Editorial

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Workplace distractions in the digital era – are smartphones a threat to safety or an essential tool?

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Keywords: Safety
Technology
Communication

Short title: Smartphones: threat to safety or essential tool?

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Anaesthesia is a technologically-dependant specialty. Whilst the impact of total intravenous anaesthesia, video laryngoscopes and ultrasound-guidance – to name but a few influential recent technologies – have been extensively studied [e.g. 1-4], the professional use of smartphones in anaesthesia remains relatively under-investigated. This is perhaps an oversight considering that this ubiquitous accessory now reaches into nearly every aspect of our lives, from communication to study, shopping and dining, and indeed – to professional practice.

In this issue of *Anaesthesia*, van Harten et al. report 'an observational study of distractions in the operating theatre' [5], which amongst other findings, highlights the (distracting) role played by smartphones. In this editorial we consider the utility and methodology of van Harten et al.'s work, reflect on the extent to which smartphones may threaten patient safety in anaesthesia, and ask how this can be balanced against their prominent and increasing role as a professional tool.

Observational research and patient safety

Though it includes quantitative elements to classify distractions by type and impact on workflow [5], van Harten et al.'s study is situated within a methodological tradition of qualitative patient safety research in which observers record and analyse clinical practice [e.g. 3,6-8]. This approach was adopted in the general operating theatres of a large Dutch hospital in order to understand why 'case irrelevant communication' (i.e. communication not directly related to the case currently in progress) occurs. Asking *why* a phenomenon occurs within social groups requires an approach that 'gets beneath the surface' and derives findings from the systematic interpretation of unstructured data [9]. In this case, van Harten et al. describe their study as adopting an 'ethnographic approach'; a methodology concerned with the use of observation to understand cultures and societies, which often takes place in everyday settings.

As with all qualitative research the influence of the research team should be considered, including the role of the observer [9]. Observations are traditionally classified either as 'overt', in which the identity and purpose of the observer is declared, or 'covert', when the observer does not declare their purpose, and is typically present in the guise of another role, e.g. a medical student [9]. Van Harten et al.'s study incorporates elements of both approaches: in the first phase participants knew

they were being observed but did not know why, whereas in the second phase the observer prompted team debriefs about whether silence had been observed appropriately. The 'semi covert' approach in phase 1 is presumably in order to mitigate the so-called 'Hawthorne effect' – when participants behave differently under conditions of observation [9], whereas the second approach aims to generate dialogue about the topic of interest.

Despite the attempt to reduce the Hawthorne effect in this study, it is reasonable to consider how the presence of a researcher in the operating theatre may influence behaviour, even when participants do not know the purpose of the research. In our experience, those who are observed try to represent themselves well, and studies such as this therefore tend to represent what the participants perceive as 'good practice' [8]. It is striking therefore that van Harten et al. observed distractions and interruptions so frequently – approximately once every two minutes. This suggests that whilst the observer was able to detect these through careful observation, operating theatre staff had become so accustomed to interruptions that they failed to notice and mitigate them. This capacity to find novelty and meaning in routine occurrences, sometimes known as 'making the familiar strange', is a key tenet of ethnographic research [10].

Distractions and the operating theatre

The role of distractions has long been of interest to patient safety researchers in anaesthesia [11-13]. This appears to be due to the perception that some phases of anaesthetic work are what van Harten et al. describe as 'low workload', occupied by 'passive tasks' such as monitoring. Whilst integral to anaesthesia practice, passive tasks are seldom explicitly recognised. For example, the Association of Anaesthetists' *Recommendations for Standards of Monitoring During Anaesthesia and Recovery* states that 'the anaesthetist must be present and care for the patient' - that the anaesthetist should remain vigilant and maintain situation awareness is left unsaid [14].

Van Harten et al. identify that during times of 'low workload' staff seek distraction, for example engaging in conversation 'to stay alert and active'. In interpreting distractions in this way, two categories are defined - distractions at times of high workload (e.g. during induction of anaesthesia) which may be detrimental to patient safety, and those that are *sought* during times of low workload in an effort to maintain alertness. Though the notion that humans have a homeostat for cognitive arousal at which they feel comfortable has face validity, there is scant evidence at best that this

phenomenon is in any way beneficial to vigilance [11]. Indeed, 'low workload' may be a misnomer – whilst 'workload' carries connotations of visible physical labour, cognitive work can be unseen. Indeed, psychologists contend that attention during monotonous tasks is effortful, but in the absence of *interest*, a sense of boredom is induced [15]. Seeking distraction during passive tasks may, therefore, simply represent a break in the monotony rather than a strategy to improve situation awareness overall.

