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ESSAY

'They didn't do anything wrong! What will I talk about?'

APPLYING THE PRINCIPLES OF COGNITIVE TASK ANALYSIS TO DEBRIEFING POSITIVE PERFORMANCE

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ABSTRACT

Simulation educators are often unsure of how to conduct a debriefing when learner performance meets or exceeds the expected standard and no significant errors have occurred. Similar to patient safety practices in clinical settings, simulation educators frequently focus on debriefing errors. Indeed, much debriefing training focuses on developing skills needed to conduct the "difficult conversations" that involve giving feedback on errors that occurred. Many simulation educators have not been taught an approach to debriefing positive performance. This manuscript provides such an approach. The approach applies the principles of Cognitive Task Analysis, a technique used in human factors research, to debriefing positive performance. The steps of knowledge elicitation, knowledge representation, and data analysis and synthesis can guide debriefers as they help learners discuss their positive performance, with the goal that the same positive practices will be repeated in future clinical practice.

Background

Simulationists, driven by a desire to improve clinical practice, and therefore patient safety, often focus debriefing discussions on errors or opportunities to improve practice. In fact, simulation cases are often deliberately designed to push learners to their zone of proximal development [1–3] where perfect performance is not expected. In this desire to improve practice, simulationists often ignore or overlook positive performance. Even when positive performance is discussed simulationists often do not know what to say beyond 'good job!'. When learners do not make significant errors in the case simulationists feel as though 'there's nothing to talk about' during post-simulation debriefing. This is a missed opportunity to explore and learn from good practice.

The publication of "From Safety-I to Safety-II: A White Paper" [4] called attention to this missed opportunity in many current patient safety practices. The methods used by patient safety teams generally focus on clinical practice errors or near misses. Root cause analyses usually focus on examining the causes of errors [5,6] and clinical event debriefing is often focused on errors. That is, most of our efforts to improve practice focus on the relatively small percentage of time that clinicians make mistakes. This focus on error is understandable. Even though the percentage of clinical practice time in which errors occur may be small, we must not be willing to tolerate error that can cause patient harm. Despite this ubiquitous examination of errors, unacceptably high rates of medical error persist

[7,8]. There is a dawning realization that we should instead be learning from the many times that patient care goes right [9,10]. The Safety-II mindset is one in which we are curious to know how the successful team adjusted their approach to meet the challenges of the current situation in order to achieve the best outcome [4]. In the case of novice learners, explicating the cognitive steps that underlay good practice can be enlightening and promote the formation of schema for use in future similar situations [11–14]. For expert learners, surfacing the reasoning process that contributed to good decision-making is a retrieval exercise that may strengthen that neural pathway, improving the chance that the clinicians will replicate the same decision-making in real clinical practice [15,16]. It also models expert thinking for others in the learning group.

This article discusses an approach to debriefing positive performance that combines the principles of Cognitive Task Analysis with a technique used in Debriefing with Good Judgment [17], namely the Preview/Advocacy-Advocacy/Inquiry/Listen (PAAIL) [18] facilitation technique to create meaningful learning in situations when learner performance meets or exceeds desired performance. While this approach will be discussed in the context of simulation, it should be noted that it can also be used to debrief clinical experiences and to conduct reflective learning conversations in the classroom.

Cognitive task analysis

Cognitive task analysis (CTA), a technique first introduced in the literature in 1979, has its roots in the early years of the industrial revolution, as psychologists studied the interface of humans and machines [19]. This field of study was originally termed ergonomics, or the study of work. The International Ergonomics Association uses the terms ergonomics or human factors interchangeably or as a unit (i.e. human factors/ergonomics or HFE) [20]. The discipline of human factors studies the interactions among humans and other elements of a system to optimize human well-being and overall system performance. Human factors science has a subdivision that specifically focuses on the study of cognition, error and expert decision-making and includes CTA to focus on the study of cognition at work [19, 20].

