denomination of these offices is activity-based workplace (ABW) (Kim, et al. 2016), and ABW is what it will be known as hereafter in this text. The ABW is an office without strict spatial definitions, an employee can choose to work at a traditional desk, in the cafeteria, in a lounge-area, or in some other area that suits the employee at the given moment (Danielsson & Bodin, 2009; Kim, et al., 2016). Kim et al. (2016) conducted a survey among employees that worked in different office buildings, comparing those who worked in an ABW and others who worked in open-plan offices. The aforementioned authors results showed that there were some advantages to the ABW in comparison to the more traditional open-plan office. Their article focused on desk-ownership; desk-ownership refers to an employee having a designated desk or a permanent workstation, and they are free to spread their belongings on/arrange the desk according to their preference, that you return to the next day versus working under a clean-desk policy. A clean-desk policy is used in the ABW and is one of its basic policies. To the employee this means that they empty their workspace after every workday, store the materials (such as papers, computer, photos etc.) in a secondary location and when the employee returns for the next work-shift, they unpack their belongings at that day's chosen work location. What Kim et al's findings show is that the question of desk-ownership is of less importance for the overall reported satisfaction, and perceived productivity and health than other factors. For example, the design of the ABW, with more spaces for meetings and the possibility to choose their own workspace location, contributed to a higher reported satisfaction than in the territorial open-plan office. On the other hand, employees in the ABW reported more negative feedback regarding the teamwork effectiveness, that in the ABW a problem based on its free-seating design, was that unnecessary time was spent locating team members when meeting were

about to be held. All in all, ABW only works when there is an availability of space that flexibly fits the need of the employees throughout the work process and throughout the workday, and with that a working infrastructure for communication.

Privacy and distraction

Sundstrom, Burt and Kamp (1980) define psychological privacy as being “in control over oneself or one’s group. It includes control over transmission of information about oneself to others, and control and inputs from others” (p. 101). In other words, it is about being in control of your own presence in the group (e.g. a team at the workplace), to be able to retreat if needed, and to have control over what information is shared to other people in this group. Privacy can be divided into two main categories, acoustical and visual (Danielsson & Bodin, 2009; Kaarlela-Tuomaala et al., 2009). Acoustical privacy refers to both being able to speak without being overheard, and secondly, to be able to isolate oneself from noise. Visual privacy refers to having the opportunity to isolate oneself from unwanted observation. The former form of privacy is important to the greater experience of privacy in an office setting. What this also implicates is privacy’s close relation to distraction, another main subject in this current study. Danielsson and Bodin (2009) looked at different office types (cell-offices, open-plan offices and ABW) and, among other factors, noise and privacy. The results showed that the reported complaints regarding the impinged privacy and reported distracting noise was lowest in the cell-offices and complaint were at a highest level at the offices with an open-plan design. The participants in the ABW office placed just in between the other two office types. These results are in line with de Been and Beijer’s (2014) results. The authors looked at three different office-designs in the Netherlands (cell-office, shared office and ABW). They found that the reported feeling of privacy and concentration correlated to which extent it offered possibilities to be curtained from the rest of the office. It is true that ABW offers this to a higher extent than open-plan offices, but a cell-office or shared office will, in most cases, have a greater opportunity for privacy and less distraction than the other office types.

Kaarlela-Tuomaala and colleagues (2009) investigated acoustic environment in cell-offices and open-plan offices. They found the same trend as Danielsson Bodin (2009), namely that the employees working in the open-plan offices to a higher degree reported a violated privacy and to a greater extent elements of distraction. Noise was a big factor that contributed to this distraction, it was clear that work which included a greater cognitive load, were especially disrupted by noise. What they also could see was that persons working in the open-plan offices used an increasingly higher degree of coping behaviors than the persons that were working in cell-offices. The authors give two examples of such coping behaviors, either interrupting what the person currently is working on, or bringing the task home to work with in peace and quiet. The conclusion was that a lot of the theorized benefits of working in open-plan environments were lost due to the lack of privacy and the high amount of distractions, for example, cooperation between the employees became less pleasant and direct, and information flow and approachability of other employees were not significantly different between the office types. These results correspond to the theory about crowding, that the density of people in a given space affects the experience of privacy (Danielsson & Bodin 2009; Danielsson et al. 2015; Stokols, 1972a; Stokols, 1972b). Even though the offices' total amount per square meters per employee is higher in the open-plan office, the ABW-office offers more effective space per employee, and the possibility to go to a zone that is more in line with what they are working on at the moment. It is further corroborated by the research performed by Kim and de Dear (2013), they could show that the less crowded an office is, the people working there report less violations against their privacy.

Distraction is an everyday term that most people can identify and specify, but still it has to be defined in a scientific sense, with a sound theory as a ground. Seddigh et al. (2014) referred to the cognitive load theory, proposed by Lavie et al. (2004) ten years earlier. Lavie and colleagues (2004) describe the underlying mechanisms of distraction (or more specifically, of being distracted) as a function of selective attention and cognitive control. They state that distraction depends on the level and

type of load a person is being subjected to. The result of their experiments can be explained like this; high perceptual load, when processing task-relevant stimuli have a positive effect in the sense that it reduces the effect of the distractor interference. On the other hand, when the processes of cognitive control (example of these processes is working memory and task coordination) are subjected to a high load it has a negative effect in that distractor interference is increased. This last effect is especially interesting in the case of office related distraction. Working memory has a finite capacity both in the amount of information that can be stored and manipulated at a given time, and how long it can be stored in the working memory (Baddeley, 2011). A distractor like a phone ringing, colleagues talking or some other sound that is common in the office environment, will be picked-up by the phonological loop (a function within working memory), effectively cancelling out whatever information that was stored and used before. This leads to the person losing focus over what he or she was working on and time will be spent getting back to that focus. This model of cognitive load can be used to explain the results in all of the articles in the following paragraphs.