Professional empathy

Distractions, then, may be damaging but also appeal to an apparent human need for interest during monotonous tasks. It is in this respect that van Harten et al.'s study elicits an important finding – staff who work in the operating theatre are not a unified group, but a collection of sub-teams: surgery, anaesthesia and scrub [5]. The workload of these teams is described as 'asynchronous': a recognisable concept for many anaesthetists who will be familiar with noticing an impatient surgical colleague peering through the anaesthetic room door during induction, and then sitting wearily through what seems like an interminably long operation. Of course, in this circumstance both parties are simply providing safe care, but because the peaks and troughs in their workload do not synchronise, they lack empathy for what the other is doing. This is described as 'division of professions' by van Harten et al., who go on to explain that social interactions sought during passive tasks by one sub-team often occur at a time when they are most distracting to others.

The concept of the 'sterile cockpit' has been proposed as a solution to the unmet need for silence during demanding periods of peri-operative care [16]. Its origins lie in a Federal Aviation Administration regulation that forbids non-essential activities during 'critical phases' of flight, such as flying below 10,000 feet [17]. This has led to a proposal that the phrase '10,000 feet' be used as call-out to indicate a need for quiet by a member of the operating theatre team [18]. However, as van Harten et al. point out, this is still in essence a request for silence which, according to their findings, colleagues seldom feel empowered to make.

Increased understanding and quiet distractions

What, then, are the potential solutions to address the problem of distractions caused by colleagues who work asynchronously? Van Harten et al. propose that a cultural shift is required – away from an expectation that professionals should be able to cope with distractions [e.g. 12,19], and towards a culture where colleagues understand and facilitate one-another's need to concentrate at particular junctures. In illustrating this, van Harten et al. describe one group (an 'exception') who worked in this way. Here, the qualitative findings indicate subtle behaviours unique to this team. For example, the drape between the anaesthetist's workspace and that of the surgeon was kept low, facilitating mutual awareness, and these colleagues sat together for lunch whereas other sub-teams 'turn[ed] to [their] own corner of the canteen' [5]. Though this particular team had cultivated their relationship through years of working together, clinical training may have a role in facilitating an empathetic approach to teamwork. It is notable for example, that in the UK surgeons require no exposure to anaesthesia as part of their training, and nor do anaesthetists require any exposure to surgery, beyond the few months typically spent as a surgical foundation programme trainee. Here, we can look to the *advanced labour ward practice* training module offered to obstetric trainees, in which a short attachment to anaesthesia is required [20]. This, to our knowledge, is the only surgical specialty training curriculum in the UK that requires anaesthetic experience; perhaps this should be extended to all surgical trainees, and perhaps anaesthetists should reciprocate?

Even if training can be amended, culture change is notoriously difficult to effect [e.g. 21], so perhaps a more pragmatic solution is required. Imposing a blanket rule similar to that of the Federal Aviation Authority is a possibility [17], however, in view of the apparent need to seek distraction during passive tasks and the asynchrony of operating theatre work, van Harten et al. caution against this approach, noting 'it is not expedient to expel case-irrelevant verbal communication, unless one has an alternative that would fill the void' [5]. Here however, we wonder if van Harten et al.'s own data provides a solution; though they find that smartphones can distract, they also find that they tend only to distract the user rather than the whole team. This quiet form of distraction may reconcile the need for some to seek diversion whilst others focus. Indeed, perhaps this is why smartphone use was so commonplace in van Harten et al.'s observations – team members may have been alleviating their own boredom, but not wishing to impose distraction on others.