Modern CTA is the study of cognition in real-world contexts, especially when things go well [21]. CTA aims to determine what the practitioner knows, and how they know it. CTA techniques elicit the working knowledge that drives actions when performing complex tasks. It has been used to study and train practitioners in many fields, including law enforcement, the military and healthcare [22–24]. The knowledge elicited during CTA can then be applied as learners perform similar tasks in the future [25].

There are various approaches to performing CTA; this article will apply the basic principles as described by Crandall et al. [21] to debriefing positive performance in healthcare simulation. These principles include three key elements of CTA: (1) knowledge elicitation (what do they know about the situation), (2) knowledge representation (how do they know it) and (3) data analysis and synthesis (how did judgment and action co-create the outcome). Each of these principles is mapped to a debriefing scenario in Table 1. These principles are blended into the first author's real-world debriefing experience in hundreds of cases over the past decade.

Debriefing positive performance: the process

When debriefing positive performance, the role of the facilitator is the same as when debriefing errors, i.e. to facilitate reflection for the purpose of understanding thought processes. Unlike debriefing an error, the goal now is to uncover the *correct* thinking that led to the right decisions. During the phases of knowledge elicitation and knowledge representation, the debriefer guides the learner(s) to identify important cues in the situation, patterns of thinking as cues were interpreted, rules of thumb used, key decisions that were made and actions that were taken. As the debriefer seeks to understand what the learner knew and how they knew it, they may ask about such things as their perceptions, goals, expectations, judgments, confusions and uncertainties [21]. Learners will often discuss unique strategies they used that were helpful in the situation.

Once knowledge elicitation and knowledge representation are understood, a key responsibility of the debriefer is to help the learners make meaning of the situation by analysing and synthesizing the data points to tell the story of successful decisions that led to correct actions. During this time, connections between their judgments and actions and the positive outcome are made. These connections can then be used to create an algorithm for action in future similar situations as the newly surfaced knowledge is assimilated with existing knowledge. These steps are detailed in Table 1.

Debriefing positive performance: technique

Many debriefings include a mix of topics for discussion that represent both errors and positive performance points. The positive performance that is debriefed is discussed during the understanding or analysis phase of the debriefing [17,26,27]. See Table 2 for phases of debriefing, and positioning of specific debriefing questions.

As the debriefer opens a new topic, and throughout the debriefing, a consistent framework for asking reflective questions, such as PAAIL provides a framework for approaching questions in a way that invites the learners to reflect on and share their thought processes with the group for the purpose of learning. This questioning technique involves the steps of:

Previewing: Introduce the topic
Advocacy¹: State what was seen or heard
Advocacy²: State the instructor's point of view about what was seen or heard
Inquiry: Ask a short, open-ended question to invite the learner to share their thinking

Listen

This example demonstrates how an instructor might explore the thinking behind a team's ability to start fluid resuscitation immediately for a hypotensive patient:

Table 1. Application of CTA principles in a debriefing

Debriefer dialogue	Learner dialogue	CTA data ***(Element 2: knowledge representation*****)**
P: Paul, I'd like to talk about your approach with the family member **A**[1]: I saw that when the family member did not sit down, you engaged with them in a way that seemed to calm them. **A**[2]: It really helped the team that you were able to stay with the family member so that the team could communicate more clearly. **I:** I'm curious what was going on in your mind then? **L**isten…		
	Well, I could see them getting restless in the chair & I heard their voice getting louder and louder, so I knew they were getting more upset. They weren't even able to listen to us. This could be a problem. (**Element 1: *Knowledge elicitation*: This is behavior that's escalating in a problematic way.**)	Cue: Restlessness Increasing volume of voice Not responding to requests from team
	Once they got out of their chair & came to the bedside, the behavior really made it hard for the team to work – the team leader couldn't pay attention to the situation and the family member at the same time & none of us could hear her anymore. It was just too chaotic now.	Judgment: family member is now interfering with team's ability to function Goal: control the chaos
	I was torn about what to do, because I wanted to stay there and continue manage the IV fluids, since the BP was so low. We all agreed that the most helpful role for me would be to stay with the family.	Uncertainty: provide care for patient vs manage family member
		Perception: the remaining 3 team members would be able to handle the IV fluids, VS, and communication with provider for now
Right, that was very effective.		
Now, talk to me about your approach with the family member	First of all, I know what it's like…I've been the parent standing next to the stretcher in the ER…it's awful.	Unique strategy: Find empathetic connection
	Well, I knew that shouting at them would only escalate the situation, so I purposely kept my voice and manner quiet and calm, hoping they'd mirror that. I made eye contact & led them to the chair, alongside one for me.	Expectation: if I'm calm, it will calm them; if I go with them, they'll step away from the bedside, too
	I also wanted them to know that they could stay, but that the team had to put their loved one first and answer their questions later. I told them I'd stay with them and explain everything that was happening & lead them back to the chair and sat down right next to them. I calmly explained everything that was happening, and answered their questions. I noticed that they visibly relaxed and got quiet again. So I just stayed there with them	Goal: establish a common goal with family member – care of their loved one Cue: strategy is working