In the study by Kim et al. (2016) that is referred to and elaborated above, the authors further looked at noise distraction, they asked if the workplace enabled the participant to work without being distracted or interrupted by noise and how satisfied they were with the noise levels in their workspace. Kim and colleagues found that the participants were distracted by noise, but without being able to identify a significant difference between the two office types. This difference was found in Seddigh et als (2014) study. The study looked at different office types and a handful parameters related to workplace satisfaction, one of these parameters was distraction. The results showed that the more people that are concentrated per square meter, the higher the self-reported distraction is. The employees per square meter ratio was lower in the ABW kind of office than in the open-plan office that were investigated in the study and the results followed the above logic with more self-reported distraction in the open-plan office.

Both privacy and distraction affect job-satisfaction at a global level (Danielsson & Bodin, 2009; Kaarlela-Tuomaala et al., 2009; Seddigh, 2014). One of the key elements affected is the ability to concentrate on the work at hand, when this ability is violated, not only does it breed more stress, but it also affects productivity as a whole (Haynes, Suckley & Nunnington, 2017; Ojo, et al., 2018). A loss in productivity affects both the employee, the group or team the employee is a part of, and on a bigger level, the organization he or she is working for.

Mental stress

Perceived privacy has been shown to affect psychosomatic stress response (O'Neill & Carayon, 1993). Their article shows that a worker that has control over their visual enclosure (e.g. being able to choose the level of visual privacy of your own volition) will have a stronger sense of privacy than if this condition is not met. This in turn has a great impact on how much stress this worker will experience in the workplace. These results are later confirmed by several authors. (Brand & Smith, 2005, Danielsson & Bodin, 2009) As shown when conducting searches on different databases, when it comes to noise distraction, there are not a lot of published articles (Furnham & Strbac, 2002). Evans and Johnson (2000) investigated stress in the open-plan design by, as one condition, simulating low intensive office sound during three hours. They could conclude that even though the participants did not report feeling a higher level of stress than in a silent condition, that both physical (elevated epinephrine levels) and behavioral effects (lowered motivation to adjust furniture and other devices during work) could be recorded that showed a higher stress level in this group. Banburry and Berry (1998) conducted three experiments where they had participants perform cognitive task with or without background noise (office sounds with or without speech, and speech only). Their results showed that the office noises alone, with speech, and speech alone disrupted the participants performance on memory and arithmetic tasks. From these studies on privacy and distraction, we can conclude that both act as powerful stressors; stressors that are ever present in the modern office concepts.

Extraversion

Extraversion, and its contrasting factor introversion, was first brought to the masses by Jung (2014) in the early 1920's. Since then, the meaning and usage has changed. Even today there are differences in how these concepts are described. One of the major theories that is used to explain different dimensions of personality today is the five factor model of personality (also known as the Big Five)(John, Robins, Pervin, 2008). In the five factor model of personality, a few of the behaviors used to describe an extraverted person are talkative, energetic, outgoing, outspoken and forceful (John, Robins & Pervin, 2008; Tompson, 2008). On the other hand, introversion is recognized as someone being shy, quiet, reserved and silent. In this model extraversion is seen as a factor that lies on one side of a continuum, with introversion as a contrasting pole. Further, a person with a high level of extraversion tends to show an energetic approach towards both the material and social world, a person who scores on the other end of the continuum will have less of these properties. Extraversion and introversion have been shown to differ on other planes as well. Belojevic, Slepcevic and Jakovljevic (2001) investigated how noise affected persons with either of these personality dimensions. They could not show that noise had an effect on the outcome of the tasks the participants were working on in the presence of distracting noise. What they could show was that introverts needed longer time to finish the task when the noise was present, while the extroverts were not affected to the same extent. In the same vein, Cassidy and Macdonald (2007) asked 40 participants to complete a series of cognitive tests such as an iteration of the Stroop-test, an immediate recall task, and a delayed recall task. The test started with the participants categorizing different music as either inducing a high or low experienced arousal level to each individual. The participants were also divided into two groups depending on how they scored on an extraversion - introversion scale. The persons who placed on the introversion part of the scale had higher results throughout the different tests (except the Stroop-test) when the low arousal music were playing, but they were to a higher extent negatively affected by both high arousal music and everyday noise. This last part, that everyday noise negatively affected

the introversion group more than it did the extraversion group, is especially interesting in an office environment. Everyday noise is ever present in an office environment, and as discussed in the section about privacy, one can expect a backdrop of ringing phones, colleagues taking calls, chatter and so on in any office type that can be considered as shared. As the results of Cassidy and Macdonald's study showed that people high on introversion are affected negatively to a greater degree by this backdrop, and that the group's performance on cognitive tasks are negatively affected by this, it can be assumed that the shared office environment would have an adverse effect on the group's performance. Since it is possible to avoid a big part of the noise in an ABW office, due to the possibility to work in a silent zone, these results suggest that persons who are more introvertedly inclined would thrive to a greater extent in a ABW-office than they would in an open-plan office. This assumption is further backed by the results of an article expanding on the subject of extraverts and introverts, and distracting background noise (Dobbs, Furnham & McClelland, 2011). In the study that the article describes, a group of participants who placed in either of the two sides of the extraversion continuum performed a series of cognitive tasks. The authors predicted that there would be a difference in the results of the two groups when either music were playing in the background or if there was other kind of noise in the background, with the introversion group performing worse during these conditions than the extraversion group. A third, silent condition (no background sound) was predicted to yield no differences in the results between the groups. These predictions were confirmed in the analysis of the results, except for on one of the cognitive tests. Dobbs and colleagues results are quite clear, the higher on the continuum for extraversion you score (the more extraverted you are), the lower will the impact of the distracting sound be, and vice versa the more introverted you are. Music will have less of an impact than office noise, and silence will have no impact on either of the two groups. Once again we can assume that in a real world setting, if the results still stands, introverted persons would be impacted more negatively than extraverted persons by the

distracting noise in an open-plan office, and that this difference in impact would be lower in an ABW type of office.

