



## KEY POINT SUMMARY

### OBJECTIVES

The purpose of the study was to examine the effects of music in operating rooms on the performance of anesthesia monitoring in a simulated experimental setting.

### DESIGN IMPLICATIONS

Operating room environment should be optimized to facilitate anesthesia monitoring by providing music controllable by anesthetists.

## The Effects of Ambient Music on Simulated Anaesthesia Monitoring

Sanderson, P.M., Tosh, N., Philp, S., Rudie, J., Watson, M.O., Russell, W.J.  
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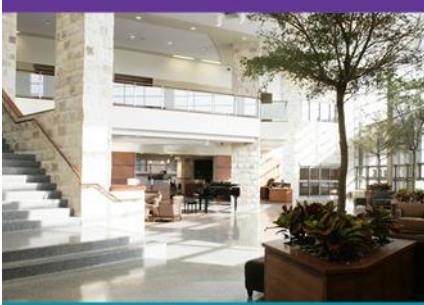
### Key Concepts/Context

While working in operating rooms, surgeons, anesthetists, and other staff need to be highly concentrated on the tasks they are performing. However, noise or other environmental factors may distract staff's attention from core tasks and interfere with staff communication. As a result, staff's work performance and efficiency may be deteriorated.

One potential source of noise is music that often played in operating rooms. Research around music in operating rooms produced mixed results. Some research showed benefits of music in improving surgeon performance while other research indicated that staff generally preferred silence than music and found music distracting. The effect of music may vary depending on many environmental and personal factors, such as the loudness, presence of other distractors, music style, and listener's personal preference and familiarity of certain music type.

### Methods

In this experimental study, 24 college students without any previous training in anesthesia monitoring (12 with and 12 without music training) were instructed to monitor patient vital signs on an anesthesia simulator under three environmental conditions (i.e. no music, classical music, and rock music). After a 2-hour training, participants monitored both visual and auditory signs presented by the simulator, including electrocardiography and capnography waveforms, pulse oximetry of heart rate and SpO<sub>2</sub>, auditory tones of respiratory rate, tidal volume, and so on. Participants completed monitoring tasks in nine predetermined anesthesia scenarios divided in three clusters, each of which contained one scenario with no music, one with classic music, and one with rock music. To avoid potential biases due to the order of music, the order of environmental conditions was counterbalanced across clusters. During each scenario, participants responded to recorded questions



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and indicate whether a specific vital sign (e.g. heart rate) was normal, high, or low and whether it was steady, increasing, decreasing or fluctuating. Participants also rated the ease of monitoring after each scenario, each cluster, and the whole experiment. The percentages of correct responses and subjective ratings of ease of monitoring were compared across three conditions.

## Findings

Participants' monitoring accuracy (including abnormality and directional judgments) was comparable to the performance of experienced anesthetists on similar tasks. Participants made more accurate judgments about trending of vital signs (direction judgments) when the music was played (with no difference found between classic and rock music). Participants with music training were more accurate in directional judgments than participants with no music training. Greater benefits of music over no music in improving directional judgment accuracy were shown in participants with no music training than those with music training. No effects of music were found on abnormality judgment. Participants reported that it was easiest to monitor when there was no music and music might worsen concentration but they were more enjoyed the process when music was played.

## Limitations

There were several limitations of this study:

- The experiment was conducted on college students with only 2-hour of training in anesthesia monitoring in a simulated environment. The results may not be readily applied to more experienced and better trained anesthetists (who possibly have different reaction to music and different patterns of attention) in real-life operating rooms.
- It was not clear whether the music had more impact on the monitoring of auditory vital signs than the monitoring of visual signs. Further research is needed to examine whether the improvement in monitoring performance is caused by a general arousing effect or only an acoustic effect of music.
- The study did not examine the effects of other factors such as the loudness of music that may potentially influence the results.