**Does feedback on interruption length influence people’s self-interruption behaviour?**

**Summary of findings so far**

Observations in Study 2 showed that data workers prepare some information they need for a data entry task beforehand. Other data items are retrieved as the task goes along. As soon as they realise they need information, they interrupt themselves and this can happen frequently during a single task. Finding information can take longer than expected, and people can get distracted along the way. In general, finding information is disruptive: people may forgotten where they were in a task, enter information in the wrong fields, or they might be automatically logged out of a system because of inactivity. Study 4 and 5 showed that in a controlled setting where people know the time it will take them to retrieve information, they adapt and schedule their tasks accordingly. They will look up and enter items that take the least time first, and postpone getting information that is difficult to lookup. An issue is that people often do not know how long it will take them and therefore cannot schedule or adapt to it. Can people be nudged into making more mindful interruptions, if they are given feedback on how long it takes them to find information?

**Introduction**

Studies have consistently shown that interruptions are disruptive to task performance. Interruptions lead to an increase in errors and increase task performance time (e.g. Trafton, Altmann, & Ratwani, 2011). However, sometimes an interruption can be relevant and even necessary for a task to be completed. For example, people may have to look up task-related information. Study 2 showed that even though data workers collected some information carefully before starting a task, they often interrupted their task to retrieve additional information. They either did not realise they needed this information until starting the task, or they perceived the information to be quick to find, and therefore did not feel the need to collect it beforehand. Other observational studies found that looking up task-related information was a common reason for self-interruptions, and was perceived by participants as part of the activity (Cangiano & Hollan, 2009; Jin & Dabbish, 2009).

A number of laboratory studies have looked at how people decide when to address interruptions. These studies showed that people defer interruptions until lower workload moments (Salvucci & Bogunovich, 2010), or switch to another task when there is a delay in the primary task (Gould, Cox, Brumby, & Wickersham, 2016; Katidioti & Taatgen, 2013). However, these studies primarily focused on characteristics of the primary task, and it is unclear from these studies if the time taken to address an interruption has any effect. Study 4 and 5 showed that if the time to access data items for a data entry task is consistent throughout a controlled experiment, participants learn to look up and enter easy-to-access items first, before looking up other items. Might people therefore manage their interruptions differently, if they are given feedback on how long it takes them to find information?

Gould, Cox, & Brumby (2016) looked at people’s switches to other, unrelated activities during an online routine data entry task. They found that a cue that asked participants to remain focused on the task after they switched reduced self-interruptions. The two studies proposed in the current chapter aim to see if a cue which indicates the duration of an interruption has any effect on people’s switches to a related activity: look up information for a data entry task. The first study uses an experimental data entry task to measure if the cue has an effect on number, duration and timing of switches. The second study replicates this study with data workers doing expenses work, to evaluate if the cue is suitable for an applied task, and to see whether the cue also has an effect on switches to other, unrelated activities.

**Study 1 – (lab/online?) experiment**

In the first study, an experimental data entry task will be used. The data entry task is similar to the task used in Study 4 and 5 and is conducted in a web browser (see Figure 1). One browser tab shows a data entry form in which the participant has to enter data items related to particular expenses. These data items have to be retrieved by switching to another browser tab and looking up the items in a table. The location of the correct data item in the table differs, and the participant does not know beforehand how long it is going to take to find an item: some may be quicker to find than others.

The between-participants independent variable is a notification. In the *notification* condition, the participant receives a notification when switching between browser tabs. Before switching from the data entry tab, they receive a warning message (e.g. ‘It is recommended to not leave the data entry interface for more than 10 seconds’). When switching back to the data entry tab, they receive a message stating how long they were away from the interface (e.g. ‘You left for 6.4 seconds.’) In the *control* condition, participants receive no notification.

Dependent variables are the number and duration of switches, the ordering and grouping strategies (i.e. in what order do participants look up and enter data items, and how many items do they look up and enter per switch), task completion time and data entry errors.

This study aims to address the following research question: does feedback on interruption length have an influence on the number, duration and timing of switches?

**Participants**

Thirty participants will take part in the study. The study will take approximately 45 minutes, and participants will be reimbursed with £7.50 for their time.

**Materials**

Participants have to complete 50 data entry tasks, and for each task have to enter four items, which have to be retrieved from another browser tab (see Figure 1). The experiment will be conducted in a web browser, and the notification is implemented as a Chrome extension browser plug-in using HTML and JavaScript. Upon switching between browser tabs, a notification will appear at the right-hand corner of the screen. All key presses, tab switches and their corresponding timestamps are recorded using JavaScript. The tab switch timestamps will be used to determine the number and duration of switches away from the data entry tab.

**Results (expected)**

* Participants will initially look up and enter data items in the order of the data entry form. Participants in the notification condition will learn that if an item takes longer to find, they will first look up and enter other items. Participants with no notification will continue to enter the form in sequential order.
* Participants in the notification condition will make more but shorter interruptions.
* Participants will look up and enter fewer items per switch.

**Study 2 – field study**

In order to understand whether the notification will work in a less controlled setting, the study will be replicated with data entry workers doing expenses work. They will be asked to install the plug-in in their browser and use it when they are processing expenses. Participants can use the add-in to select the browser page which shows the expenses system as the ‘main task page’. Every time they switch away from this page, or if the page is inactive for more than x seconds, a JavaScript event will be triggered to log the timestamp. This event will be triggered again when the user returns to the page. The timestamps will be used (and stored in an online spreadsheet?) to determine the number and duration of interruptions.

To observe the effect of time feedback, the participants will be divided into a control and experimental group.

The experimental group will be asked to install the plug-in and will receive a notification. If the main task page is not in focus, either because participants have switched to another page or if it has been inactive for x seconds, they will receive a notification with a warning message. Upon returning to the expenses page, they will receive a notification indicating how long they were away from the page. The control group will be asked to install the plug-in, but will receive no notifications. It is explained that the purpose of the study is to log people’s switching behaviour, and participants will be able to see their data at the end of the study.

Participants will be asked to use the add-in for one week in which they have to do a substantial amount of expenses work, and keep a diary of their experiences. Within a week of finishing the diary, a follow-up interview will be scheduled to gather more detailed explanations of participants’ experiences of using the add-in.

The study aims to address the following research question: does feedback on interruption length have an effect on people’s self-interruption behaviour for expenses work in a finance office setting?

**Method**

**Participants**

Ten participants will take part in the study. They will be reimbursed with x for their participation.

**Materials**

The task studied will be expenses tasks data entry workers carry out as part of their work, which is done in a browser. The expenses system typically gets logged out after it has been inactive for 4 minutes. Therefore, the notification will give a warning that the data entry system will be logged out after 4 minutes.

**Results (expected)**

* Participants in the *notification* condition will make shorter and fewer interruptions (measured).
* If they learn the time of their interruptions, they will also finish completing the rest of the task first and defer interruptions until later in the task (no quantitative measure available so has to be derived implicitly from interviews).

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*(a)*

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*(b)*

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*(c)*

*Figure 1. Participants have to enter project codes into a data entry form (a). They retrieve these by switching to another browser tab. Participants in the notification condition receive a warning message when they switch tabs (b). When they switch back to the data entry tab, they receive a message stating how long it took them (c).*