To flexibly measure extraversion and the other four dimensions of the five-factor model John, Donahue and Kentle (1991) constructed the Big Five Inventory (BFI). Except for extraversion it measures agreeableness, conscientiousness, neuroticism and openness.

Locus of Control

Locus of Control (LOC) was first proposed by Rotter (1954) in his article about social learning, and in 1966 the same author conceptualized the theory into the “Internal – External Scale”, which is the base that most tests that pertain to the LOC concept builds on. The concept consists of two factors, an internal factor and an external factor. Persons who score within the internal range of the scale are classified as having an internal LOC, if a person scores within the other half of the scale they are said to have an external locus of control. As these categories imply, LOC is about controllability and, explicitly, control over the outcomes of one’s actions. More specifically, persons with an internal LOC are assured that they are the ones that dictate their own fate, that the outcomes of their actions are consequences of their behavior (Ng, Sorensen & Eby, 2006). In stark contrast, persons with an external LOC see the outcomes as results of, mainly, external factors. Behaviorally, Ng and colleagues describes the persons with an internal LOC as seeing themselves as more actively involved in their own fate, that their behavior has a direct effect on the outcomes. Persons with an external LOC, are described as not believing they are able to affect the outcome of their fate, and therefore are more passive observers attributing the outcomes to luck or external factors.

When looking at the concept of locus of control, it is important to recognize that there are two main viewpoints to from which the concept can be examined (Muhonen, 2004; Wang, Bowling & Eschleman, 2010). The first is to see it as a global concept utilizing the same test for all populations, that there is comparability between different groups and different domains. The second viewpoint is domain specific, a group is identified and the test

used in examining this group is adapted to measure that specific population. A good example of an adaptation is exemplified in Spector's test that measures Work Locus of Control (WLOC) (Spector, 1988). Spector used Rotter's original questionnaire as a basis, but adapted the questionnaire to measure LOC in the workplace by adding items that were more relevant to the domain of work.

Even though Rotter's test is still widely used, more and more adaptations of the test for different uses are being published and utilized in research (Lefcourt, 1992). Many researchers agree that LOC is a valid concept to use, but that this concept can be different for a person based on which domain of their life (work, school, romantic, etc) one is looking at (Ang 1999; Lachman 1986; Muhonen 2004; Wang, Bowlings & Eschleman, 2010). For this reason, it has become more and more popular to use one of the domain specific tests instead of the more uni-dimensional test of Rotter. These domain-specific tests has also turned out to be better predictors than the global, uni-dimensional measures, Wang, Bowling and Eschleman (2010) summarizes the research relevant to the validity of the two types of test in two main explanations. Their analysis focuses on the work of frame-of-reference researchers and relies heavily on Lievens, De Corte and Schollaert's 2008 article in which they propose an alternative view to the traditional view of the effect of frame-of-reference. The traditional understanding is that you can see a difference between test subjects who are answering a generic personality inventory based on their frame-of-reference and that this frame-of-reference is assumed to be used throughout the inventory and is to be applied to all items. Here the frame-of-reference effect is visible through the between-subject variability and that this effect will be mediated by imposing a uniform frame-of-reference across the test subjects, e.g. being at school, being at work or some other common frame-of-reference. The alternative view discusses two sources of variability; in contrast to the more traditional uni-dimensional view the variability of the within-subject inconsistency is added. As mentioned Lievens, De Corte and Schollaert (2008) discuss this alternative view and explains that the validity of a domain-specific test, like WLOC, is higher due to the lowered between-

subject variability that is observed when a frame-of-reference is imposed (as explained above). Part two is the within-subject inconsistency which also is lowered when a frame-of-reference is added. For example, when taking the generic test of Rotter (1966) different situations is described and itemized throughout the test, a person will, understandably, adjust their frame-of-reference based on which interpretation they make of the item. This will add an inconsistency in the answers that is not observable when one frame-of-reference is used throughout the test. Let us use WLOC as an example again, when answering the items of the WLOC the frame-of-reference is clearly the workplace, and when considering the different items, the person will rely on this common denominator in every part of the test. Blau (1993) performed a test on a population of bank-tellers to look at LOC and performance. He used Rotter's (1966) test and Spector's (1988) test to further look at LOC, the two factors of the scale and how these factors relate to performance. Performance was divided into initiative performance (involving spontaneous and innovative behavior) and compliant performance (involving a behavior consistent with a prescribed role e.g. here, the role as bank-teller). In Blau's study, only using Spector's test, a relationship between internal/external LOC and employee performance could be established. The results showed that participants with an internal LOC performed better on the dimension of initiative performance and the participants with an external LOC had a stronger relationship to the compliant performance dimension. Blau explains this by relating to Fisher's (1980) discussion about personality inventories and fit, that to be able to ensure a high predictive validity, the researcher needs to consider the fit between the measure used and the performance outcome (Blau, 1993). In other words, the measures used while investigating personality and specific attitudes in relation to work performance, has to relate to specific behavior that is a part of the work dimension (Fisher, 1980). Blau (1993) explains that since self-development is a big factor in Spector's test, and further, that the questions relate in a greater sense to the work domain, this test has a better fit than Rotter's test. This is the reason that Blau was able to point out

relationships when it came to using the domain-specific test, but not while using the unidimensional test.

