

1. Anesthesiology. 2020 Feb;132(2):379-394. doi: 10.1097/ALN.0000000000002960.

Artificial Intelligence in Anesthesiology: Current Techniques, Clinical Applications, and Limitations.

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Artificial intelligence has been advancing in fields including anesthesiology. This scoping review of the intersection of artificial intelligence and anesthesia research identified and summarized six themes of applications of artificial intelligence in anesthesiology: (1) depth of anesthesia monitoring, (2) control of anesthesia, (3) event and risk prediction, (4) ultrasound guidance, (5) pain management, and (6) operating room logistics. Based on papers identified in the review, several topics within artificial intelligence were described and summarized: (1) machine learning (including supervised, unsupervised, and reinforcement learning), (2) techniques in artificial intelligence (e.g., classical machine learning, neural networks and deep learning, Bayesian methods), and (3) major applied fields in artificial intelligence. The implications of artificial intelligence for the practicing anesthesiologist are discussed as are its limitations and the role of clinicians in further developing artificial intelligence for use in clinical care. Artificial intelligence has the potential to impact the practice of anesthesiology in aspects ranging from perioperative support to critical care delivery to outpatient pain management.

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2. Nat Rev Genet. 2018 Mar;19(3):148-159. doi: 10.1038/nrg.2017.104. Epub 2018 Jan 8.

The new genetics of intelligence.

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Intelligence - the ability to learn, reason and solve problems - is at the forefront of behavioural genetic research. Intelligence is highly heritable and predicts important educational, occupational and health outcomes better than any other trait. Recent genome-wide association studies have successfully identified inherited genome sequence differences that account for 20% of the 50% heritability of intelligence. These findings open new avenues for research into the causes and consequences of intelligence using genome-wide polygenic scores that aggregate the effects of thousands of genetic variants.

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3. Turk J Ophthalmol. 2020 Mar 5;50(1):37-43. doi: 10.4274/tjo.galenos.2020.78989.

Artificial Intelligence and Ophthalmology.

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Comment in
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Artificial intelligence is advancing rapidly and making its way into all areas of our lives. This review discusses developments and potential practices regarding the use of artificial intelligence in the field of ophthalmology, and the related topic of medical ethics. Various artificial intelligence applications related to the diagnosis of eye diseases were researched in books, journals, search engines, print and social media. Resources were cross-checked to verify the information. Artificial intelligence algorithms, some of which were approved by the US Food and Drug Administration, have been adopted in the field of ophthalmology, especially in diagnostic studies. Studies are being conducted that prove that artificial intelligence algorithms can be used in the field of ophthalmology, especially in diabetic retinopathy, age-related macular degeneration, and retinopathy of prematurity. Some of these algorithms have come to the approval stage. The current point in artificial intelligence studies shows that this technology has advanced considerably and shows promise for future work. It is believed that artificial intelligence applications will be effective in identifying patients with preventable vision loss and directing them to physicians, especially in developing countries where there are fewer trained professionals and physicians are difficult to reach. When we consider the possibility that some future artificial intelligence systems may be candidates for moral/ethical status, certain ethical issues arise. Questions about moral/ethical status are important in some areas of applied ethics. Although it is accepted that current intelligence systems do not have moral/ethical status, it has yet to be determined what the exact the characteristics that confer moral/ethical status are or will be.

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4. Acad Radiol. 2020 Jan;27(1):62-70. doi: 10.1016/j.acra.2019.10.001. Epub 2019 Oct 19.

Artificial Intelligence in Medicine: Where Are We Now?

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Artificial intelligence in medicine has made dramatic progress in recent years. However, much of this progress is seemingly scattered, lacking a cohesive structure for the discerning observer. In this article, we will provide an up-to-date review of artificial intelligence in medicine, with a specific focus on its application to radiology, pathology, ophthalmology, and dermatology. We will discuss a range of selected papers that illustrate the potential uses of artificial intelligence in a technologically advanced future.

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5. J Pak Med Assoc. 2021 Dec;71(12):2777-2781. doi: 10.47391/JPMA.1779.

Emotional intelligence and academic performance of students.

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The medical profession deals with 'humanism' which involves interactions with people, the ability to think about them, care for them, and to provide positive reinforcement in clinical follow-ups. Emotional intelligence integrates the significant features of personal relationships to promote self-management skills, like adaptability, control of temperaments and reduction of tension, which can improve performance of individuals. This has led to increasing interest in the importance of emotional intelligence for effective academic growth, professional experiences and clinical practice. There are many studies examining the correlation between emotional intelligence and academic achievement at different education levels, signifying its importance to predict students who need guided intervention. With proven relationship between emotional intelligence and academic success, the assessment of emotional intelligence can be introduced in entrance exams of medical schools to recognise students who might need directed intermediation. With the agreement of all stakeholders, emotional intelligence training workshops and awareness sessions

can be introduced for educators and students.

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6. Am J Kidney Dis. 2019 Dec;74(6):803-810. doi: 10.1053/j.ajkd.2019.05.020. Epub 2019 Aug 23.

Artificial Intelligence in Nephrology: Core Concepts, Clinical Applications, and Perspectives.

