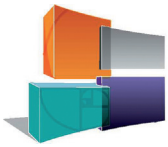
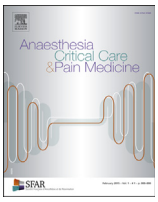
Anaesth Crit Care Pain Med 34 (2015) 5–7



SFAR
Société Française d'Anesthésie et de Réanimation



Editorial

Assessing clinical reasoning in anesthesiology: Making the case for the Script Concordance Test

ARTICLE INFO

Keywords:
Script Concordance Test
Anesthesiology
Resident

Whether our field of expertise is providing anesthesia per se, perioperative medicine, critical care or pain management, as physicians and healthcare professionals most of us need to display and rely on our clinical reasoning skills on a daily basis. Although there is no unanimously accepted way to define clinical reasoning, most experts would probably agree that, at the minimum, it encompasses the skills needed to make an accurate diagnosis. Competence in clinical reasoning relies on the application of acquired knowledge and concepts to new and often ill-defined clinical situations in order to predict the most likely diagnosis. Of course, for many experts, skills in clinical reasoning should go beyond the process that leads to a diagnosis and allow the health professional to use his knowledge to envision the achievable means of addressing and resolving the situation. In a broader way, clinical reasoning can then be viewed as a process in which the proper knowledge is applied in order to develop a solution to a clinical problem. Whether competence in clinical reasoning should be limited to means that primarily involve the patient (history, physical examination, tests, etc.) or should also take into account the need for teamwork and collaborative skills which are necessary to bring the patient's situation to a proper resolution is a matter of opinion and taxonomy. In this issue of *Anaesthesia Critical Care & Pain Medicine*, the reader will find two articles pertaining to the evaluation of clinical reasoning, or, in a broader sense, problem solving in anesthesiology trainees [1,2]. An original note about these articles is that the authors used, as evaluation tool, the Script Concordance Test (SCT), a method that has been the subject of many publications worldwide, a sizable part of them authored by pioneer researchers at the Université de Montréal [3,4].

The idea that humans remember real-world knowledge in a schematic way has been around for nearly four decades. The term script was coined to describe some of these schemas when they exhibited certain characteristics [5]. Scripts are stereotyped sequences that are composed of interconnected events stored in long-term memory. These events are usually linked by temporal, causal or hierarchical elements. The script, or sequence of events, that is recalled or activated in certain circumstances will contain empty slots or blanks to be filled with elements from the actual situation. Simply stated, it means that a practitioner faced to a clinical problem is expected to identify contextual elements that will prompt him to pull a menu of scripts that are likely to fit the actual situation and help him manage it. Scripts are going to be retained or discarded based on situational elements or data. Elements pertaining to both the clinical situation (complexity and specificity of the symptoms or problems, emergency, etc.) and the caregiver (knowledge, experience, etc.) will be at play to guide the health professional in identifying and sorting out the most relevant scripts. Although the illness script concept may be only a part of the underpinnings needed to offer a comprehensive explanation of how knowledge is acquired and apply to clinical reasoning, it has been used successfully to help understand and explain some aspects of the medical expertise development and application. For example, it might explain why experienced caregivers, through their ability to acknowledge relevant clinical elements and quickly match them to the most common scripts, might solve usual problems more expeditiously than novices who may be easily overwhelmed and sometimes paralyzed while having to go through multiple poorly defined scripts that bring uncertainty. On the other hand, the experienced practitioner encountering a somewhat unfamiliar situation will sometimes avoid contemplating known but rarely sought scripts. Elements contradicting a familiar script will then be ignored or given less weight at the expense of those favouring it, thus potentially delaying the diagnosis and treatment of an uncommon condition because of fixation on the wrong script.

Recognizing that multiple scripts may, at least partially, fit a certain clinical situation and that experts may take various paths to solve clinical problems, SCTs are designed to take into account expert-induced variability. The SCT presents trainees with situations in which their answers to progressively added elements are scored through an aggregate method that takes into account the variability amongst experts of the field instead of just relying on a good vs. wrong consensual answer. The SCT may then offer a more realistic view of how clinical reasoning is applied, at least according to the illness script concept. Many authors have looked if SCT scores matched various training levels [6,7]. Such attempts have largely been successful whether undergraduate students or residents were examined. Being able to discriminate between

http://dx.doi.org/10.1016/j.accpm.2015.01.003

more or less advanced trainees has been considered by many of these authors as a demonstration of SCTs' validity. Such studies have been conducted in students of numerous medical specialties, including pediatric emergency medicine [8], radiology [9], otorhinolaryngology [10], gynecology [11], radio-oncology [12], internal medicine [13], surgery [14] and neurology [15]. The article by Ducos et al., [2] in the present issue of *Anaesthesia Critical Care & Pain Medicine* concludes that SCTs can also discriminate between experts, junior trainees, and senior students in the field of anesthesiology. The SCT has also been studied outside of medicine per se and has proven reliable in nursing education [16] and for veterinarians [17]. Some attempts at using the SCT online for Continuous Professional Development purposes were well received, suggesting that it can be utilized starting with undergraduate level students up to the established caregiver [6]. A few articles even looked at how the SCT fared when applied in multiple institutions [18] or even through jurisdictions with significant cultural differences [19]. An American study even suggested, by analyzing the SCT and multiple-choice question (MCQ) examination scores of medical students in their 3rd-year internal medicine clerkship and comparing them to the National Board of Examiners results, that the SCT could be more valid than MCQ testing [20].

