Physical and social isolation in various places of work

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Abstract

Purpose – The purpose of this study is to analyse perceived physical and social isolation and how they are linked in various places of work.

Design/methodology/approach – A nationwide study was conducted involving 3,352 Estonian office workers in spring 2021. Physical isolation was measured in terms of what proportion of time a person works away from co-workers (0%, 1%–25%, 26%–50%, 51%–75%, more than 75%). Social isolation diverged into two factors: lack of contacts and lack of meaningful connections. The different places of work the authors considered in the study included working from home with and without a dedicated room and different types of offices (private office, shared-cell office, activity-based office and open-plan offices of various sizes).

Findings – The results show that the negative consequences of physical isolation in the form of perceiving social isolation start to show when a person works 51% of the time or more away from others. However, the authors revealed the dual nature of social isolation in that when a person experiences a lack of contacts, the connections they do have with their colleagues are actually more meaningful.

Originality/value – The originality of the study comes from the fact that the authors uncovered the paradoxical nature of social isolation. This reveals itself in various places of work depending on the conditions at home and the type of office. Therefore, the authors move away from the simplified distinction of home vs office and take into account the level of physical isolation (what amount of time a person actually works away from colleagues).

Keywords Isolation, Communication, Office type, Employee, Workplace, Remote work

Paper type Research paper

1. Introduction

Being isolated from peers does not come naturally to individuals. To draw on social identification theory (Ashforth and Mael, 1989), need-to-belong theory (Baumeister and Leary, 1995) and relational cohesion theory (Thye *et al.*, 2014), individuals need meaningful relationships, a sense of belonging and common ground. However, in the context of COVID-19, isolation-related problematics have intensified and complicated matters in organisational settings.

The consequences of physical isolation are usually researched using the example of remote work (Gajendran *et al.*, 2021 meta-study). However, we do not know from what point being away becomes an issue because even when working from home, it is possible to see

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Data availability statement: Raw data were generated at The Salary Information Agency www.palgainfo.ee/en/. Derived data supporting the findings of this study are available from the corresponding author [AA] upon reasonable request.

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colleagues regularly and sufficiently. This is why in our research, we consider actual physical isolation, namely, what proportion of time a person works away from their co-workers (0%, 1%–25%, 26%–50%, 51%–75%, more than 75%). What is more, physical isolation may not only be a challenge for remote workers (Bartel *et al.*, 2012). Non-remote workers may also spend a lot of time away from colleagues (e.g. when meeting with clients, when their office is located far away from others, etc.). There is some research on this topic, but it is based on very specific samples or based on a single organisation (Bentein *et al.*, 2017; Mulki and Jaramillo, 2011). Our nationwide data ($n = 3{,}352$) from a broad assortment of sectors and occupations enables us to obtain a more elaborate picture of the situation.

One of the by-products of physical isolation may be perceiving social isolation or sometimes what is referred to as workplace loneliness or social loneliness. Again, we have quite a good understanding of social isolation issues for remote workers (Orhan *et al.*, 2016) and some information about non-remote workers (Aizenberg and Oplatka, 2019), but there is limited relevant research about different office types. We assume that it is probable that experiences regarding both physical and social isolation may vary depending on what kind of office a person works in – a private office mostly means working alone, and an open-plan office means having people around all the time. Regarding working from home, we have information that may shed new light on the matter of isolation, namely, in regard to what conditions individuals work: do they have a separate room for working, and are there other family members present during work time?

The aim of this article is to analyse perceived physical and social isolation and how they are linked in various places of work. Consequently, we consider open-plan offices, activity-based offices, shared or private offices and home offices. As mentioned above, we also differentiate what proportion of time a person works away from others to specify physical isolation. It is stated that physical and social isolation and their interaction have been rarely researched together (Wang *et al.*, 2020), and therefore, our intention is to widen the horizon on that matter.

The article is organised as follows. Firstly, physical and social isolation are defined in subchapter 2.1. Secondly, previous study results are presented in subchapter 2.2. Thirdly, the data, measurement tools and data analysis methods are introduced respectively in chapters 3. Fourthly, the results of the study are put forward in chapter 4, and finally, the results are discussed, and implications and limitations are provided in chapter 5.

2. Literature review

2.1 Defining physical and social isolation

In this subchapter, we define what we mean by physical and social isolation. In the case of physical isolation, it is rather straightforward – it can be defined as "employees' experience of working in settings in which they are not allocated with fellow organisation members" (Bartel *et al.*, 2012, p. 744). Clearly, full-time remote workers work most of the time away from others. But as already mentioned in the introduction, non-remote workers may also experience physical isolation. Thereby, physical isolation may be forced upon an individual by their work or organisation, but it may also be voluntary.

In defining social isolation, we looked at previous definitions used specifically in the work context. Most authors seem to rely on two definitions:

(1) "Workplace isolation results from her/his perceptions of lack of availability of support and recognition, missed opportunities for informal interactions with co-workers, and not being part of the group" (Marshall *et al.*, 2007, p. 196).

(2) "Isolation is the state of being cut off from immediate interaction or extended relations" (Diekema, 1992, p. 481).

It is important to note that the definition of social isolation may sometimes coincide with the definitions of workplace isolation, professional isolation and psychological isolation in some sources. Despite the different names, the principle of the matter stays the same (sometimes, the definitions are even quoted directly under a different name). For this reason, we ignore the different names and use the term "social isolation".

