

Costly Cell Phones: The Impact of Cell Phone Rings on Academic Performance

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College students participated in a study on the “psychology of note taking” during which they took notes on video content and later completed a multiple-choice test on the material. Researchers assigned 71 participants to either the ringing condition (the video was disrupted by a ringing cell phone) or the control condition (no cell phone rings disrupted the video). The hypothesis that the cell phone rings would impair performance was confirmed. Compared to the control group, participants in the ringing condition performed significantly worse on the disrupted test items and were less likely to include the disrupted information in their notes. Citing empirical evidence of academic impairment in course syllabi may improve regulation of cell phone use in the classroom.

The primary difference between the . . .” (a ringing cell phone distracts the students attending the lecture), “which accelerates heart rate and inhibits peristalsis, and the (the phone rings again) . . .”

Students who experience a cell phone intrusion, as in this example, might be unable to identify the disrupted lecture content, and thus their learning could be impaired. The purpose of this study was to determine if a ringing cell phone impacts learning in the classroom.

Researchers have used a variety of methodologies to establish that noise impairs participants’ performance on cognitive tasks (Banbury, Tremblay, Macken, & Jones, 2001; Tremblay, Nicholls, Alford, & Jones, 2000). In typical laboratory experiments, researchers expose college students to a noise (e.g., tone, speech) while they are completing a reading comprehension task or attempting to memorize

a stimulus, such as a list of ordered words (Hughes & Jones, 2001). In field studies, experimenters examined the negative impact of environmental noise (e.g., trains, airports) on children’s academic performance in school (Enmarker, Boman, & Hygge, 2006; Hygge, 2003). The control afforded by experimental design has enabled researchers to identify how various characteristics of the sound or task can impair performance, albeit in a sterile environment. The ecological validity of the field studies highlights the real-world consequences of noise with regard to education, specifically grade impairment. Unfortunately, attempts to abate environmental noises (e.g., trains) have not sufficiently eliminated students’ impaired performance, indicating that researchers should examine irrelevant noises that could be more feasibly eliminated (Shield & Dockrell, 2003), specifically, noise generated from inside the classroom, a source that researchers typically neglect (Dockrell & Shield, 2006).

Despite evidence that people consider the use and ringing of cell phones in the classroom inappropriate and problematic (Wei & Leung, 1999), with both faculty and students reporting support for efforts to regulate cell phone use (Campbell, 2006), ringing cell phones continue to invade college classrooms (Gilroy, 2004). The purpose of this study was to determine if the effects of noise on academic performance generalize to that of the cell phone ring in a real-world setting. Specifically, we hypothesized that a cell phone ring originating from inside a classroom would impair participants’ performance on a recognition task and that a cell phone ring would decrease the probability that participants record critical lecture material in their notes.

Participants

Researchers recruited 71 (23 men, 48 women) undergraduate students through the psychology department's participant pool. Participants believed they were participating in a study examining the "psychology of note taking" in exchange for research credit. The sample's mean age was 20.21 years ($SD = 2.13$), and most participants (83.1%) were White.

Procedure

Researchers randomly assigned 32 (12 men, 20 women) participants to the ringing condition and 39 (11 men, 28 women) participants to the nonringing condition. After obtaining informed consent, researchers informed participants that they would watch an educational video (Blue, Thomas, Ackerman, & Lustig, 1995), during which they would take notes as they would during a lecture. Researchers also told participants that they would complete an eight-item multiple-choice comprehension test without notes. To ensure that participants approached the task in a serious and motivated manner, researchers informed participants that those who scored highest on the test would be eligible to win a gift certificate to a local restaurant.

In the ringing condition, cell phone rings disrupted the viewing of the video. At two predetermined times, a confederate caller phoned a confederate recipient seated in the center of the classroom. The phone rang for 5 sec while the confederate recipient "searched" through a backpack. In the nonringing condition, there were no cell phone disruptions.

Following the video, researchers collected the notes, and participants completed a multiple-choice test that assessed their ability to recognize factual video content. Two of the test questions corresponded with information presented at the time of the two phone calls in the ringing condition. Upon completion of the test, participants completed an item that served as a manipulation check (97.2% of the participants correctly identified the absence or presence of a cell phone ring). Additionally, two raters coded the participants' notes for the absence or presence of the information presented during the ringing of the phone (93.3% inter-rater agreement).

We used 2 (condition: ringing or control) \times 2 (item performance: correct or incorrect) chi-square contingency tests to determine if participants in the ringing condition performed significantly worse than participants in the control condition on the disrupted test items. Participants in the ringing condition scored significantly worse than the participants in the control condition on the first disrupted item, $\chi^2(1, N = 71) = 8.54, p = .003$, and the second disrupted item, $\chi^2(1, N = 71) = 6.83, p = .009$ (see Table 1 for percentages). There were no significant differences between the conditions on the six nondisrupted test items. Two 2 (condition: ringing or control) \times 2 (presence in notes: yes or no) chi-square contingency tests revealed that participants in the ringing condition were less likely to record the necessary information for the first disrupted item, $\chi^2(1, N = 71) = 5.58, p = .018$, and the second disrupted item, $\chi^2(1, N = 71) = 11.30, p = .001$, when compared to participants in the control condition (see Table 1).

Discussion

Findings indicated that cell phone rings during a video presentation impaired academic performance. Specifically, participants in the ringing condition performed worse on disrupted test items and were less likely to have recorded pertinent test information for disrupted test items than participants in the control condition.

Table 1. Comparison of the Academic Performance of Participants in the Control and Ringing Conditions

| Academic Task | Disrupted Item | Condition | |
|--------------------|----------------|-----------|----------|
| | | Control | Ringing |
| Correctly answered | | | |
| | Test Item 1 | 94.9% | 68.8%** |
| | Test Item 2 | 79.5% | 50.0%** |
| Presence in notes | | | |
| | Test Item 1 | 79.5% | 53.1%* |
| | Test Item 2 | 82.1% | 43.8%*** |

Note. Table indicates the percentage of participants in each condition.

* $p < .05$. ** $p < .01$. *** $p = .001$.

There are several limitations to consider. In an attempt to standardize the lecture, researchers chose to use a video instead of a teacher. If the participants could have requested that the teacher repeat the disrupted information, the negative effects of a ring might have disappeared. The timing of the test might have impaired performance. If tested at a later date, students could attempt to combat the impairment (e.g., reference the course textbook), although the data suggest that “studying their notes” would be an ineffective strategy as the notes were more likely to be missing the relevant information. Despite these limitations, other characteristics associated with cell phone disruptions might have led to greater impairment. For example, research suggests that had we used a ring tone with acoustic variation (e.g., a song), increased test item difficulty, and measured recall performance, the impairment would have been more pronounced (Hygge, 2003; Tremblay et al., 2000).

Faculty and students must continue to support policies that regulate cell phone use in the classroom (Gilroy, 2004). Policies requiring students to reduce the volume of the tone or change the ring to vibration mode might be ineffective, as the mere audibility of noise, not necessarily intensity, impairs performance (Banbury et al., 2001; Hughes & Jones, 2001). Wei and Leung’s (1999) participants perceived that self-regulation of one’s personal cell phone use would be an effective means of curbing inappropriate cell phone use. If professors disseminate the results of this and future studies to students (e.g., syllabus content), it might provide an incentive, specifically a simple means of preventing impaired academic performance, for the students to regulate their use.

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Notes

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