Since the SCT is primarily designed to measure the ability of students to analyze and interpret medical information in ill-defined cases, it comes as no surprise that it can be a valuable evaluation tool during anesthesia and perioperative medicine training. Uncertain situations are common during the perioperative period and even more so in critical care medicine. As is the case in clinical practice, SCTs provide students with an array of realistic options and scoring takes into account the variability expressed in the experts' answers. The validity of the SCT during anesthesia training was implicitly recognized by Compere et al. [1], who used it to ascertain the impact of participating in a problem-centered tutored group on trainees' ability to face uncertain situations. So, why isn't the SCT a regular feature of most anesthesia and other healthcare professionals training and evaluation? In spite of numerous reports of its application to different specialties, many professionals hardly know what an SCT is. Even if guidelines have been published on how to properly design and use SCTs [21–23], the formula is still largely unknown, even amongst those in charge of teaching and evaluating medical students and other healthcare practitioners. Training programs usually rely on more traditional means of assessment, which, although « time-tested », have not always been proven reliable or valid. I do not suggest that all questions surrounding SCTs' validity and reliability have been put to rest. Lineberry et al. [24] commented that studies on SCTs have generally ignored inter-panel, inter-expert and test-retest measurement errors and that trainees systematically endorsing the scale midpoint for every item could fare better than those using it as intended. Even if guidelines stating the principles that should direct SCTs construction and application have been published, questions regarding methodological elements still remain. How many experts should be involved in an SCT development? [25] Is the number of questions pertaining to each case more important than the number of cases? [26] Can the variability amongst experts be too low or too high? [27] What instructions exactly should be given to students? [28] These are all questions that have been raised regarding SCTs design. Interrogations related to how properly score SCTs include what to do with deviant answers or deviant expert panelists [29] and how to combine SCTs results with other measures of evaluation [30].

After more than a decade of research and experiments regarding their application to various healthcare domains, there may still be issues that need to be clarified before recommending that SCTs become an integral part of high-stakes examinations. Nonetheless, if all of us, as healthcare professionals in the field of anesthesiology or other medical specialties readily acknowledge the importance of clinical reasoning for the development of medical expertise in our students, we also need to recognize that we often feel ill-equipped to objectively assess their evolution. Research and experience suggest that SCTs can be used for such purpose and that despite complex underpinnings; they can be fairly easy to conceive, particularly on a local basis. There is obviously no unique solution that can comprehensively assess every aspects of medical training including clinical reasoning, but growing literature suggests that the SCT could be a valuable part of the formula.

Disclosure of interest

The author declares that he has no conflicts of interest concerning this article.