Still, very often, different authors make adjustments to the original definitions, for example, in regard to who a person feels isolated from. In their original definition, Marshall *et al.* (2007) refer to co-workers, but Mulki and Jaramillo (2011) have chosen to emphasise supervisor and team and Orhan *et al.* (2016) social networks. The definition by Diekema (1992) was not originally work-related, but other authors (Bentley *et al.*, 2016; Golden *et al.*, 2008; de Vries *et al.*, 2019; Wang *et al.*, 2020) have adjusted it and added that isolation is meant in regard to "others in the workplace", although who these others are has not been specified. We agree with this last more general definition with one exception that depending on the person – contact with one meaningful organisational member could be enough to avoid social isolation.

Definitions based on Diekema (1992) are also mostly brief about what isolation actually means, often only stating that "one is out of touch with others" (Bentley *et al.*, 2016; Golden *et al.*, 2008; de Vries *et al.*, 2019). The only exception is Wang *et al.* (2020), who elaborate on Diekema's (1992) definition and say that psychological isolation is "a feeling that one is disconnected from others, lacking desired social and influential network connections, and that the need for support, understanding, and other social and emotional aspects of interaction are not fulfilled" (p. 610). According to the definitions of social isolation, "recognition" and "being a part of the group" (Bentein *et al.*, 2017) are also mentioned.

By comparing the different definitions of social isolation, it appears that whether social isolation means only missing out on formal or also informal interactions is mostly not clarified (Mulki and Jaramillo, 2011; Bentley *et al.*, 2016; Golden *et al.*, 2008; de Vries *et al.*, 2019; Wang *et al.*, 2020). Although, a few cases specify that informal interactions (Marshall *et al.*, 2007; Bentein *et al.*, 2017) or friendships (Orhan *et al.*, 2016) are also important when looking at social isolation in the work context. We believe both formal and informal connections are relevant to avoid social isolation.

There are also similarities between different definitions of social isolation. Namely, all the analysed definitions agree that social isolation is subjective by nature. This can be seen by the use of "perception" in the definitions that rely on the original definition by Marshall *et al.* (2007) and with words like "state of mind or belief" in definitions that are based on Diekema (1992) (with the only exception being Wang *et al.* (2020) who use the word "feeling"). We agree that in the same circumstances, one person may sense social isolation and the other not; hence, it is subjective.

It is important to note that sometimes the terms "workplace loneliness" or "social loneliness" are used to reflect that a person subjectively feels distressed because of unsatisfying relationships at work (Wright and Silard, 2021; Bayar, 2020; Ozcelik and Barsade, 2018). And in that case, some authors use the term "social isolation" as objective isolation (Bareket-Bojmel *et al.*, 2023). We have decided to use social isolation in the meaning of subjective isolation and physical isolation for objective isolation.

In addition, here we need to clarify a partial overlap of the terms "privacy" and physical isolation and also social isolation. According to Altman's privacy regulation theory, privacy is the selective control of access to the self (Altman, 1977). Hence, isolation can also be seen as the voluntary regulation of privacy, meaning that it can be sought by employees in the form of voluntarily physically isolating themselves. But it may also be the result of a

regulation of privacy imposed by others (Altman, 1976), which can then lead to social isolation.

2.2 Previous study results on social and physical isolation at work

In previous studies, isolation has mostly been analysed using a sample of full or partial remote workers but also non-remote workers. The focus has been predominantly on which groups are more affected by isolation, the consequences of isolation and what aspects could contribute to reducing isolation.

The individuals who are more prone to experiencing social isolation are those who work entirely from home or partly from home (de Vries *et al.*, 2019; Orhan *et al.*, 2016). But in some cases, non-remote workers also experience social isolation. Mostly, this is connected to contextual factors like physical distance from others (Aizenberg and Oplatka, 2019) or their particular role or tasks that limit communication with others. For example, cleaning workers (Bentein *et al.*, 2017), salespeople (Mulki and Jaramillo, 2011) and music teachers (Sindberg and Lipscomb, 2005). This indicates that perceived physical isolation plays a part in perceiving social isolation.

Still, there is evidence that physical isolation and social isolation are not necessarily connected (Wang *et al.*, 2020). Human factors like being ignored and having no reciprocal relationships (Aizenberg and Oplatka, 2019), even as a non-remote worker, can all play a role. In addition, the presence of more people and more communication does not automatically mean the situation is better. Namely, Mulki and Jaramillo (2011) have found that more meetings with supervisors and co-workers do not lead to less isolation. In the same vein, Orhan *et al.* (2016) stress that face-to-face interactions with just anyone are not as important as with those who are relevant for doing your job.

What is more, both organisations and employees have coping mechanisms for dealing with isolation. Charalampous *et al.* (2022) and Lal and Dwivedi (2009) explain that individuals are not "passive bystanders", and they can "take proactive steps" to reduce social isolation or as one of the participants of Sindberg and Lipscomb (2005) study puts it: "I think that, as with any job, you are only as isolated as you let yourself be" (p. 55). Previous research shows that lower social isolation is perceived by those who have more support from colleagues and the organisation (Bentley *et al.*, 2016), who have a more considerate leader (Mulki and Jaramillo, 2011) and higher leader-member exchange (de Vries *et al.*, 2019) and where some ways have been found to communicate meaningfully even when working remotely. What is more, Chaudhary *et al.* (2022) show that there is a need to specifically improve e-leadership, which entails, for example, e-team building, e-social skills and e-communication skills, among others.

