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News from the field

TEACHING

The negative effects of laptop internet use during class
Ravizza, S. M., Uitvlugt, M. G., & Fenn, K. M. (2016). Logged in and zoned out: How laptop internet use relates to classroom learning. *Psychological Science*. DOI: 0956797616677314.

There has been an uptick in empirical evidence against using laptops in the classroom, such as those emphasizing handwritten notes over typing to improve learning (e.g., Mueller & Oppenheimer, 2014). The present study examines one issue related to classroom laptop use, the Internet. The authors examined classroom performance as a function of time the student spent on the Internet during class. This objective measure of Internet use was accomplished by instructing participants in an Introductory to Psychology lecture to login to a proxy server during class throughout the semester. By directly measuring Internet use the authors circumvented potentially inaccurate information about Internet use that may occur during self-report, a potential criticism of previous work on this topic. The variables examined included an estimate of the average time spent online, the actual number of the average http requests, self-reported Internet use in response to an end of the semester survey, classroom performance as measured by score on the cumulative final exam, and intelligence as measured by the participants ACT score obtained from the registrar.

The lectures during which Internet use was monitored lasted an hour and 50 min, including a 10-min break during which Internet use was not included in the study. During the 100 min of class time that was included in the analysis, the median time students spent on non-academic related sites (e.g., social media, email, shopping, watching videos, chatting, news, and playing games) was 37 min. Unsurprisingly, this non-academic Internet use was negatively correlated with their final exam grade.

Some students justify Internet use during class because they want to look up information related to class material. To examine the effectiveness of this claim, the authors also examined the relationship between academic Internet use and final exam grade. Academic Internet use included visits to websites like the university's learning management software Desire2Learn that housed course-related material, dictionary sites, and Wikipedia sites that were related to class but not those that were unrelated to class. The relationship between academic Internet use and final exam grade was not significant, indicating that the assertion that having Internet access improves grades appears to be unsupported.

Presented with the above evidence, some students may claim that they are intellectually superior to some of their peers and are therefore better at multitasking and will not suffer the detrimental effects of classroom laptop use described here. However, an analysis of intellectual ability as measured by ACT scores indicated that dividing students into two groups, those with high versus low ACT scores, showed a similar relationship between laptop Internet use and final exam score. This dispels the notion that some students are smart enough to be able to use the Internet during class with no negative consequences relative to their peers. In fact the negative relationship between laptop use and final exam score was larger for students with higher ACT scores (although this trend was not significant).

This past fall semester I implemented the rule that students on their laptops had to sit in the back three rows of the classroom. This classroom rule is consistent with those of my colleagues and was presented to the students on the first day of lecture while citing empirical evidence that laptop use is detrimental to their learning and distracting to their peers. At the end of the semester, a few students complained that it was

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unfair they had to sit in the back of the room and they introspected that having to sit in the back resulted in their lower grades. Of course, they were not forced to sit in the back of the room but clearly chose to do so rather than turn off their laptop. As additional evidence against classroom laptop use, as in the present study, accumulates it is tempting to completely ban laptops from the classroom. This study suggests that banning laptops entirely would likely improve the grades of the people in my classroom, eliminating the misconception that their low grade was a result of being in the back of the classroom rather than the more likely culprit of their low grade, using their laptop in the first place. – Ashleigh M. Maxcey

Additional References:
Mueller, P. A., & Oppenheimer, D. M. (2014). The pen is mightier than the keyboard advantages of longhand over laptop note taking. *Psychological Science*. DOI: 0956797614524581.

ATTENTION

Do angry faces draw attention?

Burra, N., Barras, C., Coll, S., & Kerzel, D. (2016). Electrophysiological evidence for attentional capture by irrelevant angry facial expressions. *Biological Psychology 120*, 69–80.

Burra, N., Coll, Y., S., Barras, C., Kerzel, D. (2017). Electrophysiological evidence for attentional capture by irrelevant angry facial expressions: Naturalistic Faces. *Neuroscience Letters 637*, 44–49.

The idea that threatening stimuli, and angry faces in particular, automatically draw attention is compelling to us (the authors of this comment). We get the feeling this might have evolutionary utility. But intuitions and evolutionary accounts of cognition can be slippery things.

Results demonstrating attentional bias to schematized angry faces have been criticized as a potential product of low-level salience rather than emotional content. These faces – indicating anger with heavily inclined eyebrows and upside-down smiles - may inadvertently create saliency by modulating spatial frequency or by creating intersection points between facial features and the head outline.

In these two papers Burra and colleagues report a set of careful ERP experiments that largely control for these low-level confounds. In both studies, attentional selection is indexed in lateralized ERP components – the N2pc in the 2016 study and the Pd in the 2017 study. This allows for a degree of insight on attentional processing that is not provided by measurement of behaviour alone.

In the first study, an angry distractor elicits an N2pc, reflecting attentional selection. Importantly, the N2pc disappears when the faces are inverted - a manipulation that presumably does little to the low-level features of the stimuli. The second study is similar to the first, but uses naturalistic photos of faces rather than schematics. Results again show that angry distractors elicit lateralized, attention-related ERP activity. But, critically and confusingly, the lateral component here is the Pd, not N2pc, reflecting attentional suppression rather than selection.

This, of course, raises a big question: why do participants select schematic angry faces but suppress real-world angry faces? Burra et al. (2017) offer an account based on differences in target / distractor similarity. In the 2016 study, the target shares key low-level features with the angry distractor, making them hard to distinguish. Participants occasionally attend to the distractor because they have mistaken it for the target. This similarity is reduced in the 2017 study when naturalistic faces are employed, so participants never make this mistake and are able to consistently suppress the distractor.

The implication is that angry faces are salient, but do not invariably draw attention. Unfortunately, Burra et al. do not show us the experiment that would nail this issue shut. That would show that a schematic angry face elicits a Pd when target / distractor similarity is reduced, and, for us at least, some lingering doubt will remain until this appears. However, our (slippery) intuitions like the idea that angry faces are inherently salient, but that the influence of this salience on the deployment of attention is under strategic control. – Nicholas Menghi & Clayton Hickey