Abouserie (1994) investigated, as part of a larger study, how academic stress and LOC correlated. The results showed that the higher a person placed on the internal-external continuum, the more overpowering the person experienced the stress. Schmitz, Neumann and Oppermann arrived at a similar conclusion (2000). Their study featured German nurses working in different hospitals, and they looked at LOC and how they handled workplace stress. Once again, the more external one was in their LOC, the poorer they handled stress. A third article compared persons that have an internal LOC to a group of persons with an external LOC, and how they viewed stress (Bernardi, 1997). Bernardi could show that the internal LOC-group viewed stress as something positive, that helped them fulfil an achievement, whereas the persons that scored more towards an external LOC did not share these views. These three articles shows in a convincing manner that LOC is positively correlated with stress, that the higher one places on the continuum, the more affected by stress one will be.

Purpose

The purpose of this study is to take a closer look at how individuals with different personality characteristics react to the stressors present in the modern office environment, and how the design of these offices can moderate these reactions. The study will aim to answer the following questions: how do individuals that score differently on the personality factors of extraversion and LOC (isolated and in combination) differ in their reactions (stress-level) to the office-related stressors of distraction and violated privacy? Are the results tied to which office-design that these different personality types work within?

Hypotheses

Hypothesis 1. The population of the open plan-office will be affected by the stressors, privacy and distraction, to a higher extent, and report a greater degree of perceived stress than the population working in the ABW-office.

Hypothesis 2. Persons who score in the lower part of the extraversion continuum (introverted) will to a higher degree report being affected by the stressors than persons who score on the other end of the continuum (extraverted) and report a higher degree of stress.

Persons who score on the lower part of the WLOC continuum (internal WLOC) will to a lesser degree report being affected by the stressors than persons who score on the higher part of the continuum (external WLOC), they will also report a lower degree of stress.

These results will further be moderated by which office-environment the participant works in.

Hypothesis 3. A combination of the personality factors will predict to what extent the subjects report being affected by the stressors, and this will further predict how well they will thrive in the different office environments.

Persons with an internal locus of control and a high degree of extraversion (internal group 1) will by a lower degree report being affected by the stressors and report a lower amount of stress.

Persons with an internal locus of control and a lower degree of extraversion (internal group 2) will report being affected by the stressors to a greater extent than internal group 1 and report a higher amount of stress.

Persons with an external locus of control and a high degree of extraversion (external group 1) will report being affected by the stressors to a higher degree than internal groups 1 and 2 but to a lower degree than persons with an external locus of control and a low degree of extraversion (external group 2).

Method

Participants

The participants of the study were all employees of offices where qualified work were being conducted. Qualified work is defined as work that you either need a longer training to conduct; alternatively work that requires a longer period of experience to be able to carry out. The participants were

mixed in term of gender, no screening of that factor was conducted, the participants were not asked to reveal their gender either. To not ask about gender were decided based on the previous literature in the subject; since very few articles encountered by this study used gender as basis for their research.. The participants were employed in different line of work, but since they all fulfilled the requirement of conducting qualified work, they were consolidated into two groups. The total amount of participants in the ABW-office group were 90, and for the open plan-office group it was 82. The total of 172 participants were higher than the needed sample size (119) to reach an adequate statistical power.

Offices

Nine different offices were involved in the gathering of the data. The offices were categorized as Danielsson (2005) defined in her article. Six offices utilized an open-plan design; the other three offices had an ABW design. To collect the data an invitation was formulated, this invitation was the same for all the offices. It was sent out by an office manager of some sort, and it targeted all the employees conducting qualified work in the offices of interest. The invite consisted of at short description of the study, that it was voluntary to participate, and that it would only take a brief period of their time to answer. Included was a link to the Google Docs-document.

Ethical Considerations

Two main ethical considerations had to be addressed. First, how anonymity is ensured. To make sure that no participant can be identified by the author or by any third party, a couple of steps were taken. No information about gender, age, or other personal information are asked for when filling out the questionnaire, the only information logged of that nature is which office-type they work in, and since every office filled out a separate questionnaire which specified which office they work at. The information about which office they work at is to be considered sensitive, especially since some offices are smaller in size and/or only have a small amount of responses. Therefore this information is not released to any third party and are not published in the final study. All the information regarding the participants

(office-type, which office, and responses) are stored in files on Google Drive (cloud service), they are all password protected.

Another ethical consideration is if the participant will experience any discomfort answering the questions of the different scales. To ensure that this will not be a problem, each participant is informed that they have the option to quit at any time during the questionnaire, that there is no requirement to finish answering the questions if they have started doing so, and that no sanctions will be exerted from neither the author nor their employer for not finishing the whole questionnaire.

Questionnaire

The questionnaire consisted of seven pages. Page one was an introduction to the test, with further information about anonymity. The participants were informed that neither the author of this thesis, nor their employer would be able to identify them, this because no identifying information would be asked to be inputted. They were also informed, again, that the questionnaire was voluntary, that they could abort their participation at any time. Lastly information about feedback was given, no personal feedback will be able to be released to anybody, but if they were interested in the results, they could send the author an email and in return they would receive a copy of the finished thesis. The following five pages consisted of the different scales used to measure the relevant factors, and a finishing page thanking the participant for their participation.

Scales

In total five scales were used. A Swedish translation of Spectors Work Locus of Control (WLOC) scale (Muhonen, 1999) and the items relating to extraversion in the Swedish translation of the Big Five Inventory (Zakrisson, 2010) measured these personality factors. Distraction was measured using four items that Seddigh (2014) formulated and privacy was measured using items that Söderberg (1993) used and that later was used by Bodin and Danielsson (2009). The Swedish translation of Perceived Stress Scale will measure the stress that the subjects experience (Eskin & Parr, 1996).

