How work-related communication applications affect perceived stress levels among employees

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ABSTRACT

This paper examines Slack's effects on perceived stress levels among employees compared with classical work communication such as email. The study also investigates whether or not modern work platforms such as Slack affects the way people view and separate work and leisure time. As work from home increased drastically with the spread of Covid-19, simple and fast communication at work became more important than ever. Employees did not have the same possibility to meet daily at the office which created new demands on text-based communication platforms used for work purposes.

The study was performed through a survey with 113 contributing respondents as well as three follow-up interviews. The study shows a difference in the respondents' approach toward Slack compared to email. Close to 11% stated that they read emails after work hours whereas 24% stated that they read Slack messages after work. Even though a slight difference can be seen between the two ways of communication, it becomes clear that it is more likely the ease-of-use and simple accessibility of modern work communication can cause stress than Slack itself. The results show that platforms such as Slack make it easier to interact with colleagues even after work hours. These results illustrate the issue of living in a time where the office is equally as remote as fixed.

CCS CONCEPTS

• **Human-centered computing → Interaction design theory, concepts and paradigms**; **Empirical studies in interaction design**.

KEYWORDS

Slack, Stress, Work platform, Employee health, Remote work

1 INTRODUCTION

The digital revolution has provided us with many useful and effective tools for both everyday life as well as work. With these modern tools and platforms comes information in overwhelming quantities, that most people are continuously exposed to during their woken hours. Due to notifications, they get interrupted by information even when they are not actively using their mobile devices, which has led to a common expectation that people should be available and reachable at all times.

This constant influx of information from multiple sources tends to leave many people overwhelmed [13]. Most people receive numerous notifications per day, interrupting everyday life. One study shows that most notifications tend to come from social apps like text messaging and email [14], that often demand a response.

This concept of always being connected and available through mobile applications is rather new, especially in combination with work. Nowadays, there are not only message applications to easily get in contact with our friends and family, but also platforms specifically intended to be used for work purposes. Besides communicating in a totally new way through modern platforms, there is also a possibility to keep track of email on your phone.

In the middle of 2013, the messaging app Slack first entered the market. It was intended to replace email communication between employees [16]. It did in some ways change the way many people communicate at the office by offering a chat function, available on both your phone and computer, that notifies one instantly when a new message arrives [20].

During the pandemic, many employees had no option but to work from home. About 50% of American workers switched to remote working [2]. This made easy and fast communication more relevant than ever, which caused mobile-based work platforms such as Slack to grow considerably [4], leaving us with a new reality where the hybrid office is more common than ever before [15]. The question is, has this made it more difficult for people to leave their work at the office and disconnect when they get home after a workday?

2 OBJECTIVE

The aim of this study is to investigate digital work platforms, more specifically how they affect perceived stress levels among employees. To achieve the objective the following research questions are answered:

- How do work-related notifications affect perceived stress levels among employees?
- How does the work platform Slack affect the way employees view and separate work and leisure?

3 THEORY

The following section will give a theoretical introduction to the key concepts of this study.

3.1 Stress

Stress reactions are biological mechanisms that helped our ancestors survive by enhancing the readiness to prepare for a fight or flight. However, in today's modern Western society stress reactions tend to do more harm than good. Nowadays people face other kinds of stressors, e.g. work pace, expectations, and social achievements. The reactions related to these stressors do most likely not require muscle strength like it did biologically and historically. The stress mechanism is not adapted to fit these types of new stressors which causes a variety of problems for many people [1].

The stress reaction itself can be seen as an alarm response with both physical and psychological effects. When balanced, stress can be positive as a motivating force. However, stress becomes harmful when the demands exceed the capability of an individual. Prolonged stress increases the risk of high blood pressure, heart failure, and a number of other health problems [1].

