

## The Article : “Helping experts and expert teams perform under duress: an agenda for cognitive aid research.”

Marshall, S. D. (2017)

[Anaesthesia, 72: 289–295. doi:10.1111/anae.13707](https://doi.org/10.1111/anae.13707)

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### First Published :

- 29/03/2017

Simulcast Journal Club is a monthly/ series heavily inspired by the [ALIEM MEDIC](#) Series.

It aims to encourage simulation educators to explore and learn from publications on Healthcare Simulation Education.

Each month we publish a case and link a paper with associated questions for discussion.

We moderate and summarise the discussion at the end of the month, including exploring the opinions of experts from the field.

### The Case :

Nimali and Cath sat on the hospital balcony and clutched their coffee flasks in the cold morning air, as they had done together for the last 3 years. Handover was in 15 minutes, but Nimali knew that with her upcoming conference presentation a week away this was likely the last chance she'd have to catch up with her friend before then. And she had sensed that something was wrong.

“The truth is,” Cath sighed, “I’m ashamed.”

“We had this kid last week come in in asystole. I wasn’t team leading, but as the new consultant on the block I wanted to help out. I got asked to do CPR, so I did CPR... I did continuous chest compressions for 2 minutes, with great swaps with Brad, and together we kept good quality going CPR going for about 15 minutes.

But when ICU came down, they asked me whether the patient had a pulse. And I realised for the last 15 minutes we’d been giving CPR without even a pulse or rhythm check.”

She stared out at the traffic below for a while before continuing.

“I’m the consultant. I teach Advanced Paediatric Life Support. I teach on Paeds BASIC. I’ve been doing this for 10 years. The next kid who comes in with asystole might have me in charge, team leading. But when this really sick kid actually came in, everything I’d learned, everything I’d taught, it all went out the window. It’s made me think that deep down, maybe I’m just not that good at this.”

Nimali put her hand on Cath’s shoulder and gave a wry smile. It was company and a safe reflective space that her friend needed now, but the educator in her just couldn’t stay quiet.

“Have you read the Checklist Manifesto?” she asked.

### Discussion :

Cognitive Aids are often recommended by Simulation Educators as important tools in a resus, but uptake at many hospitals is scattered at best.

In his editorial in ‘Anaesthesia’ in November 2016, Dr Stuart Marshall provides an overview of current evidence around Cognitive Aids, identifies current knowledge gaps in the research and proposes a series of principles that should underline future research.

In doing so he provides not only important information for future researchers, but also a thorough overview of the principles behind Cognitive Aids in healthcare for clinical practitioners.

For our Journal Clubbers this month :

- If you are involved in clinical research, what points have you found pertinent in reflecting on your own study designs?
- If you are primarily a clinician, how have you found the implementation of cognitive aids in the workplace? What’s worked for you? Has this article changed your thoughts or approach to them?

## Article Summary :

In “*Helping experts and expert teams perform under duress: an agenda for cognitive aid research.*”, Dr Marshall provides a compelling overview on cognitive aids (CAs) and the research behind them.

The article begins by establishing current evidence for CAs in emergency situations, primarily arguing that “evidence from studies from anaesthesia, and emergency medicine have shown that displaying cognitive aids during emergencies reduces omissions, time to perform tasks and improves team skills, communication and performance in most instances.”. While the existence of some studies showing no improvements in crises with CAs is acknowledged, Dr Marshall argues that this is related to education on the tool or poor design of the tool itself.

He then examines current knowledge gaps and issues in cognitive aid research including :

- That clinical uptake of CAs is far less than we would anticipate, making investigation into the barriers against uptake important.
- The importance of orientation to the tool itself and the importance of “simplicity of design” for a tool to be used during stress.
- The difference between complex ‘foundational tools’ that teach management in depth vs ‘implementation tools’ that provide a concise structure to resuscitation.

The article then provides a variety of strategies to ensure appropriate streamlining of CA design, particularly around which items to include. Using examples from the development of the COVER ABCD acronym and the ANZAAG Anaphylaxis cognitive aid, he describes the identification and reworking of barriers to uptake.

Following this, Dr Marshall provides a series of discussion points regarding the implementation of CAs in context including :

- Keeping them closely related to nearby required equipment
- Pros and cons of smartphones CA storage
- Improved use with linear rather than branching algorithms
- The existence of a validated Cognitive Aid in Medicine Assessment Tool
- Integration into existing technology

Finally the article ends with a set of “principles for future cognitive aid research” in Table 3, which is a particularly useful read for both preparing future research and assessing current papers.

## Expert Opinion: Dr Stuart Marshall



*Stuart is a practicing anaesthetist, simulation educator and researcher with interests in Patient Safety and Human Factors / Ergonomics. He has served on the Australian Society for Simulation in Healthcare (ASSH) executive committee and the Victorian Simulation Alliance (VSA) board and is an active reviewer for Anaesthetic, Human Factors and Simulation journals and conferences. He is the convenor of the 7th International Clinical Skills Conference in Prato, Italy in 2017 and Associate Editor for the Advances in Simulation journal.*

*His research includes investigation of the effects of cognitive aids on team functioning during emergencies and on simulation as an educational technique to teach patient safety and improve patient and health worker outcomes. He has developed several innovative patient safety courses for both undergraduate and postgraduate students, and units for Masters courses in Perioperative Medicine, Health Professional Education, and Health Service Management.*

### Stuart’s response to this month’s article:

Thank you for the invite to comment and indeed thank you for choosing my paper for the journal club!