Work Locus of Control. This domain-specific scale measures LOC in respect to the workplace. The scale used is translated in to Swedish by Muhonen (1999) and modelled upon Spector's (1988) WLOC scale. It consists of 16 statements, eight worded for internal LOC and an equal amount worded for external LOC, which the participant is asked to give a value between one and six on a Likert scale, depending to what degree they agree with the statement, a higher value indicates that this is in line with the participants own opinions. The higher to score on the complete test, the more towards an external LOC the participant is concluded to be, because of this the eight questions that are worded for internal LOC need to be reversed when the score is calculated. Examples of these questions are "If employees are unhappy with a decision made by their boss, they should do something about it" and "To make a lot of money you have to know the right people" (Spector, 1988). The calculated Cronbach's alpha for this study for WLOC was .86, a level that is seen as good.

Big Five Inventory. To measure the fundamental personality dimension of extraversion a Swedish translation of the Big Five Inventory was used (Zackrisson, 2010). The questions pertaining to this dimension were lifted from the entirety of questions. The scale is designed to measure the extent of a person's extraversion, a high score indicates a high degree of the dimension, a score on the lower half of the continuum indicates that a person is more introverted. Eight questions remained after the non-relevant questions were excluded. These were all statements that began with the same initial words (i.e. I see myself as someone who...), examples of these statement are "is talkative" and "tends to be quiet". These questions were to be answered with using a five point Likert scale. On all but three items a high value is interpreted as more extroverted, the remaining three have to be reversed during the analysis, these questions leans more toward the lower part of the continuum. This translation of the Big Five Inventory has a reported Cronbach's alpha of .84. The calculated Cronbach's alpha for this study is very close to Eskin and Parr's, the value .83 is within the good range.

Distraction. Distraction was measured using the four item scale that Seddigh (2014) formulated. The questions ask about the extent to which the participant has experienced distraction in the workplace during the last month. Each question is answered on a one to five Likert scale, where one is not at all and five is to a great extent. When the total score is added together, a higher value indicates a higher degree of distraction, and a lower value a lesser degree of distraction. The two sample questions are formulated like this, “How often are you for some reason disturbed so you are not able to fully sink into the task at hand?”, and “How often are you disrupted when you have to finish a task within a short time period?”. When calculating the Cronbach’s alpha value for this scale a resulting value of .9 were found, this is seen as excellent.

Privacy. Privacy was measured using the questions that Söderberg (1993) composed. The scale consists of five items that the participant was asked to rate on a Likert scale from one to four. One question touched on the subject of the physical environment of the office, it asked “How do you judge that the room you are seated in gives you the possibility of privacy?”. The other four questions were formulated to evaluate if the participant was bothered by different privacy intruding factors. An example is “Are you bothered, in any way, by being watched?”. When calculating the final score, the question about the physical environment is reversed, a high total score indicates that the person to a higher extent feel that their privacy is violated. The calculated Cronbach’s alpha value for the privacy scale for the current study was .87, a value that is seen as good.

Perceived Stress Scale. The perceived stress scale measures mental stress on a global level, i.e. it is not work specific. In this study, the Swedish version of the English original of the Perceived Stress Scale was used (Eskin & Parr, 1996; Cohen, Kamarck & Mermelstein, 1994). It is used as measure to compare the scales relating to distraction and privacy too. These are two stressors that a person might score high on, but to make sure that it is affecting their overall stress level this test is also conducted. The test consists of 14 items formulated as questions that requests that the

participant rates the question on a Likert scale from zero to four depending on how often they experience what is asked about. Two sample questions are “In the last month, how often have you been upset because of something that happened unexpectedly” and “In the last month, how often have you felt nervous and stressed” (Cohen, Kamarck & Mermelstein, 1994). A Cronbach’s alpha of .82 was reported by Eskin and Parr (1996), for the current study the calculated Cronbach’s alpha was .71, which is seen as acceptable. When calculating the results of this scale, seven of the questions are reversed. A high score indicates a higher total stress level, at the same time a lower score indicates the opposite.

Analysis

The first round of analysis looks at the differences between the office on a global level, it will not take in to consideration which group (based on personality factors), the participant belongs to. In this initial analysis three one-way between groups analysis of variance (ANOVA) tests will be carried out to compare the mean scores between the offices. In a second round of analysis each personality factor (i.e. each group) will be analysed and compared to the same factor, both within each office (e.g. introverted vs. extroverted in the ABW-office) and between offices (e.g. introverted in the ABW-office vs. introverted in the open plan-office). This will be done by conducting a one-way between-groups analysis of covariance (ANCOVA). In a third round of analysis, the four groups depend on a combination of two factors. These factors are how the participant scored on either of the two mentioned scales. Group one consists of persons with an internal LOC and a high degree of extraversion (i.e. extroverted), group two consists of persons with an internal LOC and a low degree of extraversion (i.e. introverted). Group three is made up of participants who have an external LOC, and a high degree of extraversion, the last group features participants who have an external LOC, and a low degree of extraversion. In this round of analysis, the procedure consists of a series of t-tests (one for each combination of personality factors), groups will be compared both within each office, but also between offices. These analyses will consist of a series of t-tests.

The variables relating to personality are viewed as continuous, that a participant is more or less of the personality factor, this is since both personality factors are designed to be a continuum. The variables relating to the scales measuring stress and the two stressors can be divided into dichotomous variables, but for the ease of analysis they are also viewed as continuous. This means, as an example, that you are more or less stressed, instead of stressed or not stressed, this also results in a more varied result which any results that are around a possible cut-off level do not have to be excluded.