Although when one is not coping or there is a lack of good practices in place in the organisation, isolation may be a very negative experience. As one of the participants of the study by Whittle and Mueller (2009) reflects: "I could be dead for two weeks and my boss would never know" (p. 138). According to previous studies, social isolation may lead to lower performance (Golden *et al.*, 2008; Orhan *et al.*, 2016), lower job satisfaction (Bentley *et al.*, 2016; Orhan *et al.*, 2016), lower affective commitment (Wang *et al.*, 2020), higher emotional exhaustion (Bentein *et al.*, 2017) and more psychological strain (Bentley *et al.*, 2016). Although we cannot forget that most of the research has been conducted using samples of remote workers, non-remote workers may also experience all of these unfavourable outcomes due to social isolation.

In summary, we can see that several combinations of physical and social isolation are possible, and Figure 1 schematises these options. Sector I indicates where physical isolation is high and social isolation is also high. This means that employees who are working remotely or for some other reason do not have enough contact with others feel higher social isolation.

Sector II describes the case where individuals are working closely together; hence, physical isolation is low, but social isolation is high because people just do not always get along, and one can be in a room full of people but still feel lonely (Ozcelik and Barsade, 2018). As Aizenberg and Oplatka (2019) suggest: "Isolation is not necessarily connected to the number of people surrounding a person" (p. 996). Sector III illustrates how, in some cases, both physical isolation and social isolation may be low. Consequently, employees are together a lot, and relationships are good. Finally, Sector IV depicts the option where, although physical isolation is high, social isolation is low. Ergo, good practices have been found for coping with social isolation, or individuals are simply not keen on socialising with others much.

There are very few previous studies that have asked the respondents about the actual physical isolation (Bartel *et al.*, 2012; Wang *et al.*, 2020). Meaning that while a person is not working remotely, they may have some other reason for being physically isolated from others. What is more, some people who do remote work may still have regular contact with others. In addition, previous studies about physical isolation have only been conducted on the basis of one organisation (Bartel *et al.*, 2012) or one sector (except Wang *et al.*, 2020). Studies about social isolation are also often conducted based on one organisation (Golden *et al.*, 2008; Lal and Dwivedi, 2009) or a specific sample: preschool teacher-directors (Aizenberg and Oplatka, 2019) or cleaning workers (Bentein *et al.*, 2017). Hence, we do not have an elaborate overview of the level of physical isolation and how it is connected to social isolation for a wide selection of sectors and occupations. Therefore, the first research question is:

RQ1. How are physical isolation and social isolation linked?

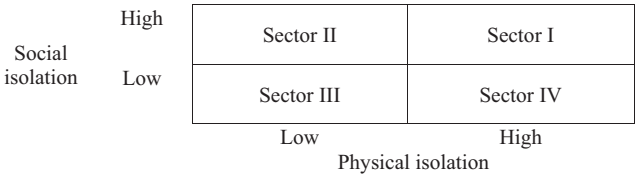
In addition, we are not just comparing remote workers and non-remote workers; and we take into account different places of work. Physical and social isolation may vary depending on how many colleagues one works alongside and how the office is arranged. We consider working at home with different conditions (is there a specific room for working and how many others are at home during work time) and working in the office considering six office types: private offices where a person works alone, shared cell offices where 2–3 individuals work together, activity-based offices where there are both closed and open areas, small open-plan offices (4–9 people), medium open-plan offices (10–24 people) and large open-plan offices (25 or more people). There is no prior research on different places of work and isolation, and thus, our second research question is:

RQ2. What are the levels of perceived physical isolation and social isolation in different places of work?

3. Data and method

3.1 Sample

We use Estonian Salary Information Agency data from April to May 2021. The data set is composed by conducting a survey, which includes questions about salary, but also job



Source: Compiled by the authors

Figure 1. Combinations of physical and social isolation

satisfaction, work engagement, organizational commitment and occupational health. The data set covers a wide selection of different sectors and occupations in all regions of Estonia. As we are interested in workplace isolation, we limit our analysis to those respondents working at the time they responded to the survey, those working in Estonia and those whose work at least partly includes work with computers. After applying these limitations, our sample includes 3,352 respondents. It is important to note that in late Spring, office workers in Estonia could attend work fairly normally (no considerable covid restrictions).

As we have focused on people who use computers in their work, it is inevitable that we focus on employees who are more likely in managerial, professional, clerical support or sales positions. Also, our sample includes more females (67.2) than males, and about one-third of respondents are from the capital city of Estonia (39.3%). It also seems that younger and more educated individuals with managerial positions from larger organisations are slightly over-represented in our sample, but as explained, this is triggered by our focus on jobs where computer work is needed. Most respondents work full time, about 40% of the respondents work 75% apart from others, and those who work from home mostly do not have a dedicated room for working, and most of them have two or more family members at home during work time.

3.2 Measures

Regarding the questions about isolation, the authors had a chance to suggest suitable measures to the Salary Information Agency to be included in their survey. However, the number of questions that could be suggested was very limited (no more than ten) as their survey is very lengthy and covers various topics. Below, we describe which sources we used as inspiration and how we worded the specific questions.

3.2.1 Physical isolation. There are multiple ways to determine how much time a person spends away from other organisational members. Broadly, we can notice two streams of approaches in the literature: ones that take more of a discrete approach and others who use a continuous method of measuring. Examples of the discrete approach are as follows:

- Did a person work from home (yes, partly, no)? (de Vries *et al.*, 2019).
- Low remote work intensity (less than 8 h a week) and high remote work intensity (more than 8 h a week) (Bentley *et al.*, 2016).
- How many days does a person work from home (none, less than a day, one day, two days, three days, four days, all days)? (Van Zoonen *et al.*, 2021).
- How many days is a person separated from co-workers? (Wang *et al.*, 2020).
- How many face-to-face meetings does one have with co-workers and the supervisor? (Mulki and Jaramillo (2011).