Smartphones and the operating theatre

That smartphone use was recorded so often in van Harten et al.'s study, even in the presence of an observer, suggests smartphones are accepted in the operating theatre just as in everyday life. But should this be the case? It could be argued that they are merely another screen amongst a plethora of devices including electronic patient records, anaesthetic machines and ultrasound scanners. And it is without doubt that they have much to offer as a professional tool: applications and browsers provide ready access to information often unobtainable on workplace computers with restricted internet access; encrypted messaging provides a secure means to communicate with colleagues [22]; social media is valuable for continuing professional development [23]; and mobile platforms provide an efficient method for acquiring research and audit data [24]. However, as demonstrated in a vignette from van Harten et al.'s data in which staff members gather together to laugh at a video on a colleague's smartphone [5], the versatility of these devices makes them potentially as disruptive as they are useful. Furthermore, smartphone use carries with it a degree of professional risk. Writing about intra-operative reading in 2009, Slagle and Weinger noted that 'even in the absence of evidence of actual negative impact, [it] may look bad and give the appearance of inattention' [13]. We suspect that Slagle and Weinger's observation remains applicable in the smartphone era, and though the opinions of others are perhaps not a useful measure of safety, an appearance of inattention can be important both in terms of team dynamics and medicolegal implications [25]. Should a critical incident occur, the 'always on' nature of smartphones means that usage data around the time the event could be obtained as part of any resultant investigation [26].

In balancing the advantages of smartphones against their potential disadvantages, it is clear that there are times when it is inappropriate to use a potentially-distracting device. Van Harten et al.'s data suggests that operating theatre staff already tend to self-regulate with regards to their own workload. However, it is in considering the needs of others where improvement must be made. We believe that van Harten et al.'s qualitative data provides useful direction here: rather than viewing smartphone use as a single activity, users should be mindful of the impact of different mobile tasks. For example, browsing Twitter or sending messages (with the alert tone silenced) may have little effect on others, whereas colleagues crowding round a smartphone to view a video is clearly disruptive. Whilst some of this is undoubtedly due to audio-visual distraction, in the instance reported by van Harten et al. there was also an element of envy – of missing out on something entertaining – an important distractor in itself [5]. This suggests that the use of smartphones for pure leisure, for example gaming, may not only distract the individual but also lead to tension amongst the team and, we believe, would be perceived with particular distain in the investigation of any incident [25]; this should therefore be avoided.

Conclusion

Van Harten et al.'s study usefully updates the patient safety literature for the digital age. In unpicking how and why smartphones are used in the operating theatre, they show that smartphones can be a distractor, but this should be balanced against the many professional benefits that they offer. In doing this, anaesthetists should adopt a responsible professional approach to the use of mobile technology, and consider the impact of different mobile tasks not only to themselves, but to others. A more empathetic approach may yield benefits to safety and teamwork; we encourage colleagues to reflect on how the workload of their practice synchronises with that of others, and consider the appropriate way to tap, zoom and swipe in the workplace.

Acknowledgements

AFS is an editor of *Anaesthesia*. No other competing interests and no external funding declared.

References

1. Miller D, Lewis SR, Pritchard MW, et al. Intravenous versus inhalational maintenance of anaesthesia for postoperative cognitive outcomes in elderly people undergoing non-cardiac surgery. *Cochrane Database of Systematic Reviews* 2018; **8**: CD012317.
2. Lewis SR, Butler AR, Parker J, Cook TM, Schofield-Robinson OJ, Smith AF, Videolaryngoscopy versus direct laryngoscopy for adult patients requiring tracheal intubation: a Cochrane Systematic Review. *British Journal of Anaesthesia* 2017; **119**: 369–83.
3. Shelton CL, Mort MM, Smith AF. Techniques, advantages, and pitfalls of ultrasound-guided internal jugular cannulation: a qualitative study. *Journal of the Association of Vascular Access* 2016; **21**: 149-56.
4. Kåsine T, Romundstad L, Rosseland LA, et al. The effect of needle tip tracking on procedural time of ultrasound-guided lumbar plexus block: a randomised controlled trial. *Anaesthesia* 2020; **75**: 72-9.
5. Van Harten A, Gooszen HG, Koksma JJ, Niessen TJH, Abme TA. An observational study of distractions in the operating theatre. *Anaesthesia* 2020; in press.