Stress also has a lot of psychological effects, such as mental health issues. In many cases both depression and anxiety are related to stress [9]. When talking about stress, the term burnout is often brought up. It refers to a state of physical and emotional exhaustion that can occur after long-term stress [23]. Despite the fact that the term is used internationally in different forms, Sweden is the only country to have a specific diagnosis for it, called "Utmattningssyndrom" [5] (Exhaustion syndrome).

During the pandemic, a small increase in stress levels could be seen within the Swedish population [12] and the risk of sick-leave during the pandemic was increased [10].

3.2 Notifications

The term notifications refer to a visual cue, auditory signal, or haptic alert generated by an application that communicates a message to the user outside of his or her current focus of attention [8]. In other words, the purpose of a notification is to provide awareness of information while a user is focused on another task. Although it is considered an effective way of helping users maintain information awareness, it is also considered to be a large source of disruption when it comes to ongoing tasks [7]. This makes balancing the information delivery timeliness with interruption cost an essential challenge of notification [8].

3.3 Slack

Slack is a messaging app primarily aimed towards businesses and office use. It was first launched in mid-2013 as a replacement for company emails [16]. The comapny behind Slack claims that they make access to your colleagues easy by offering a message function that is similar to everyday chat services. People can work in dedicated spaces called channels intended for certain information, people or projects. The software is available for browsers as well as desktop and phone apps [20].

Slack provides a number of different functions. Besides just being able to send text messages, it offers a function called Huddle where you can call your colleagues through voice- or video call [21]. The app also provides a function called Slack Connect that is used to communicate with customers and other people outside the organization [18]. To show your colleagues your current status, you can use Slack's built-in status function and set it to "Active", "Away", "Vacationing", etc. [19].

Besides having plenty of built-in functions, Slack can also be connected to several other services like Google Drive, Trello, Zoom, Dropbox, among others. [17]

3.4 Hybrid working

Hybrid working can be defined as a blend of in-office and remote work. It is usually very flexible for employees, giving them the option of choosing where and when they feel the most productive [3]. Since Covid-19, hybrid working has become more common than prior to the pandemic [24]. A study among employees in Germany, India, and the United States showed that employees were at least as productive during remote working as when they worked from the office [6].

4 METHOD

In order to acquire a better understanding of the effects Slack has on its users, a study consisting of a survey with complementary interviews, was conducted to gain both quantitative and qualitative data [11]. The survey mainly targeted Slack users but individuals who did not use Slack at work could still answer some of the questions. The survey was written in Swedish and all questions have been translated into English for this paper.

4.1 Survey

The survey consisted of 26 questions, 6 of which were free-text questions and the rest were either multiple choices or scales. There were two parts of the survey; one for all users and one for Slack users. Only Slack users got to answer all questions in the survey, and non-Slack users got to skip all questions regarding Slack. All questions were mandatory except for the free-text questions. People answering that they did not work at all, were instantly directed to the end. The survey was created using Typeform [22].

4.2 Interviews

Three survey respondents were chosen for follow-up interviews. These interviews were semi-structured and consisted of the following ten pre-defined questions:

- How do you experience the separation between job and leisure when working from home?
- Do you experience that your regular work hours differ when you work from home?
- How often do you work evenings or weekends?
- How do you feel when you get job-related notifications after work hours?
- How do you act when getting work-related notifications after work hours?
- Are you stressed, and if so, what do you believe it's caused by?
- What notifications settings do you have and why?
- Do you see any obvious difference between the way you communicate via Email and Slack?
- What advantages and disadvantages can you see with Slack?
- Are there any specific occasions when you get stressed by your Slack messages?

4.3 Participants

In total, 119 respondents answered the survey, but six of them did not work at all and could therefore not contribute to the study. Among the respondents, 77,4% said that they work full-time, and 17,4% said they work part-time. The majority were between the ages of 26-35 years and 73,5% identified as women and 26,5% as men. The respondents varied in both work situations and areas of business. The majority, however did, work within the technology field. Out of the 113 respondents in the study, 75 of them use Slack in their work. Three respondents were chosen for follow-up interviews. All three participants use Slack in their work. They were all between the ages of 23-33 and worked in different fields.