Orhan *et al.* (2016), Golden *et al.* (2008) and Bartel *et al.* (2012) have opted for a continuous approach. More precisely, Orhan *et al.* (2016) calculated a virtuality score with a maximum level of 100 (where 100 means that there is no face time with team members), and Golden *et al.* (2008) asked how much a person, on average, is working remotely and Bartel *et al.* (2012) used a scale from 0% to 100% to describe working away from other organisational members.

When measuring physical isolation, we tried to find a middle ground between these approaches. On the one hand, so that not much information gets lost and on the other hand, so that it would still be reasonably easy to answer because sometimes it is very hard to specify an exact number. Consequently, physical isolation was measured using the statement offered by Bartel *et al.* (2012) –

> On average, what percentage of your total work time do you work in a physically isolated setting away from the organisation, your supervisor and co-workers, and other members of the organisation? (p. 748).

To ensure that the respondents understood what was meant, we added the following explanation: "for example at home, in a different building, with the client, doing field work separately from others etc.". The options to choose from were as follows: all the time together; 1%–25% apart; 26%–50% apart; 51%–75% apart; more than 75% apart.

3.2.2 Social isolation. Similarly, we turned to previous literature to measure social isolation, where there are slightly different approaches. To get a better overview, we compiled Table 1, where we present different aspects that are covered in different questionnaires about social isolation. We analysed the following measurement tools that have been used in the work context:

- Bucquet *et al.* (1990) Social isolation scale (five statements).
- Connaughton and Daly (2004) Sense of being isolated (three statements).
- Hawthorne (2006) Friendship scale for measuring perceived social isolation (six statements). Although this was originally developed for measuring the isolation of older adults, it has also been used in work settings (Bentein *et al.*, 2017).
- Wright *et al.* (2006) Loneliness scale with two subscales: emotional deprivation (nine statements) and social companionship (seven statements).
- Marshall *et al.* (2007) Colleagues subscale of workplace isolation (five statements).
- Golden *et al.* (2008) Professional isolation scale (seven statements). Although the name indicates professional isolation, the scale or parts of it have also been used to measure social isolation (Bentley *et al.*, 2016) and psychological isolation (Wang *et al.*, 2020).
- Orhan *et al.* (2016) Physical isolation scale (six statements). Although it is called "Physical Isolation", it contains similar aspects that other authors use for measuring social isolation, and the authors use this subscale for measuring social isolation.

Although these measurement tools are quite different in their wording and adopt various angles, the aspects can be divided into eight main groups. None of the measurement tools covers all eight aspects. For this reason, we decided to compile a new measurement tool. We explain our choices as follows.

Aspects covered in questionnaires about social isolation	Bucquet *et al.* (1990)	Connaughton and Daly (2004)	Hawthorne (2006)	Wright *et al.* (2006)	Marshall *et al.* (2007)	Golden *et al.* (2008)	Orhan *et al.* (2016)
1. General feelings	X	X	X	X		X	X
2. Difficulty in reaching others	X		X		X	X	X
3. Isolation that has emerged over time				X			X
4. Feeling excluded even with others around		X	X	X			
5. Communication in general	X		X	X			
6. Lightweight communication				X		X	X
7. One side of communication			X	X	X		
8. Relationship on a deeper level	X		X	X	X	X	

Source: Compiled by the authors

Table 1. Aspects covered in questionnaires about social isolation

Firstly, most of the questionnaires ask something about general feelings related to isolation. For example, whether one feels isolated (Hawthorne, 2006; Golden *et al.*, 2008; Orhan *et al.*, 2016), disconnected (Connaughton and Daly, 2004; Wright *et al.*, 2006), lonely (Bucquet *et al.*, 1990), alone (Hawthorne, 2006), left out (Orhan *et al.*, 2016), abandoned (Wright *et al.*, 2006), emotionally distant (Wright *et al.*, 2006) or like a burden (Bucquet *et al.*, 1990). As we can see, there are emotions ranging from fairly neutral (e.g. feels isolated, disconnected) to very negative (e.g. left out, abandoned). It can be noted that in the case of some of the emotions listed, we do not know whether the cause is isolation. We decided to opt for the following statement in our questionnaire: "I feel lonely at work". We wanted to avoid strong emotions but still indicate the discomfort that comes specifically from social isolation.

Secondly, very often, the questionnaires highlight the difficulty of reaching others. Here, we see three angles of the problem pointed out:

- A neutral aspect that there just are not others around (Marshall *et al.*, 2007; Orhan *et al.*, 2016) and people miss face-to-face contact (Golden *et al.*, 2008).
- A negative situation indicating that a person is being separated from others (Orhan *et al.*, 2016).
- A situation where, for some reason, it has been hard to get in touch with others (Hawthorne, 2006) or it is hard to make contact (Bucquet *et al.*, 1990).

Here, we decided on the following statement: "It is difficult for me to get in touch with colleagues when I needed to". We wanted to avoid an overly negative angle but still indicate that the person wants to approach others but cannot.

Thirdly, some questionnaires ask whether the isolation has emerged over time. More precisely, whether the person no longer feels close to anyone (Orhan *et al.*, 2016) or feels alienated (Wright *et al.*, 2006). We chose the first option because it has simpler wording, and instead of "anyone", we specified that we mean colleagues. "I feel I am no longer close to my colleagues".

Fourthly, the questionnaires about social isolation sometimes cover the sense that the person can feel excluded even when other people are around. Namely, "When with other people I felt separate from them" (Hawthorne, 2006) and "I often feel isolated when I am with my co-workers" (Wright *et al.*, 2006) and "Despite the fact that my manager and I are co-located I often feel isolated" (Connaughton and Daly, 2004). We adjusted our statement so that it is also suitable for remote work, and additionally, we emphasised more clearly that the person feels discomfort about the situation: "I feel excluded, although I am in touch with my colleagues".