References

[1] Compere V, Miriceau J, Gouin A, Guitard P-G, Damm, Provost D, et al. Residents in tutored practice exchange groups have better medical reasoning as measured by the script concordance test: a pilot study. Anaesth Critical Care Pain Med 2015. http://dx.doi.org/10.1016/j.accpm.2014.12.001.
[2] Ducos G, Lejus C, Sztark F, Nathan N, Fourcade O, Tack I, et al. The script concordance test in anesthesiology: validation of a new tool for assessing clinical reasoning. Anaesth Critical Care Pain Med 2015. http://dx.doi.org/10.1016/j.accpm.2014.11.001.
[3] Charlin B, Roy L, Brailovsky C, Goulet F, van der Vleuten C. The Script Concordance test: a tool to assess the reflective clinician. Teach Learn Med 2000;12:189–95.
[4] Charlin B, Desaulniers M, Gagnon R, Blouin D, van der Vleuten C. Comparison of an aggregate scoring method with a consensus scoring method in a measure of clinical reasoning capacity. Teach Learn Med 2002;14:150–6.
[5] Custers EJ. Thirty years of illness scripts: theoretical origins and practical applications. Med Teach 2014;1–6. http://dx.doi.org/10.3109/0142159X.2014.956052.
[6] Hornos EH, Pleguezuelos EM, Brailovsky CA, Harillo LD, Dory V, Charlin B. The practicum script concordance test: an online continuing professional development format to foster reflection on clinical practice. J Contin Educ Health Prof 2013;33:59–66.
[7] Humbert AJ, Johnson MT, Miech E, Friedberg F, Grackin JA, Seidman PA. Assessment of clinical reasoning: a Script Concordance test designed for pre-clinical medical students. Med Teach 2011;33:472–7.
[8] Carriere B, Gagnon R, Charlin B, Downing S, Bordage G. Assessing clinical reasoning in pediatric emergency medicine: validity evidence for a Script Concordance Test. Ann Emerg Med 2009;53:647–52.
[9] Brazeau-Lamontagne L, Charlin B, Gagnon R, Samson L, van der Vleuten C. Measurement of perception and interpretation skills during radiology training: utility of the script concordance approach. Med Teach 2004;26:326–32.
[10] Kania RE, Verillaud B, Tran H, et al. Online script concordance test for clinical reasoning assessment in otorhinolaryngology: the association between performance and clinical experience. Arch Otolaryngol Head Neck Surg 2011;137:751–5.
[11] Kow N, Walters MD, Karram MM, Sarsotti CJ, Jelovsek JE. Assessing intraoperative judgment using script concordance testing through the gynecology continuum of practice. Med Teach 2014;36:724–9.
[12] Lambert C, Gagnon R, Nguyen D, Charlin B. The script concordance test in radiation oncology: validation study of a new tool to assess clinical reasoning. Radiat Oncol 2009;4:7.
[13] Marie I, Sibert L, Roussel F, Hellot MF, Lechevallier J, Weber J. [The script concordance test: a new evaluation method of both clinical reasoning and skills in internal medicine]. Rev Med Interne 2005;26:501–7.
[14] Meterissian S, Zabolotny B, Gagnon R, Charlin B. Is the script concordance test a valid instrument for assessment of intraoperative decision-making skills? Am J Surg 2007;193:248–51.
[15] Tan K, Tan NC, Kandiah N, Samarasekera D, Ponnamperuma G. Validating a script concordance test for assessing neurological localization and emergencies. Eur J Neurol 2014;21:1419–22.
[16] Dawson T, Comer L, Kossick MA, Neubrander J. Can script concordance testing be used in nursing education to accurately assess clinical reasoning skills? J Nurs Educ 2014;53:281–6.
[17] Dufour S, Latour S, Chicoine Y, et al. Use of the script concordance approach to evaluate clinical reasoning in food-ruminant practitioners. J Vet Med Educ 2012;39:267–75.
[18] Nouh T, Boutros M, Gagnon R, et al. The script concordance test as a measure of clinical reasoning: a national validation study. Am J Surg 2012;203:530–4.
[19] Sibert L, Charlin B, Corcos J, Gagnon R, Grise P, van der Vleuten C. Stability of clinical reasoning assessment results with the Script Concordance test across two different linguistic, cultural and learning environments. Med Teach 2002;24:522–7.

[20] Kelly W, Durning S, Denton G. Comparing a script concordance examination to a multiple-choice examination on a core internal medicine clerkship. Teach Learn Med 2012;24:187–93.
[21] Dory V, Gagnon R, Vanpee D, Charlin B. How to construct and implement script concordance tests: insights from a systematic review. Med Educ 2012;46: 552–63.
[22] Fournier JP, Demeester A, Charlin B. Script concordance tests: guidelines for construction. BMC Med Inform Decis Mak 2008;8:18.
[23] Lubarsky S, Dory V, Duggan P, Gagnon R, Charlin B. Script concordance testing: from theory to practice: AMEE guide no 75. Med Teach 2013;35:184–93.
[24] Lineberry M, Kreiter CD, Bordage G. Threats to validity in the use and interpretation of script concordance test scores. Med Educ 2013;47:1175–83.
[25] Gagnon R, Charlin B, Coletti M, Sauve E, van der Vleuten C. Assessment in the context of uncertainty: how many members are needed on the panel of reference of a script concordance test? Med Educ 2005;39:284–91.
[26] Gagnon R, Charlin B, Lambert C, Carriere B, Van der Vleuten C. Script concordance testing: more cases or more questions? Adv Health Sci Educ Theory Pract 2009;14:367–75.
[27] Charlin B, Gagnon R, Pelletier J, et al. Assessment of clinical reasoning in the context of uncertainty: the effect of variability within the reference panel. Med Educ 2006;40:848–54.
[28] van den Broek WE, van Asperen MV, Custers E, Valk GD, Ten Cate OT. Effects of two different instructional formats on scores and reliability of a script concordance test. Perspect Med Educ 2012;1:119–28.
[29] Gagnon R, Lubarsky S, Lambert C, Charlin B. Optimization of answer keys for script concordance testing: should we exclude deviant panelists, deviant responses, or neither? Adv Health Sci Educ Theory Pract 2011;16:601–8.
[30] Groves M, Dick ML, McColl G, Bilszta J. Analysing clinical reasoning characteristics using a combined methods approach. BMC Med Educ 2013;13:144.

M, FRCPC,
Professor of Anesthesiology
Pierre Drolet *
Université de Montréal, Pavillon Roger-Gaudry, Faculté de médecine, Département d'anesthésiologie, CP 6128, Succursale Centre-Ville, Montréal, Québec, H3C 3J7, Canada

*Tel.: +514 252 3426; fax: +514 252 3542
E-mail address: pierre.drolet@umontreal.ca (P. Drolet)

Available online 5 March 2015