Element 3: Debriefer data analysis and synthesis: "So, this is what you've just told me – • The signs of escalating behavior include: Restlessness, increasing volume of voice, not responding to requests from team • The line that can't be crossed is behavior that interferes with patient care; at that point, it becomes a priority to de-escalate the behavior • Strategies to employ include: • Check in with team about changes in roles • Find an empathetic connection with the family member • Keep your voice low and calm • Lead them away & stay with them • Establish a common goal – ensuring that their loved one gets the best care • Monitor the situation
Anything else you'd like to add?"

Table 2. Phases of Debriefing and CTA

Welcome & Reactions Phase
Understanding Phase Topic 1 – PAAIL Question about topic Discussion Topic 2 – PAAIL Question about positive performance CTA as framework for discussion
Summary Phase

Preview: 'I'd like to talk about the timing of giving IV fluids'
Advocacy[1]: 'I heard the team discuss the likelihood that the low BP was due to sepsis. The words were hardly out of your mouth before the Normal Saline was hanging'.
Advocacy[2]: 'That quick thinking prevented the patient's blood pressure from getting dangerously low'
Inquiry: 'What was on your mind during that time?'

Listen – the debriefer listens to the learner(s) responses

Use of PAAIL is most effective when the instructor has taken the time to create a psychologically safe learning environment [28]. When learners feel psychologically safe, they are more likely to share their thinking, including their uncertainties and doubts [29,30]. As the learners share their thinking, the elements of CTA are enacted by the debriefer to help the learners make meaning from the simulation. The first element, knowledge elicitation, seeks to ascertain the learners' perceptions about what was going on in the situation. The second element, knowledge representation, seeks to understand how the learner(s) came to that conclusion. The debriefer's goal is to see the simulation through their eyes: what did they see that led them to the conclusion about the clinical problem (i.e. their judgment). The debriefer then connects their judgment to their actions by having learners reconstruct the decision-making process. As learners reconstruct their decisions and actions, the debriefer notes significant cues that led to key actions. These actions are tied to the corresponding clinical outcome(s) in the third element, the debriefer synthesis. During this synthesis, the debriefer can help to create an algorithm for an approach to the clinical situation.

For example, in a case involving a septic patient, the debriefing conversation may flow as follows. Regarding knowledge elicitation, the learners may respond to a PAAIL question by saying: 'I/we knew it was sepsis pretty quickly'. Regarding knowledge representation (i.e. determining how they knew that), the learners may say 'He was a couple days post op emergency hemicolectomy for a ruptured diverticula, which is a risk factor for peritonitis and sepsis. Then I/we noted that he was febrile, the BP was low, he was tachycardic, and he has new onset confusion. All that says sepsis'. By asking the learners to reconstruct their decisions and actions, they reveal their clinical decision-making process. The learners may say 'When I/we saw that BP, we knew he needed fluids right away; antibiotics were the next priority. If the BP hadn't responded, I/we would have started an IV vasoconstrictor….'. The debriefer then synthesizes (the third element of CTA) by linking their judgments and actions to patient outcomes by saying 'So what I'm hearing you say about prompt recognition and management of sepsis is to: 1. Identify risk factors; 2. Link presenting symptoms to the suspected pathology; 3. In the absence of other plausible hypotheses, quickly treat the problem with fluid resuscitation, antibiotics. The BP is the guide to fluid resuscitation and the decision about vasoconstrictors'. The application of CTA principles in a debriefing is diagrammed in Table 1.

