



Tempted by the smartphone

How our digital companions influence our concentration at work

A psychological study by the
Universities of Würzburg and Nottingham-Trent
for Kaspersky Lab

Do smartphones make us smarter?

We conducted research earlier this year indicating that the high availability of digital devices might have negative effects. The research found that if you take notes on a notebook, tablet or smartphone during a meeting, you are distracted, and because you miss details, you are unable to get a full understanding of what is happening in the meeting.

We wanted to know more about this and asked the University Würzburg and the University Nottingham Trent to do a **psychological experiment** for us. In their laboratories they tried to find out if the presence of a smartphone has any influence on **our ability to concentrate**. And as it turned out, it has a **significant influence**.

The researchers were able to see a clear correlation between how far away a smartphone is, and our ability to concentrate on a task. **The further away the smartphone, the better the results in a concentration test.** So, while smartphones are allowing us to access nearly all the knowledge in the world with a few fingertips, this availability of indefinite information is also a temptation. We are constantly tempted to search for information, to send a quick message to our friends, or post a picture. Or check football results. Or the weather. The list goes on.

Concentration Test

We invited participants into laboratory rooms at the universities of Würzburg and Nottingham-Trent to **test whether the presence or absence of their smartphone would have an effect on their performance in a concentration test**. The experiment was conducted in Würzburg (Germany) and in Nottingham (United Kingdom). Therefore, our sample is binational (GER: 59, UK: 36). Overall, 95 participants (56 female and 39 male) took part, varying in age from 19 to 56 years ($M = 27.97$, $SD = 8.01$). Care was taken to balance experimental conditions and gender across laboratory sites.

We recruited participants within a data collection period of two weeks from 5 April until 29 April 2016 via online advertisements (e.g. Ebay classifieds) and social media platforms (e.g. Facebook, Google+). A compensation of at least 15€ (Würzburg) or £10 (UK) was advertised for one hour of participation. The participation was based on ethical guidelines.

Previous studies have shown that on the one hand, insecure separation from one's smartphone has negative emotional effects such as increased anxiety (Cheever, Rosen, Carrier, & Chavez, 2014). On the other hand, studies have also demonstrated that one's smartphone may act as a distractor for attention when it is with us (Strayer, Drews, & Johnston, 2003).

In other words, both smartphone absence and presence could impair concentration. As a concentration test we used a modified version of the attentional blink task (Raymond, Shapiro, & Arnell, 1992), a routine method for studying attentional capacity (Dux & Marois, 2009; Shapiro, Arnell, & Raymond, 1997). During the attentional blink procedure participants are confronted with a string of visual stimuli in fast succession at the same spatial location on the computer screen. The task consists of reporting on two targets in this string after each display, the letter X and a letter in a different color, and requires continuous and undistracted attention to the screen.

In contrast to research on smartphone distraction, in which the effects of explicit interruptions and of actual phone use have been studied (e.g., Clayton, Leshner, & Almond, 2015), our study aimed to establish more subtle effects by **varying the overall status of the smartphone throughout the task**. Prior to starting the task, participants were randomly assigned to one of the following conditions:

- 1.) **Natural condition - not in view:** smartphones remained in the possession of participants (pocket or bag); no further instructions.
- 2.) **Smartphone in view:** participants were asked by the experimenter to briefly hand over their smartphones; phones were then positioned next to the computer screen that participants need to focus on for the concentration test.
- 3.) **Smartphone locked securely - not in view:** participants were asked to hand over their smartphones, which are then locked away in a metal container, remaining close to the participant during the test.
- 4.) **Smartphone taken away - out of the room:** participants were asked to hand over their smartphones after which the experimenter takes them out of the laboratory room for the duration of the task.

Upon completion of the task, participants proceeded to answer a short version of the state-trait anxiety inventory (Marteanu & Bekker, 1992). Afterwards, participants who have been separated from their smartphones regained possession of them.

Results: worse concentration without separation

#BetterOffWithoutYourPhone

Performance in a concentration test significantly increases as **distance from the smartphone** increases.