The fifth aspect covered is communication in general, and previous studies have asked whether the respondent finds it hard to get on with people (Bucquet *et al.*, 1990), is it easy to relate to others (Hawthorne, 2006) or is the respondent satisfied with their relationships at work (Wright *et al.*, 2006). Here, we decided to ask directly about communication in general as follows: "It is easy for me to communicate with colleagues".

The sixth aspect is about light communication – meaning informal chats (Golden *et al.*, 2008; Orhan *et al.*, 2016) and spending time on coffee breaks (Wright *et al.*, 2006). We aggregated these two aspects and used the following statement: "I miss informal work-related chats with my colleagues (e.g. during coffee breaks)".

The seventh aspect is more meaningful communication with just the sender's side emphasised. Namely, whether the respondent feels that they have someone with whom they can share their feelings (Hawthorne, 2006), personal thoughts (Wright *et al.*, 2006), people at work who listen to them (Wright *et al.*, 2006) or there is someone to talk to about the job or

problems at work (Marshall *et al.*, 2007; Wright *et al.*, 2006). We could see that some options were very intimate (sharing feelings and personal thoughts) and some options more neutral. In our opinion, it is not vital to open up more private topics in the work context, so we chose a more neutral option: "I have colleagues with whom to share my thoughts".

The last aspect is relationships on a deeper level. Whether the person has friends at work (Hawthorne, 2006; Marshall *et al.*, 2007; Wright *et al.*, 2006), is there a sense of camaraderie, companionship/fellowship (Wright *et al.*, 2006), do they have emotional support from co-workers (Golden *et al.*, 2008) and does the person have somebody who helps them in case of problems (Marshall *et al.*, 2007). Here, we again opted for a more neutral option because we believe that it is not vital to have deep relationships at work, but it is enough when a person has someone they can count on: "I have colleagues whom I can depend on when I have a problem".

The answers to the claims listed above were provided on a five-point scale: 1 – completely disagree, 2 – rather disagree, 3 – neither this or that, 4 – rather agree, 5 – completely agree. As some of the claims carry a negative meaning with a high score, but some are positive, we reverse the positive claims to conform to the negative nature of isolation. The reversed claims are: It is easy for me to communicate with colleagues, I have colleagues with whom to share my thoughts and I have colleagues whom I can depend on when I have a problem.

We use factor analysis to compose latent variables (Table 2). As the results for Cronbach's *alpha* were on a good level (higher than 0.8), we estimated factor scores and conducted further analysis based on these scores. As the sample size is large, we used analysis of variance (ANOVA) to estimate whether there are differences in estimations among respondents according to the degree of physical isolation and by place of work. The significance level used in the analysis was 0.05.

4. Results

The mean and standard deviations for the eight statements analysed in this study are presented in Table 2. As we can see, most of the estimations are rather low, around two

Statements	Factor 1 *Lack of contacts*	Factor 2 *Lack of meaningful connections*	Mean (SD)
It is easy for me to communicate with colleagues (R)	0.35	0.60	1.85 (0.73)
I have colleagues with whom to share my thoughts (R)		0.81	1.87 (0.86)
I have colleagues whom I can depend on when I have a problem (R)		0.77	2.00 (0.92)
I miss informal work-related chats with my colleagues (e.g. during coffee breaks)	0.49		2.95 (1.25)
It is difficult for me to get in touch with colleagues when I needed to	0.59	0.32	1.88 (0.80)
I feel excluded, although I am in touch with my colleagues	0.70		1.77 (0.85)
I feel I am no longer close to my colleagues	0.77		2.13 (1.03)
I feel lonely at work	0.75		1.87 (0.96)
Cronbach's α	*0.82*	*0.82*	

Notes: Blanks represent loadings less than 0.3; Five-point scale: 5-point scale: 1 – completely disagree, 2 – rather disagree, 3 – nor this or that, 4 – rather agree, 5 – completely agree; (R) reverse scored, SD standard deviation
Source: Compiled by the authors

Table 2. Results of the exploratory factor analysis and descriptive statistics

points, indicating that the respondents rather disagree that they feel isolated. The only exception being the fourth statement, which concerns informal work-related chats (e.g. during coffee breaks). Here, the estimation is around three points, which means "neither this nor that". In addition, it is important to note that the standard deviation for this statement is higher than for the other statements, indicating that there are different opinions about informal communication among the respondents.

Based on these eight statements, we conducted an exploratory factor analysis using varimax rotation (Table 2). According to the factor analysis, there should be two factors used in further analysis (the eigenvalues were 3.34 and 0.96, respectively). Five statements mark the negative side of isolation load to one factor, which we named "lack of contacts". The three remaining statements were reverse scored, and they compiled a second factor that we named "lack of meaningful connections".

To find out the level of physical isolation and social isolation in different places of work, we compiled Table 3, which summarises the results of physical isolation at different places of work. The results show, as expected, that employees working at home are apart from their colleagues most of the time. Still, about 10% of respondents working at home spend 51%–75% of their time apart from colleagues, and a small proportion of the respondents work with others all the time or are apart for quite a small amount of time.

Consequently, we cannot automatically assume that the physical isolation of those working from home is always high; there are exceptions. Looking at the results for different types of offices, we can conclude that only about 14%–24% of respondents are with their colleagues all the time. About 10%–20% of respondents spend 75% or more of their time apart. Logically, this percentage is higher in the private office where one works alone but also in medium-sized and large open-plan offices. Consequently, we also cannot assume that if a person works in an office, they are surrounded by colleagues all the time, even in larger offices.

