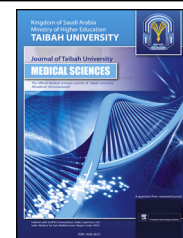




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Educational Article

Evaluating the strength of evidence in research and education: The theory of anchored narratives

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المخلص

إن البحوث التجريبية المبنية على مجموعة من المشاركين وتقييم كفاءة كل طالب، أو متدرب، أو مهني في موضوع محدد، تشترك في أمر واحد على الأقل؛ ينبغي تحديد الأدلة المؤيدة أو المضادة للفرضية بأخذ أجزاء مختلفة من الأدلة في الاعتبار بعناية وتكاملها لخلق قصة متماسكة بلا تناقضات، ولا أطراف غير مترابطة، ولا عناصر مفقودة. ولتأمين إطار تفكيري متماسك لهذه العملية، تقدم هذا المقالة نسخة معدلة من نظرية استُخدمت كنموذج لاتخاذ القرارات القانونية في الحالات الجنائية؛ نظرية الروايات الراسية. في هذه النظرية يقوم القضاة في قضية ما، بالحكم على جودة أجزاء من الأدلة، وما إذا كان من الممكن تثبيت تلك الأجزاء كروايات تشكل سلسلة من الأدلة تُمكن من التوصل إلى قرار لا يدع مجالاً للشك بجرم المتهم. توفر هذه المقالة أمثلة من المجال الطبي لإيضاح كيف يمكن لنسخة معدلة من هذه النظرية أن توفر إطاراً فكرياً للباحثين والمربين يكون فيها تقييم كل من البحث التجريبي والكفاءة في النهاية دائماً حكماً مهنيًا نوعياً مبنيًا على دمج مجموعة مختلفة من المعلومات النوعية والكمية.

الكلمات المفتاحية: الطب؛ التعليم الطبي؛ نظرية الروايات الراسية؛ قصة؛ دليل

Abstract

Empirical research based on groups of participants and assessment of the competence of individual students, trainees, and professionals in a given context have at least one thing in common: evidence in favour or against a hypothesis should be established by carefully considering and integrating various pieces of evidence to create a coherent story that has no contradictions, loose ends or

missing elements. To provide a coherent framework for this process, this article introduces a modified version of a theory that has been used as a model of legal decision making in criminal cases: the theory of anchored narratives. In this theory, judges in a case judge the quality of pieces of evidence and whether these pieces of evidence can be anchored as narratives to form a chain of evidence that enables a decision beyond reasonable doubt regarding a suspect's guilt. This article provides examples from the domain of medicine to elaborate how a modified version of this theory can provide researchers and educators with a framework in which the assessment of both empirical research and competence is a qualitative professional judgement based on an integration of various sources of qualitative and quantitative information.

Keywords: Evidence; Medicine; Medical education; Story; Theory of anchored narratives

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Introduction

Empirical research never occurs in vacuum; theory, potentially relevant previous research, setting, and interests and expectations emerging from ongoing intellectual dialogue and multilogue place a given empirical study in a particular context that has implications for the meaning of findings within and beyond the study. Likewise, assessment of the competence of students, trainees, and professionals occurs in a given context in which a variety of assessments

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are undertaken. In fact, whether we consider research on clinical reasoning,¹ legal decision making in a criminal case,² research in education,³ or the assessment of the medical competence of individual students, residents or professionals,⁴ the Latin adagio *unus testis nullus testis* is key: decisions ought not be based on a single source of information. Hence, whether we consider the evidence derived from empirical research with groups of participants or the assessment of learning or performance (e.g., current competence or an increase in competence in a given time interval), evidence in favour or against any given hypothesis ought to be established through a careful consideration and integration of a variety of pieces of evidence into a coherent story that has no contradictions, loose ends or missing elements.

For instance, to make appropriate decisions with regard to the medical conditions and needs of a patient who reports acute and severe chest pain, clinicians and other individuals (e.g., nurses and residents) have to ask the right questions, perform physical examinations, and think about possible diagnoses and other steps while continuously monitoring a patient's blood pressure, pulse rate, and respiration.⁵ In a research field, the meaning and implications of findings from a scientific study are established through the context in which a study has taken place, previous research relevant to the study at hand, and contemporary theory.³ In the context of the assessment of medical competence, professionals have to arrive at well-founded decisions about an individual's competence in a given context using qualitative and quantitative indicators of learning and performance from a variety of sources, which include objective, structured clinical examinations (OSCEs),¹ progress test scores,⁶ course exams, interviews, and feedback from supervisors, patients or others.

