Interruptions, distractions and situation awareness in advanced display studies

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**Background**

Advanced monitoring displays can help anesthesiologists detect clinical events faster and improve their situation awareness of the patient\textsuperscript{1}. However, anesthesiologists must be aware of more than just the patient’s physiology. For example, if while monitoring the patient the anesthesiologist can detect errors made by other staff, then patient safety can be improved. Some displays help anesthesiologists perform multiple tasks better, but tests of handling multiple tasks are seldom part of display evaluations\textsuperscript{2}. Recent research suggests that interruptions can make clinicians more prone to error\textsuperscript{3}. We present an example of how anesthesiologists’ management of an interruption can affect their situation awareness of non-patient but clinically relevant events.

**Methods**

We manually reviewed video recordings of 12 anesthesiologist participants from the Royal Adelaide Hospital who were presented with a “failure to check blood” event in a simulator study of head-mounted displays\textsuperscript{3}, illustrated below.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Number of participants</th>
<th>Detected</th>
<th>Missed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interruption</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Multitasking</td>
<td>1 (late)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Deferred Task</td>
<td>4</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Blocking</td>
<td>5</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

**Results**

As the far right table shows, the only two participants who missed the event both immediately agreed to organise an HDU transfer and then became engaged in doing so (Interruption). One participant initially missed the event because he was organising the HDU transfer and directing the nurse to apply a pressure bag (Multitasking) and he only detected the event later after the transfer was complete. Four participants immediately agreed to the transfer, either performed or delegated the blood check, and then organised the HDU transfer (Deferred Task). The remaining five participants provided justifications for denying the surgeon’s request and closed the conversation (Blocking).

**Conclusions**

Anesthesiologists’ strategies for responding to interruptions and handling multiple tasks can directly affect their detection of clinically relevant events. Few studies of the impact of advanced displays have manipulated multitasking, interruptions and distractions\textsuperscript{4} but effective displays should mitigate the effects of interruptions. Overall, broader test scenarios are needed to determine whether a display will affect anesthesiologists’ awareness of safety-critical but non-physiological events in the operating room.

**References**


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