Results

Preliminary Analysis

A total of 172 participants performed the different scales needed to be a part of this study. 90 of these belonged to an ABW-office and 82 worked in an open plan-office. By looking at the descriptive statistics in SPSS and then exploring the data further, one outlier were detected and removed. This outlier belonged to the ABW-group, after its removal the group consists of 89 participants, further information is available in table 1.

Table 1.

Descriptive Statistics									
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
PSSmean	171	,71	3,00	1,8191	,47338	,136	,186	-,514	,369
WLOCmean	171	1,00	4,38	2,6316	,69100	,296	,186	-,207	,369
PRIVmean	171	1,00	4,00	2,5006	,86456	,052	,186	-1,019	,369
DISTmean	171	1,00	5,00	3,0409	1,14683	,078	,186	-1,154	,369
EXTRmean	171	1,50	5,00	3,3385	,70707	-,052	,186	-,536	,369
Vaild N (listwise)	171								

Differences between Offices on a Global Level

A first one-way between groups ANOVA was performed looking at the reported mean scores of stress (PSS) between the two different office environments. Here the first hypothesis was investigated (hypothesis 1; the population of the open plan-office will be affected by the stressors, privacy and distraction, to a higher extent, and report a greater degree of perceived stress than the population working in the ABW-office). No significant difference was detected. The same test were performed to investigate differences in scores between the office environments on the stressor of distraction and then again on the stressor of privacy. A significant difference could not be found with either of these variables.

Personality Variables Isolated

Six one-way between-groups ANCOVA were conducted to compare the influence of the two personality factors on the results of stress (PSS), distraction and privacy (hypothesis 2). The mean-scores on PSS, distraction, and privacy were used as a dependent variable for each one test where the mean-scores on extraversion and WLOC were used as covariates in one test per dependent variable, in all tests office-type were used as a fixed factor.

Perceived Stress Scale. In the first analysis the effect of WLOC and office-type on the scores on the PSS were investigated. Which office-environment the participant worked in did not have a significant factor on the result, $F(1, 168) = .01, p = .97$, partial eta squared = .00, contrasting, WLOC did turn out to have a small relationship with PSS with an partial eta squared value of .10. When looking at extraversion as a covariate, the office-environment did not have a significant effect $F(1, 168) = .27, p = .6$, partial eta squared = .00. Extraversion did not have a significant effect on PSS.

Distraction. As in the previous analysis, which one of the two offices a participant was affiliated with did not make a significant effect on the result on the distraction scale, $F(1, 168) = .269, p = .60$, partial eta squared = .00. As in the previous WLOC had a small relationship with the dependent variable with a partial eta squared at .05. When extraversion was used as a covariate, office of belonging did, once again, not have a

significant effect $F(1, 168) = .68, p = .4$, partial eta squared = .00.

Extraversion did not have a significant effect.

Privacy. When using privacy as a covariate the same pattern as was observed in earlier analyses was present again. Which office-type a participant belonged to did not have a significant effect on the dependent variables outcome, $F(1, 168) = .16, p = .69$, partial eta squared = .00.

WLOC turned out to have a small relationship with an eta partial square at 0.12. In a second test for this dependent variable extraversion was used as a covariate, as for the other analyses, office did not have a significant effect $F(1, 168) = .82, p = .37$, partial eta squared = .00. The covariate did not have a significant effect.

Further Analyses. To further investigate how WLOC affects the dependent variables, WLOC was divided into two groups depending on where on the scale the participant placed. In earlier literature there is support for splitting the scale in to two depending on which side of a cut-off value they score, the cut of value is defined as the median value of the scale (Rotter 1966, Bosman, Buttendach & Rothman, 2005). Participants who have a calculated mean score that are above this median value are categorized as having an external WLOC, below the median value are the participants who has an internal WLOC.

A series of three one-way ANOVAs were conducted to investigate WLOCs effect on the dependent variables. The WLOC variable was divided into two groups, as described above, 128 participants were included in the group consisting of participants with an internal WLOC, and 43 participants in the external WLOC-group. Regarding the PSS, there was a significant difference between the groups and how they scored on the scale, $F = (1, 169), p = .00$. As seen in figure 1, the participants who placed in the external WLOC obtained a higher average score than the participants in the internal group.

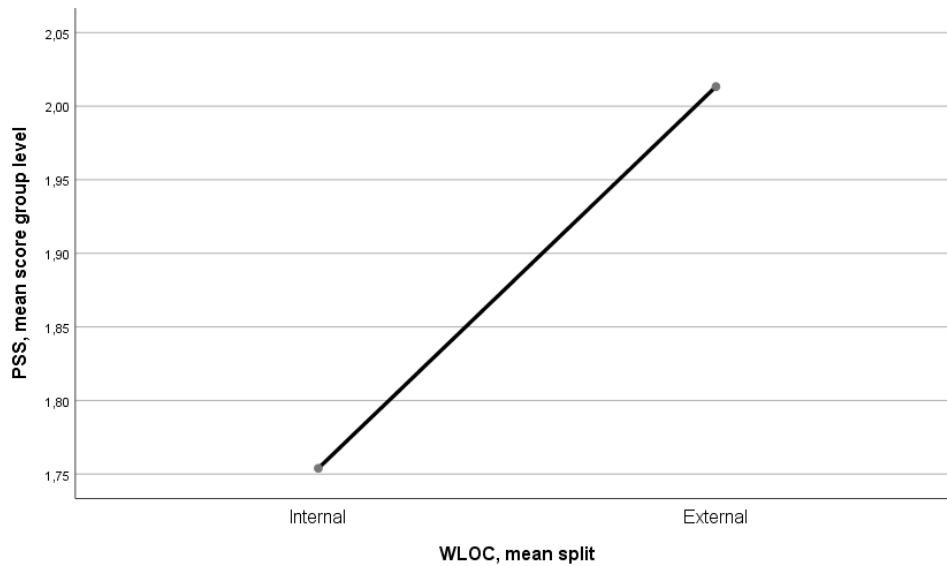


Figure 1. Mean scores of global stress (PSS) compared between internal and external WLOC groups.