In each of the aforementioned contexts — clinical reasoning, criminal law practice, educational research or the assessment of medical competence — multiple pieces of evidence have to be integrated into a *chain of evidence* that provides a coherent study with which professional judges — clinicians, judges or jury members, researchers and educational practitioners, and medical assessors — can make well-founded decisions. These decisions can pertain to the health status and needs of a patient (i.e., clinical case), the guilt or innocence of a suspect (i.e., criminal case), implications of research findings for theory, future research and educational practice (i.e., educational research), and the competence of a student, resident or professional (i.e., assessment of medical competence), respectively. Whatever practice we consider—and whether we address mainly qualitative or predominantly quantitative information—nothing operates in a vacuum: context is key.

This article introduces a modified version of a theory that was developed by legal psychologists Wagenaar, Van Koppen, and Crombag² as a model of legal decision making in a criminal case: the theory of anchored narratives (henceforth: TAN). In TAN, judges subsequently judge the quality of pieces of evidence (i.e., stories) and whether these pieces of evidence can be anchored as narratives to form a chain of evidence (i.e., a coherent story) that enables judges to decide beyond reasonable doubt about a suspect's guilt or innocence. After a concise presentation of TAN, using a criminal case example, this article introduces a modified version of TAN for the context of educational research and

assessment, and discusses this modified version in light of the contemporary validity frameworks of Kane⁷ and Messick⁸ as well as current views on workplace learning and assessment.^{9–11} Given its resonance with these frameworks, TAN provides a framework for the evaluation of the strength of evidence — in favour or against a given hypothesis — which underlines that the assessment of both empirical research and competence is in the end always a qualitative professional judgement based on an integration of a variety of qualitative and quantitative information.

In TAN, a judge comes to a decision concerning the guilt or innocence of a suspect in two stages. At the first stage, individual pieces of evidence, handed over to the prosecution and defence, are judged in terms of plausibility and quality. Subsequently, at the second stage, these pieces of evidence are evaluated in terms of how well they can be integrated or anchored into facts, common sense, and related to other pieces of evidence at hand. Each individual piece of evidence can reach the second stage (i.e., that of anchoring) only if a good and plausible story can be provided with it, and successful anchoring requires that this story be integrated into a chain of evidence. Take the following example, adopted and modified from³:

Dr. X. is found dead — with a single shot through the forehead — in the backyard of his house, and forensic examination reveals a match in DNA between suspect Dr. Y. and a piece of cigarette found in the backyard of Dr. X.

In essence, a DNA match provides a potentially decisive piece of evidence. That is, if we can provide at least one piece of evidence—and preferably several other pieces of evidence that provide a chain of evidence—pointing at Dr. Y. being at the crime scene at or around the time of the death of Dr. X., the DNA match can be considered sufficient evidence to put Dr. Y. in jail. This evidence can come from eyewitnesses who report that they observed Dr. Y. at the crime scene around the time of the critical event, from others who report that Dr. Y. was not at home or in office as expected around that time, from global positioning system (GPS) data from a mobile device, and even other sources. What these sources of evidence have in common is that they allow the DNA match to be anchored in a coherent story line that can support interpretations of the DNA match in terms of Dr. Y. killing Dr. X. At the same time, one solid piece of evidence that points either against the presence of Dr. Y. at the crime scene around the time of the critical event or against the involvement of Dr. Y. in the death of Dr. X. in some other way may have the potential to take stories about the guilt of Dr. Y. off the table. Other pieces of evidence may need to be examined in order to discard, beyond reasonable doubt, alternative scenarios such as the piece of cigarette being collected and put at the crime scene by someone who wants to set up Dr. Y. or the piece of cigarette having been dropped by Dr. Y. at a previous meeting between Dr. X. and Dr. Y. in Dr. X.'s backyard. Figure 1 provides an example of TAN in this example case.

TAN not only provides a model to explain decision making in successfully solved cases but also provides a model to explain miscarriages of justice, as a miscarriage of justice can usually be explained in terms of a judge (or jury, for that matter) either misjudging the quality or plausibility of

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