4.4 Pilot testing

Pilot tests were conducted prior to both the survey and the interviews. The tests gave useful feedback that was used to improve the survey and interviews before they were actual performed. This included input such as adapting it to different types of work situations and adding some free text questions for further explanation of certain parts.

4.5 Limitations

The study was limited to Swedish-speaking employees only and all tests were conducted in Swedish.

5 RESULTS

The following section will show the results of a majority of the questions from the survey and the interviews.

Figure 1 show how often the respondents work from home.

To the question "Do you use a separate phone for work purposes?", 64,2% answered no, and 35,8% yes. To the question "Do you generally turn off work notifications when you get home?", 58,6% answered no, and 41,4% yes. Among those who stated that they used a separate phone for work purposes, 63% responded that they turned off work-related notifications when they got home from work, while among the respondents not using a separate work phone, only 29% said they did that.
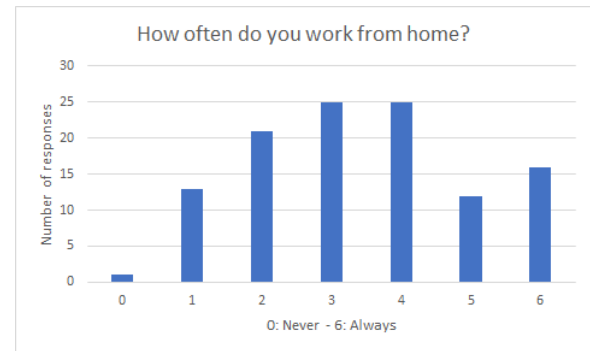

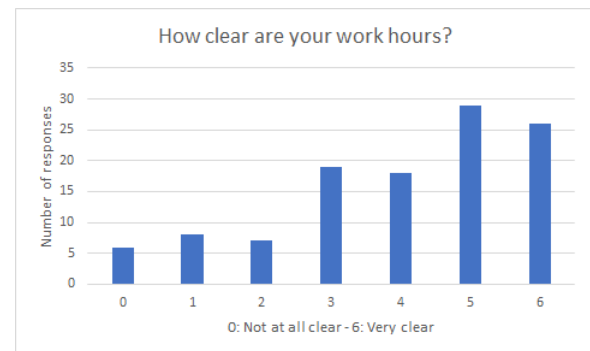**Figure 1: Survey question: "How often do you work from home?"**

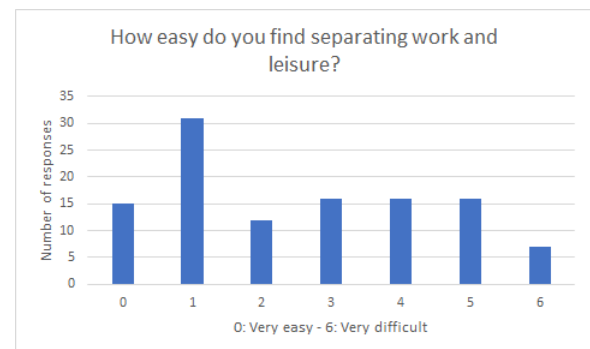**Figure 2: Survey question: "How clear are your work hours?"**

Figure 3: Survey question: "How easy do you find separating work and leisure?"

Figures 2 and 3 show the answers regarding work hours and separation of work and leisure.

To the question "Have you ever been on sick leave for stress-related causes?", 79,6% answered no, and 20,4% yes. A correlation between previous stress-related illnesses and current stress levels could be found. Among the respondents stating that they had, at some point, been on sick leave for stress-related causes, 83% chose 3 or higher on the stress scale (graded 0-6).