This trend replicated itself when the ANOVA with distraction as a dependent variable was conducted. Once again there was a significant difference between the two groups, $F(1, 169) = 4.9, p = .03$, and once again the external group had a higher mean score than the internal group, as seen in figure 2.

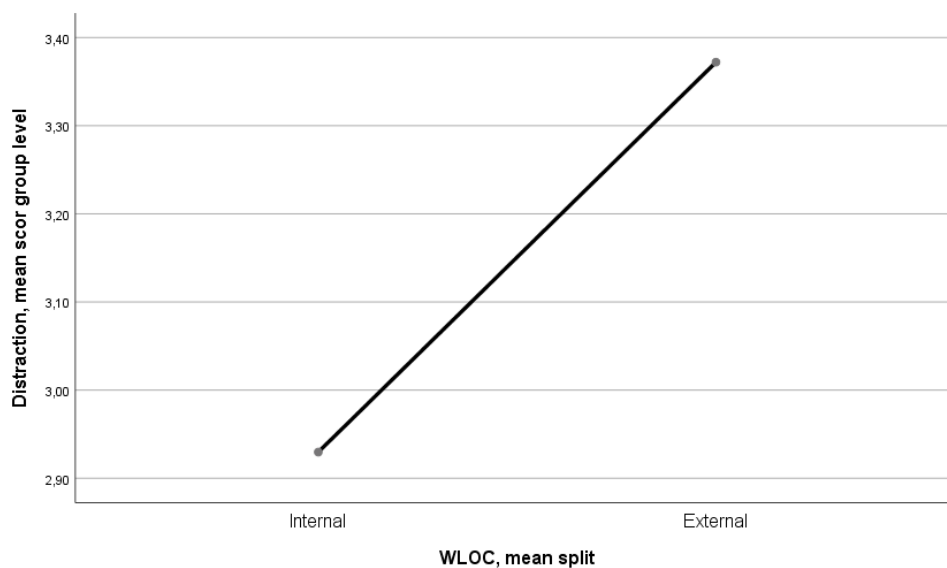


Figure 2. Mean scores on the stressor of distraction compared between internal and external WLOC groups.

A third ANOVA was performed, this time with privacy as the dependent variable. As in the previous two analyses, there was a significant difference in how the two groups scored, $F(1, 169) = 12.01, p = .00$, and with the external group scoring higher (figure 3).

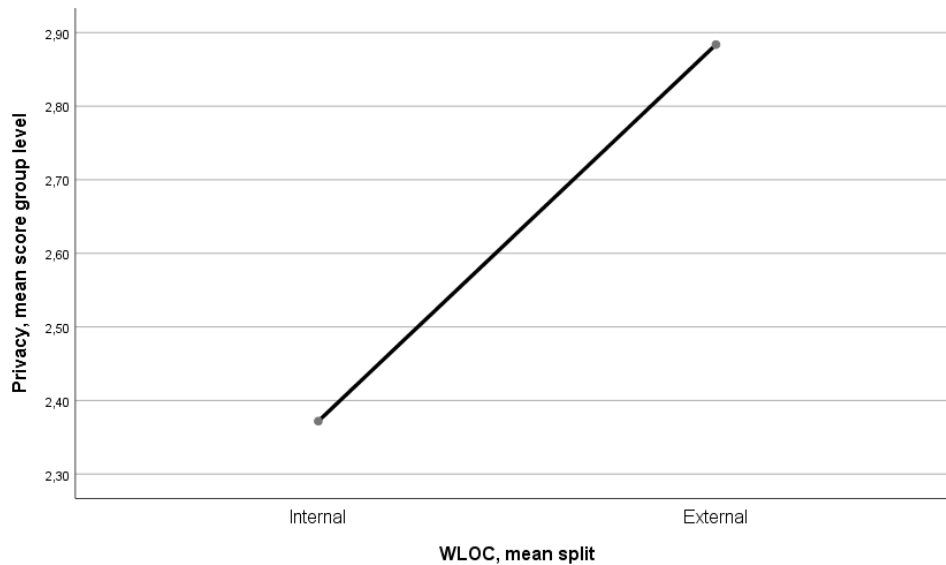


Figure 3. Mean scores on the stressor of privacy compared between internal and external WLOC groups.

Personality variables combined

Since only one personality factor, WLOC, had a significant effect on the different scales measuring stress and stressors, no analysis on the personality factors in combination were needed.

Discussion

The results of the analyses speak clearly, office affiliation did not have an effect on how the participants handle stress, neither does it matter how extroverted or introverted they are. The only factor that seems to affect how the participants react to the stress of their office environment is WLOC.

There is a clear difference between the ones with an internal versus the ones with an external WLOC which is demonstrated in figure 1 to 3. Studying the results let us know that the participants with an internal WLOC report less

global stress and report being affected by the stressors lesser degree than their counterparts in the external group. Looking closer, we can see that both the internal and the external group scoring within the mid-section of each scale, but at different levels within this section. In other words, neither the internal nor the external group reports any values towards the extreme, for example that the participants in the internal group are not affected at by workplace stress or that the participants in the external group are crippled by stress. Instead both groups report being affected by stress and stressors, but on a moderate level.