To answer the first research question about how physical and social isolation are linked, Table 4 was compiled (core results of ANOVA are presented in Appendices 1–4, and the average factor scores have also been added as mean plots with confidence intervals in Appendices 5–8). As we can see, those who work apart from others 51% of the time or more report higher levels of lack of contacts compared to those who work all the time together or up to 50% apart, which is an expected result and in accordance with previous studies.

However, the fact that the results for the lack of meaningful connections are somewhat of a reversal is a rather surprising outcome. Those who are together all the time give higher

Table 3.
Level of physical isolation in different places of work

Type of workspace (percentage working there)	Time spent apart from colleagues				
	All the time together	1%–25% apart	26%–50% apart	51%–75% apart	More than 75% apart
At home, separate room (14.4%)	0.7	3.1	4.1	11.3	80.8
At home, no separate room (26.6%)	1.2	2.7	6.0	13.8	76.3
Private (15.9%)	17.6	29.1	17.8	15.6	19.8
Shared cell (19.8%)	22.6	33.1	17.9	16.1	10.3
Activity-based (5.8%)	20.0	35.1	15.7	16.8	12.4
Small open-plan (11.6%)	23.8	34.7	17.2	12.6	11.7
Medium open-plan (4.5%)	21.2	26.0	15.1	17.8	19.9
Large open-plan (1.4%)	14.0	27.9	18.6	20.9	18.6

Source: Compiled by the authors

Category	Lack of contact	Lack of meaningful connections
Time spent apart from colleagues		
0%	Those who work more than 50% apart (covering the groups of 51%–75% and more than 75%) have significantly higher average values compared to those working all the time together, apart 1%–25% and 26%–50% of the time ($p = 0.00$)	Those who work all the time together have higher averages compared to apart 1%–25% ($p = 0.01$), 51%–75% and more than 75% of the time ($p = 0.00$). Those working apart 26%–50% of the time have higher averages compared to those working apart 51%–75% of the time ($p = 0.04$)
1%–25%		
26%–50%		
51%–75%		
More than 75%		
Significance (*F*-statistic)	0.00* (33.37)	0.00* (9.74)
Type of workspace		
At home, separate room	The average is significantly higher when working at home without a dedicated room, compared to private and shared cell ($p = 0.00$) and activity-based ($p = 0.03$) and small open-plan ($p = 0.00$) workspaces	The average is significantly higher when working in a shared cell compared to working at home without a dedicated work room ($p = 0.02$) and at home with a dedicated room ($p = 0.00$)
At home, no separate room		
Private		
Shared cell		
Activity-based		
Small open-plan		
Medium open-plan		
Large open-plan		
Significance (*F*-statistic)	0.00* (9.94)	0.00* (3.90)

Table 4. Analysis of variance based on type of workspace and time spent apart from the colleagues

averages than those who are apart 1%–25% of the time, 51%–75% or more than 75% of the time. Consequently, those who work with their co-workers all of the time feel they lack meaningful connections more compared to the three previously mentioned groups. The group that works apart from others 26%–50% of the time gives higher averages than the group who works apart 51%–75% of the time. Hence, they show a greater lack of meaningful connections.

In light of the second research question, we see from Table 4 that if a person has a dedicated room for working from home, they do not feel more socially isolated than in the office. The respondents in all office types also have similar estimations. However, working from home with no dedicated room for work contributes to experiencing more lack of contacts compared to working in a private, shared cell, activity-based and small open-plan offices.

When looking at lack of meaningful connections, the results are similar in all office types. Contrary to our expectations, the respondents do not feel a greater lack of meaningful connections working at home. On the contrary, those who work at home were more positive about this aspect than those in shared cell offices.

5. Discussion

In seeking to find out how physical and social isolation are linked, we revealed the dual nature of social isolation. On the one hand, in accordance with previous studies, physical isolation may lead to aspects of lack of contacts, like feeling lonely and excluded, but on the other hand, it can also surprisingly lead to having more meaningful connections (e.g. people to rely on for help in case of problems). This adds another layer to the matrix introduced in Figure 1, in which Sector III (low social and physical isolation) has its downside – the possibility of lower levels of meaningful connections. While respondents in our study from

Sector I (high social and physical isolation) showed higher levels of meaningful connections. We see that there are different facets of social isolation, and a purely black and white approach is not viable when looking at the consequences of physical isolation. The notion that social isolation may include different dimensions is not new. For example, Marshall *et al.* (2007) also found two factors (colleagues subscale and company subscale), and Wright *et al.* (2006) distinguished emotional deprivation and social companionship. However, the simultaneous negative and positive aspects did not manifest in previous studies.

The reason for such a paradox may be that, on the one hand, people who spend a lot of time away from others may start to value meeting their colleagues more (Charalampous *et al.*, 2022) and make conscious efforts to keep contact and take proactive steps (Charalampous *et al.*, 2022; Lal and Dwivedi, 2009). On the other hand, being away enables people to avoid toxic and destructive relationships (Van Zoonen *et al.*, 2021). Communicating with others is, therefore, more intentional, and people can be more selective about who they socialise with. Hence, the quantity of contact may be less (Lal and Dwivedi, 2009), but there may not be any loss in the quality of encounters (Fonner and Roloff, 2010). Furthermore, we cannot forget the value of information and communications technology tools (Wang *et al.*, 2020). As put forth in the theoretical part of the article, there are several tactics for coping with isolation on the individual and also on the organisational level.