Performance **increases up to 26%** when the smartphone is removed, compared to when the smartphone is in view.

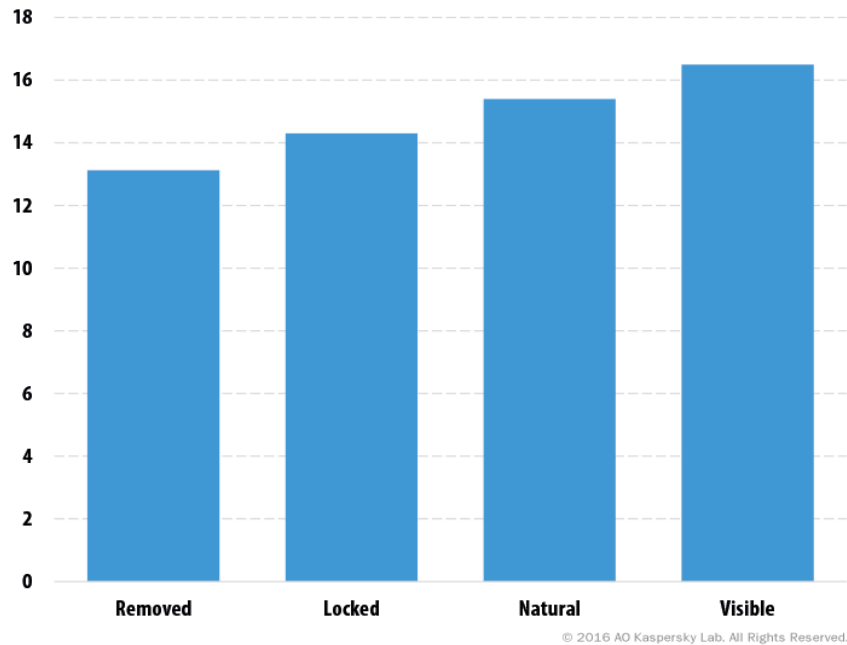


Figure 1: Mean values of task performance over all manipulations

From a scientific point of view: Performance, measured as the number of correctly identified letters in the attentional blink task, is lowest in the visible condition ($M = 13.12$, $SD = 3.85$), followed by the conditions with the phone not in view: the natural condition ($M = 14.32$, $SD = 3.50$) and the two conditions of separation where the smartphone is either locked away ($M = 15.40$, $SD = 3.94$) or removed from the room ($M = 16.52$, $SD = 3.78$).

#AnxiousWomen

Women were **more anxious** in the concentration test than men

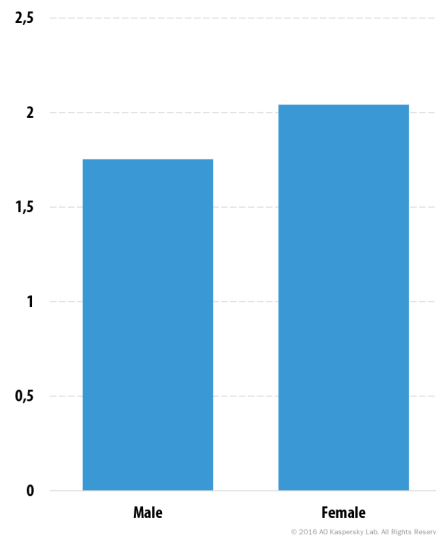


Figure 2: Mean value of anxiety for male and female participants

Scientifically speaking, across all experimental conditions the state of anxiety was significantly higher for females ($M = 2.04$, $SD = .56$) than for males ($M = 1.75$, $SD = .58$). Overall anxiety levels were on the lower side of the scale, with a score of four indicating the maximum anxiety level recorded. This may be due to the safe environment in which the test was taken. Anxiety levels did not differ between experimental conditions, nor did any effects emerge for the other measures of arousal, pleasure, and dominance.

In summary, our findings indicate that it is the absence, rather than the presence, of a smartphone that improves concentration