



## KEY POINT SUMMARY

### OBJECTIVES

The purpose of the study was to examine the effects of distractors/stressors in operating rooms on surgeon performance in a simulated experimental setting.

### DESIGN IMPLICATIONS

Operating room environment should be configured so that unnecessary distractions can be minimized.

Music may have a negative impact in combination with other distractors under certain circumstances while it may be beneficial in other situations. Proper control of music may be provided to avoid negative effects.

## Do Absorption and Realistic Distraction Influence Performance of Component Task Surgical Procedure?

Pluyter, J. R., Buzink, S. N., Rutkowski, A. F., Jakimowicz, J. J.  
*2010 | Surgical Endoscopy*  
*Volume 24, Issue 4, Pages 902-907*

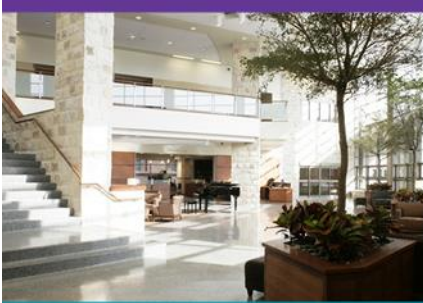
### Key Concepts/Context

Surgeons' ability of focusing their attention on surgical tasks directly impacts their performance on surgical operations, which is an important factor influencing quality of care, work efficiency, patient satisfaction, and many other healthcare outcomes. Attention or concentration is more important for performing minimal invasive surgeries which involve complex technologies and put high physical and cognitive demands on surgeons. However, organizational, environmental and team-related distractors or stressors exist in operating rooms and may negatively influence surgeons' performance on complex surgical tasks. Common sources of distraction and stress in operating rooms include noise (e.g. phone calls), music, communication irrelevant to the operations, inappropriate temperature, sleep deprivation, time pressures due to scheduling, workload, and unsuitable ergonomics.

A surgeon's cognitive style influences the level of irritation caused by external distractors or stressors. Cognitive absorption (CA) refers to a cognitive state of deep engagement and total attention to software that leads to imperviousness to distractors or stressors. Need for cognition (NFC) refers to an individual's tendency to engage and enjoy thinking. It is positively related to CA. These two aspects of cognitive style may mediate the effects of environmental distractors or stressors (e.g. noise) on surgeon performance.

### Methods

In this experimental study, 12 intern surgeons under training without previous simulator or laparoscopic experience were selected. All interns were instructed to perform laparoscopic tasks in a series of exercise sessions on a virtual reality simulator, including two runs of practices on five exercises, baseline session on one



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selected laparoscopic exercise, same exercise under non-distraction condition, and same exercise under distraction condition (a combination of distractions from music, staff communication irrelevant to the exercise, and bad laparoscope navigation). Task completion, task errors, economy of movement, and time required for procedure completion were outcomes automatically recorded by the surgical simulator. Blood pressure and heart rate were measured by a noninvasive measuring device throughout the process. A questionnaire was used to measure perceived irritation, NFC, CA, demographics, and experience at three time points along the experiment process (at the very beginning, right after the exercise under non-distraction condition, and right after exercise under distraction condition). Paired statistical tests were used to compare the performance of the same group in different conditions. Differences in task performance between interns with different cognition styles (medium CA vs. high CA, low NFC vs. high NFC) were also examined.

## Findings

Paired comparisons showed that better task completion and fewer task errors were recorded under non-distraction condition than the distraction condition. A learning effect was shown—performance (task completion, time required for procedure) in baseline exercise was better than in practice. The interns reported higher level of irritation due to noise in the distraction condition than in the non-distraction condition. The interns with relatively low cognitive absorption and low need for cognition were more likely to be impacted by the distractors and reported higher level of irritation.

## Limitations

There were several limitations of this study:

- The study only showed a combined effect of distractors. The individual effects of distractors (i.e. music, irrelevant communication, and bad laparoscope navigation) cannot be disentangled because the distractors were not individually studied.
- The article did not include details about the development and testing of the questionnaire for the measurement of self-reported irritation and cognitive style. The results might have been biased by inaccurate measurement.
- The results were from an experiment on intern surgeons under training in a simulated environment and may not be readily applied to other more experienced surgeons in real-life operating rooms.