Figure 4 shows that 15% of the respondents answered 5 or above on the stress scale.
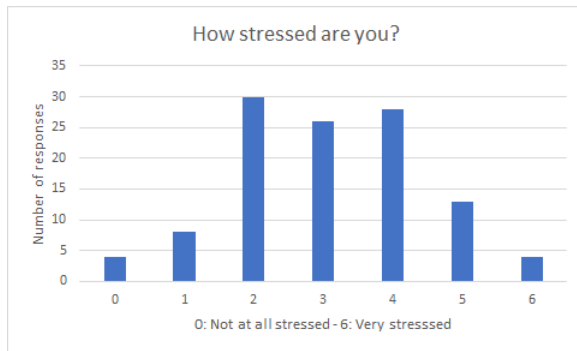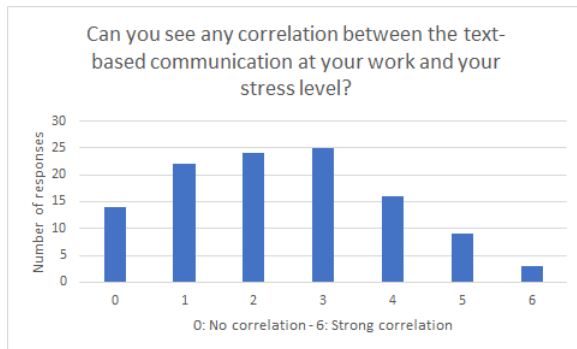
Figure 4: Survey question: "How stressed are you?"

Figure 5: Survey question: "Can you see any correlation between the text-based communication at your work and your stress level?"

Figure 5 shows that 47% of participants can see a medium correlation to a very strong correlation between their stress level and their text-based way of communication.

Regarding the question "Which text-based way of communication do you prefer?", Slack was most popular with 54% of respondents choosing it, followed by Teams and Email. No one chose text messaging as their preferred way of communication. Other suggestions that came up from a few of the respondents were Discord, Messenger, and Skype.

Among the 113 respondents stating that they worked full-time or part-time, 75 of them used Slack and therefore answered questions regarding the application. The majority of users make use of Slack on both their phones and computers (83%). A few use it solely on their phones (8%) or their computers (9%).

Figures 6 to 8 show how the respondents handle Email and Slack messages after work hours and figure 9 show that the majority of the respondents' Slack messages are work-related.

As a final question, the respondents noted how they like the Slack application overall and all participants except six scored this a 4 or higher, with 6 being the highest likeability.

Other results gathered from the survey are that some respondents find it stressful when you are dependent on a colleague that does not answer on Slack, or when an uncompleted work task is discussed after work hours. Some respondents also stated that they get more stressed from Slack notifications while in a meeting, get mentioned in a message or when bad news is received in the
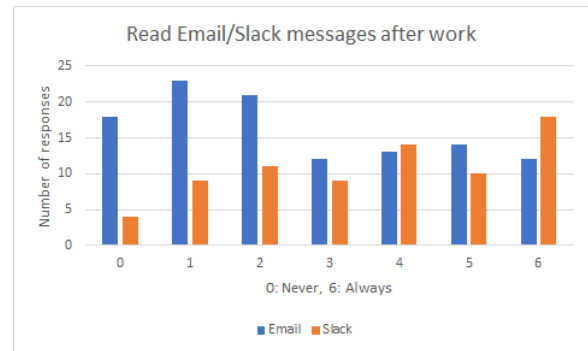

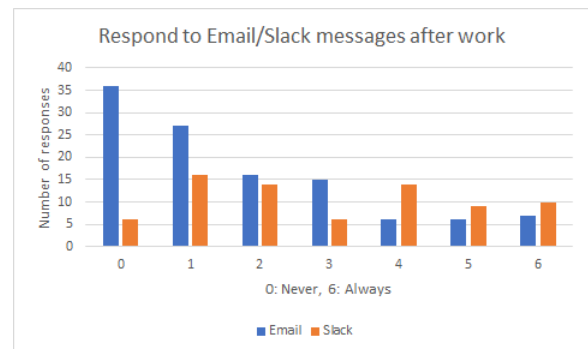**Figure 6: Survey question: "How often do you read Email/Slack messages after work?"**