Hypotheses

The results from the analyses are what if the hypotheses are supported or not are based on. Hypothesis 1 postulated that there was a difference in results depending on which office environment a participant worked in. The difference would be that a participant who worked in an ABW-office would report less impact of the global stress and both stressors than a participant who worked in an open plan-office. The current study's result could not support this hypothesis. Hypothesis 2 was about differences between personality factors and how they affected the outcome on the different scales. It also discussed how this was affected by which office-environment the participant worked in. In the second series of analysis, the first thing that is clear is that workplace does not seem to act as a moderator in these cases, it is also clear that extraversion does not affect the outcome on the used scales. In contrast, WLOC does have a significant effect on the outcomes, as discussed above. That one out of three factors has an effect does not warrant a statistical sound reason for keeping the hypothesis. Hypothesis 3 was all about the combination of the two personality factors and how they would affect the outcomes on the scales. As stated in the results-section, since only WLOC rendered a significant difference between groups, there was no reason to run any analysis relating to hypothesis 3, this means that the hypothesis were not supported.

Work Locus of Control

What does it mean that WLOC was the only personality factor that showed a relationship with stress and how a person deals with the two stressors? This finding goes hand in hand with previous research, not only is there a difference but also the way the difference looks (Abouserie, 1994, Bernardi, 1997, Schmitz, Neumann & Oppermann, 2000). These articles all show that people who are more towards an internal LOC handles stress better than those who is on the other end of the continuum. Earlier research also demonstrates that there tends to be skewness towards internality in a population, present also in these results, with 128 participants scoring in the lower bound of the continuum, and 43 in the upper bound (Muhonen & Torkelsson, 2004).

Differences between Offices

It was expected to be differences between offices. According to the literature the participants working in an ABW-setting should have a feeling of being less crowded than the participants in the open offices (Danielsson & Bodin 2009; Danielsson et al. 2015; Kim & de Dear, 2013; Stokols, 1972a; Stokols, 1972b,). This would affect their sense of privacy and to what extent they felt that this privacy was violated. In this study it were expected to be apparent when looking at the results on privacy on a group-level, that is how the different office-environments scored on the privacy-scale, with the ABW-offices having a lower general score than the open office-environments. This difference could not be observed at all, and as we will come back to later in this text when discussing how to control for office-size, and show that it is probably due to differences in office layout. With the smaller open plan-offices having a less crowded environment than a larger office of the same type. The same probably holds true when it comes to finding differences in the responses to the distraction-scale on a group-level. That because of these differences in office-design, even within the different types of environments, it was not possible to find the differences between the groups. The same was true with the global stress level measured by the PSS. Even though earlier literature showed that there should be a difference in stress-level between the offices, this could not be found in this study. Could it be that there was no difference? Or has the

persons who were really stressed quit to look for a less stressful environment to work in? Or is it simply that they were too stressed and thus less prone to take time out of their day to answer the questionnaire?

Extraversion

The most surprising finding is still that the factor of extraversion did not give a significant result when it came to the stressor of distraction. Where a participant places on the extraversion continuum is correlated to a susceptibility to distracting background noise, as mentioned before (Belojevic, Slepcevic & Jakovljevic, 2001; Cassidy & Macdonald, 2007; Dobbs, Furnham & McClelland, 2011). Since the literature in this phenomenon's favour is quite heavy, it is easiest to assume that the measure relating to distraction was not the right fit for this personality factor in this study. That the short questionnaire developed by Seddigh (2014) does not measure distraction in a way that is compatible with this personality factor. Instead another measure should be used if the research were to be replicated.

Methodological Considerations

So, what could have been done differently? If this study were to be conducted anew, the first thing to look at is the selection of the participants. The office-sizes differed on both measured environments with some offices being smaller than others. A measure would be to control for office-size, to make sure that only one office is selected in each category and that these offices would be of roughly the same size. Another way to control office-size is to be open to measuring more offices but keeping the number of offices and size of the offices constant between the categories, e.g. if X offices of x, y, and z sizes were picked for the open plan-category, the same variables must be true for the ABW-category. Another action that would be necessary would be to scrutinize the selection of personality factors. Maybe it would be more fruitful to measure the entire Big 5-scale instead of lifting one of the dimensions (extraversion in this case) from the entirety of the scales. If the entire Big 5-scale were to be used one would have the chance of getting a more nuanced result, to have more to build upon in future analyses. To further improve the research, it might be a good idea to

concentrate on personality factors in isolation before looking at the combinations of them. If this method were practiced, a sounder base to work from would be possible. In future research it would also be interesting to do a broader measuring, to include variables as sex and age. Another variable that would be interesting to investigate further is if the temporal aspect has a relationship with the dependent variables. Temporal aspect refers here to how long time a participant has worked in the setting that they currently are working in, and related to this, what kind of environments the participant has been working in before. Do previous experiences from different workplaces influence how one adapts to the current workplace?

Future Research and Conclusion

What conclusions can be drawn from the results from the study? First, none of the hypotheses were supported, office environment did not moderate stress level, neither did most of the personality factors (WLOC was the odd one out). Still these results are not without value. Given the sparse literature on the subject, this study can easily serve as a base to conduct further research from. Secondly, if we look at the reasoning under the headline above this one, we can see that there are plentiful of directions to take in future research.

It can be concluded that given the methodology of this study, there is no interaction effect between the personality factors investigated. It can also be concluded that there are no differences in the way they were hypothesised to be between the open plan-offices and the offices with an ABW-design. But the most important conclusion is that the field is in need of much more research before any true deductions can be made.

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