Another aspect of physical isolation worth considering is how much time one spends apart from others. Prior to our research, we did not know when the negative aspects of physical isolation started to emerge. According to our study, the cut-off point is around 50%. This means that when a person is away from their colleagues for 51% or more, the negative consequences of isolation brought out in the theoretical part of this article may start to show. But being all the time with others is not good either because then the levels of meaningful connection start to decrease. The reason for this may be that if one is surrounded by colleagues all the time, social relationships get strained because there is less privacy, and it is harder to concentrate. This is especially a struggle in shared cell offices, activity-based and open-plan offices, but to some extent also in private offices (Brunia *et al.*, 2016), probably due to noise levels in the background and random colleagues popping in. Here, we see how physical isolation reflects how employees may seek some kind of optimal balance in terms of privacy. As well explained by Altman`s theory on regulation of privacy (1977, p. 67), privacy is "a self-other boundary control process", where the need for privacy is determined by the person-environment fit (Altman, 1976).

A further conclusion from our study is that the experience of a lack of contacts and a lack of meaningful connections are similar in all office types. Consequently, for example, individuals in a private office do not perceive more isolation compared to those who work with colleagues in a larger room. More important than office type seems to be the time individuals actually spend apart from co-workers. Here, we need to consider that the study was carried out during the period of the COVID-19 pandemic when office workers became used to working from home from time to time – presumably due to their own choice but also out of necessity. All in all, the participants in our sample seem to value this kind of flexibility, as about half of them want to have the possibility to work both at the office and from home after the COVID-19 threat has passed. As Appel-Meulenbroek *et al.* (2022) highlight, the general tendency is that people are increasingly making choices based on the task at hand – more communication-related tasks are conducted in the office and tasks requiring concentration are completed at home. But they also stressed that this is not so for everybody, and we agree. Naturally, preferences about the place of work differs based on personality and the situation at home and also in the office (suitable rooms for concentration, suitable rooms for communication, level of noise, crowdedness, etc.) (Appel-Meulenbroek

et al., 2022). Therefore, flexibility to choose when and how much to have "downtime" from others is very valuable (Haynes *et al.*, 2017).

Our study supports this viewpoint, and we can conclude that it is not reasonable to simply view the home and office as opposites when exploring experiences of isolation. One may work from home but still have regular contact with colleagues, and alternatively, work at the office and still be away from others a lot. What is more, it turns out that when a person has a separate room for working at home, perceiving lack of contacts is, on average, at a similar level to when working at the office. However, when a person does not have a separate room, then perceiving lack of contacts is higher than in most office types (except medium and large open-plan offices). This is despite the fact that both respondents with or without a separate room work about 80% apart from others. So, in addition to physical isolation, the conditions at home are also relevant. The reason for this may be that in 63% of cases, people at home have other family members present during the work time. If they do not have a dedicated room for working at home, they are less likely to organise online meetings or even phone colleagues, so as not to disturb other family members who are probably also working or studying. Still, the paradox of isolation also appears here. Meaning that both with and without a dedicated room for working, the levels of meaningful connections are similar or even better in some cases than at the office. For example, in a shared-cell office, the level of meaningful connections was lower than at home. This may be due to the fact that in a shared cell office, individuals work closely together, and there is less opportunity to change location as in activity-based offices or blend into the larger crowd as in open-plan offices.

However, it is important to note that the levels of social isolation in our sample in general are low and differences between groups, even when statistically significant, are small. Consequently, participants from all places of work coped with isolation rather well. Still, our research covers only the aspect of isolation. We acknowledge that remote work and working in different offices have a much wider range of both positive and negative consequences.

5.1 Theoretical implications

Our study contributed to the systematisation of different approaches to how social isolation has been defined and measured. There is a clear need to view social and physical isolation separately and also be consistent with the naming and measuring of these concepts. Different levels of physical isolation should be taken into account because the consequences of isolation may not emerge only from being away from colleagues most of the time but may appear much sooner. In addition, isolation is not only an issue associated with working at home but also in the office. Therefore, the different combinations of physical and social isolation presented in Figure 1 and the dual nature of social isolation should be kept in mind.

5.2 Practical implications

This study also has some implications for practice. Namely, working remotely has come to stay, and employees value flexible work arrangements that consider their personal preferences and conditions at home and at the office. Special attention needs to be paid to remote workers who do not have a separate room for working at home and are therefore more prone to social isolation. Consequently, employers need to find creative ways to purposefully encourage building and maintaining good relationships between employees. E-leadership skills are something that needs to be worked on even after the COVID-19 crisis.

In addition, managers in the office need to pay attention to those employees who are working a significant proportion of the time away from others, as they may perceive more social isolation. For example, advanced team building and organised training for how to cope with social isolation and others. However, being with others all the time may cause a

reduction in meaningful connections. To avoid that, special areas for private concentration, taking breaks and other initiatives could be arranged. Some communal etiquette could also be agreed on so as to avoid disturbing others.

5.3 Limitations

There are some limitations to our study. Firstly, the self-reported data. Secondly, the specific timeframe. During the COVID-19 pandemic in 2021, respondents may have been more inclined towards isolating themselves and seeing it in a more favourable light. Thirdly, the results gathered in Estonia may not apply to other regions. Finally, some population groups in our sample are under, and some are over-represented.