Figure 7: Survey question: "How often do you respond to Email/Slack messages after work?"
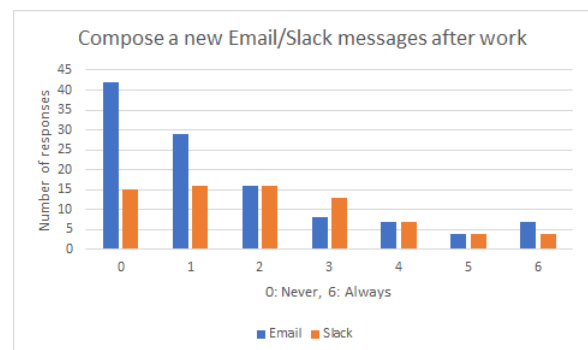
Figure 8: Survey question: "How often do you compose a new Email/Slack messages after work?"

evening. One participant also said that it is easy to get stuck reading messages instead of doing what you actually should be doing. Some respondents stated that unclear expectations of availability can be more stressful then the actual way of communicating.

While most people claimed that they appreciated the possibility to have multiple different channels for different topics on Slack,

Figure 9: Survey question: "How much of your Slack messages are work related?"
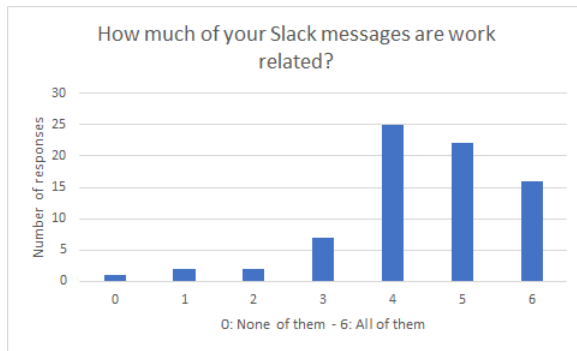
some respondents also wrote that they experienced it as unstructured and "messy". Most people that did prefer Slack as a communication tool said that this was because of the simplicity and the fast communication.

The data gathered from the interviews aligned with the data from the survey. Two participants stated in the interviews that they find it hard to concentrate on work while working from home. All three interview participants said that they experience email as more formal than Slack, and that it's easier to send Slack messages after work hours since it doesn't take as much time and/or effort as writing an email.

6   DISCUSSION

Despite many of the answers aligning with each other, it is not clear to say that Slack generally affects stress among employees. Even if some of the results point toward a correlation between the use of Slack and higher stress levels, it might in fact be due to other factors.

In figures number 6 to 8 it can be seen that more people are willing to read Slack messages more than emails after work hours. They also respond and compose more Slack messages after work hours compared to emails. As stated in the interviews, this might have to do with the fact that email can be perceived as more formal and take more time to write, compared to a Slack message that does not need a topic, introduction, or an ending stating who the sender is. According to the results, there is a possibility that the simplicity of sending messages contributes to the societal expectations of always being connected and available. Figure 7 also shows that people tend to either respond often or very rarely to Slack messages received after work hours. This might have to do with different behavioral patterns that usually look similar over time. You might either be the type of person that does respond after work hours or a person that does not. According to the results, it seems like this is more common than an in-between alternative.

Figures 6 to 8 also indicate that the respondents generally find it easy to limit emailing to work hours. They also seem to be more willing to read emails after work hours than actually engage in interaction by responding or composing new emails.

Looking at the results, the majority of the respondents did not use a separate phone for work purposes. However, among those who did, it seemed to be more common to turn off work-related

notifications when getting home after a work day. It is possible that this has to do with the simple fact that turning off work-related notifications is much easier when you have everything gathered on one separate phone. From one of the interviews, it became clear that having just one phone for work as well as private use might make your work and personal life too intertwined to separate when you get home. E.g., you might use some apps for both work and personal purposes, making it harder to just turn off the notifications regarding work.

