# Study 4

* Problem: people have to look up and enter information from various sources. The cost differs. How do people organise their subtasks of looking up information?
* What was done: this study presents a laboratory simulation to investigate the relationship between information access and performance. Participants are given claim sheets to process. The information has to be retrieved from three tabs, with differing levels of access. Some of the information is already on the form, others have to be looked up. It is a 3x3 within-subjects design with IAC (low, medium, high) and number of sources as independent variables. Dependent variables are completion time, errors, number of visits, duration of visits to source, timing of switches (look at T-pattern analysis for routines).
* What was found: duration of T-pattern (i.e. the time between two actions) influences
* Why does this matter: this can inform the design of cognitive artefacts. Electronic expenses sheets need to not only focus on the administrator as the single user, but on the multiple people involved and in providing easy access to the same information, to prevent errors from happening.

## Introduction

Study 1 and 2 showed that for a data entry task, people often have to collect and enter information from various sources, and it can take time to look up this information. The longer people are away from the primary task interface, the harder it can be to resume (Monk et al., 2008). On the other hand, interleaving tasks can introduce errors (e.g. Back et al., 2012): from this perspective, switching between looking up and entering information too often can be disruptive. Previous studies showed that if the cost to access information increases, people will switch to a memory-based strategy, and try to minimise switching between the information source and the input interface (e.g. Gray et al., 2006).

However, what if the costs of different sources differ? Do people enter all low IAC sources first, and then all high IAC sources? And do they first look up all information and then enter it, or look it up as they need it? How do people manage subtasks of looking up information from multiple sources?

In order to understand how people manage subtasks of looking up information, it is first important to know how people look up information from sources they do know the cost of. This study investigates at the effect of IAC on timing of visits when people do not copy from one, but multiple sources.

## Method

A 3x3 within-subjects design.

IV: IAC (time delay of opening tab), type of information

DV: number and duration of visits, ‘timing’ of visits (how to measure this – time between visit and entry; look at T-pattern analysis; before/during), speed, accuracy

Several things to copy from one source: for low iac will go back and forth and look up as they need it. For high iac will first look and memorise all information, and then enter it.

Condition 1: all low

Condition 2: all high

Condition 3: mix of low and high

Study 3: The effect of IAC on number and duration of visits to one source

Study 4: The effect of IAC on timing of visits to source

Hypotheses

* People will look up low IAC sources as they need it.
* People will look up and memorise all high IAC sources… before entering any information.
* People will look up low IAC sources first, in a batch, and then high IAC sources, in a batch.

## Results

* Order of entries: in control and High-Amounts, people entered in sequential order, per claim. In High-Accounts, people chunked per data type: first entered amounts, then accounts.
* Number of visits: in High-IAC conditions, people minimised visits. They grouped and first looked up all high items. In Low-IAC condition, looked up a single value at a time.

## Discussion

* For High-Account, people leave this until the end, and enter amounts first. However, if Amounts high, will still enter Amounts first. So not always that they leave High-IAC until the end, only if it is really hard.
* Overall, people entered one by one, but needed fewer visits if IAC increased.
* In trials where they entered it in column order, people grouped in High-Amount condition. Because more costly, did Amounts in one visit. However, in High-Account it probably was too difficult to group it so still visited it one by one.

**Limitations**

People interleaved between the rows, even though it was still part of the same form. Would people also interleave between two separate data entry tasks?

# Study 5

Study 4 found that …

In this setting, people had to switch back and forth between the information source and input interface. However, people increasingly use multiple devices to complete tasks, and have the opportunity to present information on an additional screen to decrease the cost (e.g. Dearman & Pierce, 2008; Jokela et al., 2015). How do people make use of this, and does reducing information cost improve performance?

## Method

A 2x3 within-subjects design.

IV: IAC (one or two screens), type of information

DV: number and duration of visits, ‘timing’ of visits (how to measure this), speed, accuracy

## Results

* People with a second screen will be faster.
* People with a second screen will check their input less.
* (People with a second screen will make more errors?)

# Study 6

Study 4 and 5 showed that IAC has an effect on how people manage subtasks of looking up information: people will look up low IAC items first, in a batch, and enter them, and then look up all high IAC items, in a batch, and enter them. This is to minimise switching between looking up and entering.

Study 2 found however that people often do not know beforehand what the cost will be and how long they will be away from the interface. Su et al. (2008) studied the use of different media for organisational tasks and found it is not the duration, but variability in duration of interaction that impacts people’s affective state. How do people manage subtasks of looking up information, if they do not know the associated cost of looking up this information?