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Appendix 1

Table A1. Results of ANOVA with lack of contacts as the dependent variable and type of workspace as the factor

Source	Sum of squares	DF	Mean square	*F*-statistic
Between groups	53.825	7	7.689	9.94
Within groups	2,561.715	3,312	0.773	
Total	2,615.540	3,319	0.788	

Note: DF = Degrees of freedom
Source: Compiled by the authors

Appendix 2

Table A2. Results of ANOVA with lack of meaningful connections as the dependent variable and type of workspace as the factor

Source	Sum of squares	DF	Mean square	*F*-statistic
Between groups	20.601	7	2.943	3.90
Within groups	2,500.654	3,312	0.755	
Total	2,521.256	3,319	0.760	

Source: Compiled by the authors

Appendix 3

Table A3. Results of ANOVA with lack of contacts as the dependent variable and time spent apart from the colleagues as the factor

Source	Sum of squares	DF	Mean square	*F*-statistic
Between groups	100.607	4	25.152	33.37
Within groups	2,414.516	3,203	0.754	
Total	2,515.123	3,207	0.784	

Source: Compiled by the authors

Appendix 4

Table A4.
Results of ANOVA with lack of meaningful connections as the dependent variable and time spent apart from the colleagues as the factor

Source	Sum of squares	DF	Mean square	*F*-statistic
Between groups	28.576	4	7.144	9.74
Within groups	2,348.425	3,203	0.733	
Total	2,377.001	3,207	0.741	

Source: Compiled by the authors

Appendix 5

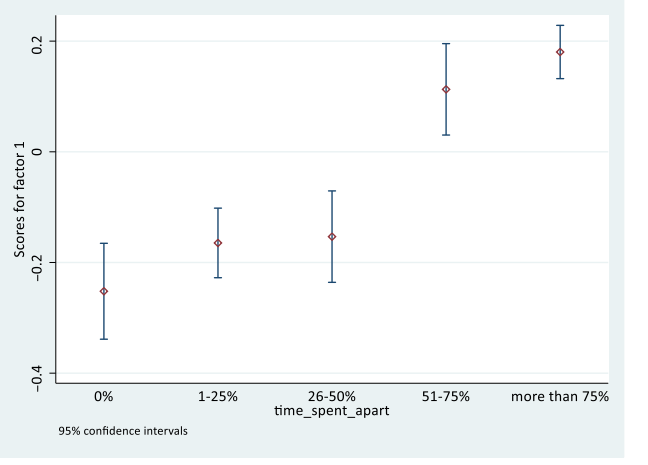
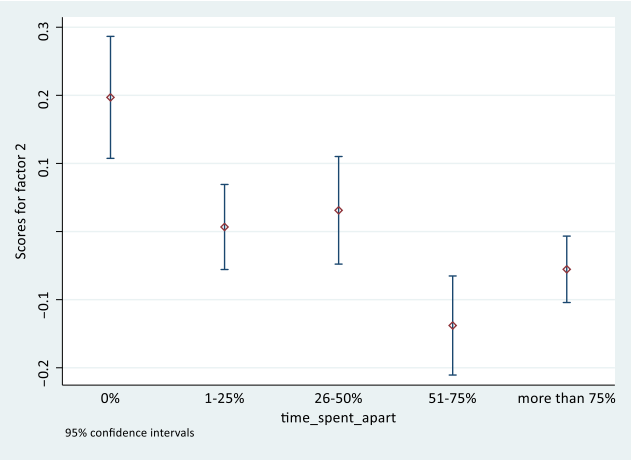


Figure A1.
Mean factor scores for lack of contacts by time spent apart from colleagues

Source: Compiled by the authors

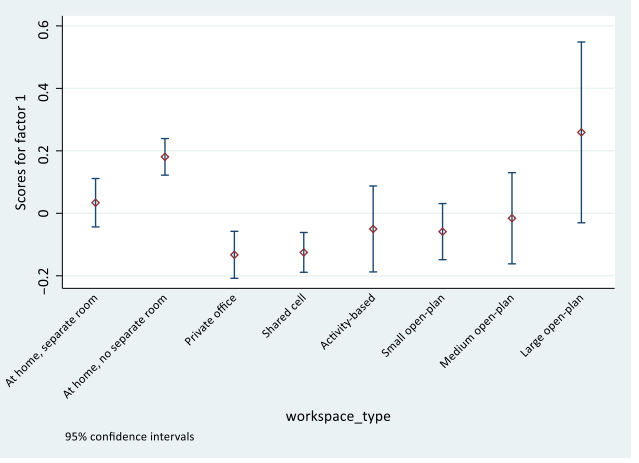
Appendix 6



Source: Compiled by the authors

Figure A2.
Mean factor scores for lack of meaningful connections by time spent apart from colleagues

Appendix 7



Source: Compiled by the authors

Figure A3.
Mean factor scores for lack of contacts by type of workspace

Appendix 8

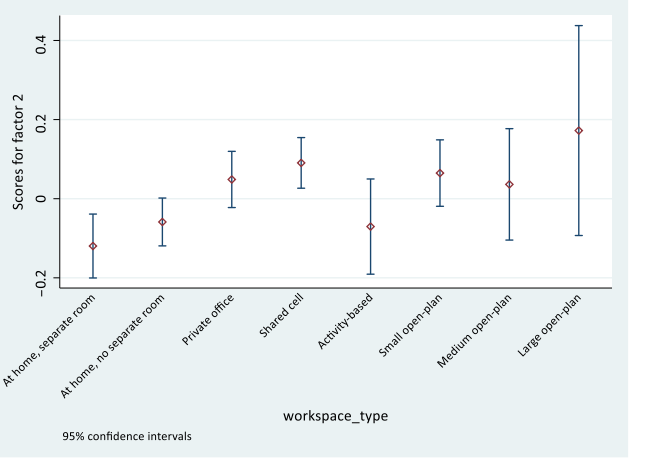


Figure A4.
Mean factor scores for lack of meaningful connections by type of workspace

Source: Compiled by the authors

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