6. Smith AF, Pope C, Goodwin D, Mort M. Communication between anesthesiologists, patients and the anesthesia team: a descriptive study of induction and emergence. *Canadian Journal of Anesthesia* 2005; **52**: 915-20.
7. Kredit AC, Kalkman CJ, Bonten MJ, Gigengack ACM, Barach P. Hand hygiene practices in the operating theatre: an observational study. *British Journal of Anaesthesia* 2011; **107**: 553-8.
8. Shelton CL. *In Search of the 'Good Anaesthetic' for Hip Fracture Repair: Difference, Uncertainty and Ideology in an Age of Evidence-Based Medicine* (PhD thesis). Lancaster: Lancaster University, 2019.
9. Shelton CL, Smith AF, Mort M. Opening up the black box: an introduction to qualitative research methods in anaesthesia. *Anaesthesia* 2014; **69**: 270-80
10. de Jong M, Kamsteeg F, Ybema S. Ethnographic strategies for making the familiar strange: Struggling with 'distance' and 'immersion' among Moroccan-Dutch students. *Journal of Business Anthropology* 2013; **2**: 168-86.
11. Slagle JM, Weinger MB. Effects of intraoperative reading on vigilance and workload during anesthesia care in an academic medical center. *Anesthesiology* 2009; **110**: 275-83.
12. Campbell G, Arfanis K, Smith AF. Distractions and interruption in anaesthetic practice. *British Journal of Anaesthesia* 2012; **109**: 707-15.
13. Jenkins A, Wilkinson JV, Akeroyd MA, Broom MA. Distractions during critical phases of anaesthesia for caesarean section: an observational study. *Anaesthesia* 2015; **70**: 543-8.
14. Association of Anaesthetists of Great Britain and Ireland. Recommendations for standards of monitoring during anaesthesia and recovery 2015. *Anaesthesia* 2016; **71**: 85-93.
15. Langner R, Eickhoff SB. Sustaining attention to simple tasks: a meta-analytic review of the neural mechanisms of vigilant attention. *Psychol Bull* 2013; **139**: 870-900.
16. Broom MA, Capeck AL, Carachi P, Akeroyd MA, Hilditch G. Critical phase distractions in anaesthesia and the sterile cockpit concept. *Anaesthesia* 2011; **66**: 175-9.
17. Federal Aviation Administration. Code of Federal Regulations, Section 121.542. 2014. https://rgl.faa.gov/Regulatory_and_Guidance_Library/rgFAR.nsf/0/7027DA4135C34E2086257CBA004BF853?OpenDocument (accessed 30/06/2020).
18. Smith P. *The Below Ten Thousand Way to a Clinician-Led Safety Culture*. Blue Mountains: Moshpit Publishing, 2019.
19. Orri M, Farges O, Clavien P-A, et al. Being a surgeon – the myth and the reality: a meta-synthesis of surgeons' perspectives about factors affecting their practice and well-being. *Annals of Surgery* 2014; **260**: 721-8.

20. Royal College of Obstetrics and Gynaecology. ATSM: Advanced labour ward practice (2018). 2018. https://www.rcog.org.uk/en/careers-training/specialty-training-curriculum/atsms/atsms-pre-august-2019/atsm-advanced-labour-ward-practice-2018/ (accessed 30/06/2020).
21. Scott JT, Mannion R, Davies HTO, Marshall MN. Implementing culture change in health care: theory and practice. *International Journal for Quality in Health Care* 2003; **15**: 111-8.
22. Thomas K. Wanted: a WhatsApp alternative for clinicians. *BMJ* 2018; **360**: k622.
23. Johannsson H, Selak T. Dissemination of medical publications on social media – is it the new standard? *Anaesthesia* 2020; **75**: 155-157.
24. Duggan LV, Lockhart SL, Cook TM, O'Sullivan EP, Dare T, Baker PA. The Airway App: exploring the role of smartphone technology to capture emergency front-of-neck airway experiences internationally. *Anaesthesia* 2018; **73**: 703-10
25. Nicholson E. Dallas Anesthesiologist Being Sued Over Deadly Surgery Admits to Texting, Reading iPad During Procedures. 2014. https://www.dallasobserver.com/news/dallas-anesthesiologist-being-sued-over-deadly-surgery-admits-to-texting-reading-ipad-during-procedures-7134970 (accessed 11/07/2020)
26. Cammarata BJ, Thomas BJ. Technology's Escalating Impact on Perioperative Care: Clinical, Compliance, and Medicolegal Considerations. *APSF Newsletter* 2014; **29**: 3.