There is a correlation between notifications and responses to messages. Among the respondents that did turn off their notifications, 71% responded that they do not read Slack messages received after work hours (scored 3 or below). However, among those that did not turn off notifications, only 31% stated that they did not read Slack messages after work. This indicates that people that turn off their work-related notifications are less likely to read work-related messages after work hours. Among the respondents that said they read Slack messages after work hours (scored 4 or higher), 75 participants stated that they also replied (scored 4 or higher). Among the respondents that did not read Slack messages after work hours, only 5% said they replied. This might imply that reading messages in most cases results in the receiver replying to them. Eliminating the work-related messages read after work hours might therefore also lead to responding less to such messages while at home. If there is a correlation between Slack messages and stress, turning off the notifications could in other words be a solution.

47% of participants can see medium to a very strong correlation between their stress level and their text-based way of communication (Figure 5) but most people do not see a correlation. When asked to elaborate on the answer, some of the respondents stated that responding to Slack messages redirects focus from more important tasks, therefore, causing stress. Some answered that it made stressful periods even more stressful, e.g. when an unsuccessful project was discussed in Slack after work hours. On the other hand, some answered that they became more stressed by not being aware of what was sent in their Slack channels.

There were no connections found between remote or hybrid working with stress and/or Slack. As mentioned in the theory, the stress levels did decrease among some Swedes along with remote or hybrid working since it made it easier for them to combine everyday tasks together with their work-life. This might be the case for the respondents participating in this study. Figures 2 and 3 clearly show that the respondents in general think their work hours are clear and that most of them do not find it hard to separate work and leisure.

From the interviews, it became clear that the participants that used Slack on both their computer and phone did it in order not to miss anything, since they checked their phones more often than the computer. One participant, however did, state that they used Slack only on their computer to be able to separate work hours from leisure. The choice of which device to use Slack on seemed to vary with what kind of company the participant worked for. One of the interview participants worked for a consultant firm, and stated that they felt the need to respond to messages fast, regardless of when they were sent due to a company policy stating that employees should respond within 24 hours.

In general, the Slack users like Slack as a communication platform. Both from the free-text questions in the survey and from the interviews it seemed to be because of the simplicity of communication. Respondents stated that they appreciated that it is less formal than writing emails. They also claimed that Slack is a good tool for building better relationships with colleagues since it provides the function to create Slack channels for other topics than just work.

Looking at the group of participants in this study, it is clear that many of them work within the same field, one age-group is over-represented, as well as Females. This could affect the results and for these to be more reliable it would be desirable to have an equal distribution of gender, age and work field represented within the test group. The study was limited to only Swedish speaking employees, and since different countries can differ when it comes to work ethics, working conditions, over all mental health and other relevant factors, it would have been beneficial to include people from multiple countries in the study for a more reliable result.

7 FURTHER WORK

To improve this study it would be desirable to include a bigger test group with more variations in demographic data such as age and field of work. It would also be beneficial to include more than just Swedish speaking employees among the participants. An even distribution of different types of participants would be an advantage, ideally having 50% Slack-users and 50% non Slack-users.

The results from this study are only based on the respondents self-evaluations when it comes to work and stress levels. Since this can generate somewhat biased answers, a further development of the study would be to make observations of the participants behaviour during their work days. The measurements of stress levels could also be improved by doing health examinations, eg. testing the participants cortisol levels for more accuracy.

8 CONCLUSION

It is not safe to say that Slack as a communication platform for work contributes to increased stress among employees. The study does show that there is a clear difference in the attitudes toward email compared to Slack. The results show that the simplicity of modern work communications makes it easier to communicate after work hours, which in turn can increase the stress levels for some employees.

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