The case describes a situation that is perhaps more common than we think- an emergency where not everything that should have been done, was actually done. Why? Well unfortunately we all have limited brain-processing capacity that becomes further limited in stressful situations (1). Not only that, but (obviously) with situations we don’t see very often, we haven’t had chance to practice and remember all of the steps in order – even when we have access to regular simulation training! Cath did her best in the situation she found herself in, but not surprisingly she forgot one part of an extremely complex and stressful procedure.

Of course, there is another complicating factor here; that we are almost always part of a larger team in these circumstances. So added to the complexity of having to remember the actions to undertake, she had to process how to assign them to team members, monitor how the team was coping and adapt the team roles and goals to any changes in circumstances (2).

So how can we cement a team in an emergency whose members often don’t know each other, and remember all of the tasks of a complex emergency? The answer of course is having a cognitive aid (3). Interestingly, the book that has kick started the interest in cognitive aids, “The Checklist Manifesto” has very little on emergency cognitive aids (except arguably one case where the checklist failed- the landing on the Hudson River by Sullenberger and Skiles) and concentrates almost solely on routine events (4). Theoretically cognitive aids should be particularly useful in emergency situations where cognitive demands for both teams and individuals most markedly outstrip the resources that are limited in exactly the situation. There is a developing literature showing that cognitive aids are beneficial for individuals to remember items to complete (5) to improve their team behaviours (6), and to improve teamwork in general (7). Of course, there’s a problem though – it needs to be simple enough to use with those limited cognitive resources.

In order for it to be used the cognitive aid must be situated where it can be seen and accessed, it must be simple enough in its design to be able to be used when the user is stressed and the team members must be familiar with it (8, 9). Unfortunately, the latter two are often not well thought out. The design is often undertaken by committee with everyone wanting their input and particular soap box issue accounted for leading to overly complex material and (inevitably) a shrinking font size or growing paper size. Occasionally designs are undertaken by an enthusiastic clinician with a laminator. Some of these are good if basic design principles are applied and too much colour is avoided, but might lack the key information for the crisis. As noted in the article a specific human factors design process is ideal. Identifying the commonly missed steps or important information such as doses and integrating it with other design elements in the environment, such as kit dumps, or colour coded Broselow tape and draws.

Training with cognitive aids is crucial. Nobody will remember to use them if they haven’t already trained with them. All too often I’ve seen team leaders in simulation pick up cognitive aids and immediately put them down in disgust because they feel it’s only adding to their cognitive workload. Simulation training with the cognitive aid and good design (based on simulation testing) should act as reminders to help task completion and team allocations. One of the team members should be tasked with reading the card out, as evidence now suggests improved team function improves with this structure. In Cathy’s case this might reasonably have been the scribe during the resuscitation, standing next to and prompting her.

## Summary of this Month’s Journal Club Discussion :

### Blog Contributors :

- Suneth Jayasekara, Ben Symon, Andy Tagg
- Ian Summers, Simon Wilson, Stu Marshall
- Vic Brazil, Rowan Duys

Discussions by our Journal Club varied between responses to the article itself and general reflections and experience sharing regarding cognitive aid design and implementation.

**There was strong consensus that cognitive aid design is particularly vulnerable to ‘death by committee’ or [‘The Homer Simpson Car Conundrum’](#)** . Commenters frequently identified design flaws in the CAs in their workplace, but this was also contrasted with reflection from Simon Wilson, Ian Summers and Stu Marshall regarding streamlined and efficient CAs such as ‘the vortex’. In exploring the reason for CA bloating, it was acknowledged that different clinicians also appear to have different needs from cognitive aids, with Ben Symon and Rowan Duys discussing the challenges of Cognitive Aid design for “once in a career” events that require rapid intervention but a significant amount of information.

**There was appreciation of the article’s advice regarding cognitive aid design and implementation.** Particularly its emphasis on the need to create streamlined, efficiently designed CAs and for in situ testing and data capture regarding their use. Vic Brazil and Ben Symon liked the fact that the article had forced them to challenge their preconceptions regarding cognitive aid function and use, with Vic mentioning she was *“forced to realise that I use checklists a lot of preparation in avoiding crises eg RSI checklist, procedural sedation, but less often when really stretched with a crisis.”*

**There was debate regarding cognitive aid use in critical emergencies vs routine situations**, with Suneth Jayasakera arguing that *“In emergency medicine where I work, I think it is most useful not necessarily for the crisis situation, but for critical procedures involving multiple steps, where missing any of the important steps could lead to a bad outcome”*. Stuart Marshall disagreed, arguing that in *“‘High Acuity Low Occurrence’ (HALO) situations like clinical emergencies we have limited capacity to think of the multitude of important items that we shouldn’t miss.”* Most commenters identified an RSI algorithm in their workplace, but other checklists and cognitive aids appeared more rarely in discussion.



## Journal Club Summary March 2017 : "Coffee, Checklists and Self Flagellation"

### Acknowledgements :

Simulcast would like to thank the creators of the AliEM MEDiC series for the inspiration for the journal club's blog format and their ongoing support and contributions to the project.

Thankyou to Dr Stuart Marshall for his expert commentary this month. This month's article was also inspired by an original twitter conversation started by Rowan Duys regarding CA research to which multiple journal club participants replied.

Thankyou to all commenters this month for sharing your thoughts and allowing us to learn from you.

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