The following provides a full case example.

Case example: de-escalating an upset family member

Learning outcome: provide compassionate de-escalation of an upset family member.
Context: Senior nursing students are caring for a patient in simulation who is not doing well. The family member (an embedded simulation participant) becomes increasingly upset as their relative deteriorates. During the simulation, the family member's voice rises. They express mistrust in the team, leave their chair and stand at the bedside among the providers. They do not sit down when asked, which interferes with the team's ability to communicate as they try to stabilize the patient. One of the participants quietly and compassionately leads the family member away from the field of care and remains with them throughout the simulation, allowing the rest of the team to carry out their care. During debriefing, the facilitator inquires about this.

Engaging learners in the discussion of positive performance

Debriefing positive performance is not without challenges. It is possible that learners are not familiar with the process of debriefing positive performance, and so may not see its value. The debriefer can preview the process to explain the 'why'. For example, a debriefer may preview the session by saying, 'We are used to discussing errors and unsatisfactory outcomes as a way to understand them and generate solutions to improve practice. It's equally important to understand what was at work when things go well. Let's take this time to unpack the team's thought processes that led to effective management and the positive patient outcome, so that we can learn from it'. Transparently discussing the process and goal of the debriefing can help to avoid learners feeling patronized, and overcome modesty.

It is not uncommon for experienced clinicians to have difficulty surfacing their thinking. When this happens, the learner may make a statement such as 'I(we) just did what I always do in that situation'. The debriefer can encourage the learners' self-reflection by explaining the value in making explicit the subtle judgments of the experts [21]. For example, 'Lets unpack the thinking behind your decisions: what data did you focus on, how did you interpret that data, what led to your decisions, what options did the team consider and then reject. We owe it to all the healthcare professionals we train to understand how the team managed the problem'.

In the book 'Blink: The Power of Thinking without Thinking' [31], the author tells the story of a firefighter who knew a building was about to collapse and ordered his team to evacuate moments before the floor collapsed. When asked how he knew that building was about to collapse, he initially could not explain his thinking. Eventually, the firefighter's thoughts and decisions were made explicit. Data that fed into his decision to order the evacuation included:

- The fire did not respond to the water from the firehose as expected
- The fire was abnormally hot
- The fire was too quiet, given the degree of heat

In this example, a firefighter with extensive training was asked a question about positive performance and was provided with an opportunity to think about what led to the decisions made. As a result, 1) teams with varying levels of expertise in firefighting were likely able to learn more; 2) others with no firefighting expertise were able to appreciate all that firefighters contribute to a team, and 3) by asking the question, it demonstrates genuine curiosity. These three perspectives provide an excellent opportunity for learning with and from each other in health care simulation.

Summary

Recent advances in patient safety include examining situations in which healthcare is delivered without error. There is much to be learned from successful performance, including strengthening the clinical judgments that led to success. CTA provides healthcare simulationists with a technique for examining and reinforcing positive performance, with the end goal that clinicians will repeat the same good performance in the future. A Safety-II mindset is one that allows the simulation facilitator to examine good performance with the same level of curiosity with which we address errors [4]. As simulationists incorporate the elements of CTA, we help learners examine and highlight the thoughts and actions that led to success, for the purpose of repeating the good performance in future similar situations. This approach gives simulationists the skills to respond to error-free performance with something more than 'good job' and helps learners develop or reinforce schema that can be called on in future similar situations.

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None declared.

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