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Artificial intelligence is playing an increasingly important role in many fields of medicine, assisting physicians in most steps of patient management. In nephrology, artificial intelligence can already be used to improve clinical care, hemodialysis prescriptions, and follow-up of transplant recipients. However, many nephrologists are still unfamiliar with the basic principles of medical artificial intelligence. This review seeks to provide an overview of medical artificial intelligence relevant to the practicing nephrologist, in all fields of nephrology. We define the core concepts of artificial intelligence and machine learning and cover the basics of the functioning of neural networks and deep learning. We also discuss the most recent clinical applications of artificial intelligence in nephrology and medicine; as an example, we describe how artificial intelligence can predict the occurrence of progressive immunoglobulin A nephropathy. Finally, we consider the future of artificial intelligence in clinical nephrology and its impact on medical practice, and conclude with a discussion of the ethical issues that the use of artificial intelligence raises in terms of clinical decision making, physician-patient relationship, patient privacy, and data collection.

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7. Dentomaxillofac Radiol. 2021 Mar 1;50(3):20200375. doi: 10.1259/dmfr.20200375. Epub 2020 Nov 16.

Artificial intelligence in oral and maxillofacial radiology: what is currently possible?

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Artificial intelligence, which has been actively applied in a broad range of industries in recent years, is an active area of interest for many researchers. Dentistry is no exception to this trend, and the applications of artificial intelligence are particularly promising in the field of oral and maxillofacial (OMF) radiology. Recent researches on artificial intelligence in OMF radiology have mainly used convolutional neural networks, which can perform image classification, detection, segmentation, registration, generation, and refinement. Artificial intelligence systems in this field have been developed for the purposes of radiographic diagnosis, image analysis, forensic dentistry, and image quality improvement. Tremendous amounts of data are needed to achieve good results, and involvement of OMF radiologist is essential for making accurate and consistent data sets, which is a time-consuming task. In order to widely use artificial intelligence in actual clinical practice in the future, there are lots of problems to be solved, such as building up a huge amount of fine-labeled open data set, understanding of the judgment criteria of artificial intelligence, and DICOM hacking threats using artificial intelligence. If solutions to these problems are presented with the development of artificial intelligence, artificial intelligence will develop further in the future and is expected to play an important role in the development of automatic diagnosis systems, the establishment of treatment plans, and the fabrication of treatment tools. OMF radiologists, as professionals who thoroughly understand the characteristics of radiographic images, will play a very important role in the development of artificial intelligence applications in this field.

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8. Synthese. 2018;195(9):4169-4200. doi: 10.1007/s11229-017-1414-z. Epub 2017 May 17.

Mandevillian intelligence.

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Mandevillian intelligence is a specific form of collective intelligence in which individual cognitive vices (i.e., shortcomings, limitations, constraints and biases) are seen to play a positive functional role in yielding collective forms of cognitive success. The present paper introduces the concept of mandevillian intelligence and reviews a number of strands of empirical research that help to shed light on the phenomenon. The paper also attempts to highlight the value of the concept of mandevillian intelligence from a philosophical, scientific and engineering perspective. Inasmuch as we accept the notion of mandevillian intelligence, then it seems that the cognitive and epistemic value of a specific social or technological intervention will vary according to whether our attention is focused at the individual or collective level of analysis. This has a number of important implications for how we think about the design and

evaluation of collective cognitive systems. For example, the notion of mandevillian intelligence forces us to take seriously the idea that the exploitation (or even the accentuation) of individual cognitive shortcomings could, in some situations, provide a productive route to collective forms of cognitive and epistemic success.

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9. Int J Nurs Stud. 2018 Apr;80:106-117. doi: 10.1016/j.ijnurstu.2018.01.006. Epub 2018 Jan 11.

The impact of emotional intelligence in health care professionals on caring behaviour towards patients in clinical and long-term care settings: Findings from an integrative review.

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BACKGROUND: Over recent years there has been criticism within the United Kingdom's health service regarding a lack of care and compassion, resulting in adverse outcomes for patients. The impact of emotional intelligence in staff on patient health care outcomes has been recently highlighted. Many recruiters now assess emotional intelligence as part of their selection process for health care staff. However, it has been argued that the importance of emotional intelligence in health care has been overestimated.

OBJECTIVES: To explore relationships between emotional intelligence in health care professionals, and caring behaviour. To further explore any additional factors related to emotional intelligence that may impact upon caring behaviour. **DESIGN:** An integrative review design was used.

DATA SOURCES: Psycinfo, Medline, CINAHL Plus, Social Sciences Citation Index, Science Citation Index, and Scopus were searched for studies from 1995 to April 2017.

REVIEW METHODS: Studies providing quantitative or qualitative exploration of how any healthcare professionals' emotional intelligence is linked to caring in healthcare settings were selected.

RESULTS: Twenty two studies fulfilled the inclusion criteria. Three main types of health care professional were identified: nurses, nurse leaders, and physicians. Results indicated that the emotional intelligence of nurses was related to both physical and emotional caring, but emotional intelligence may be less relevant for nurse leaders and physicians. Age, experience, burnout, and job satisfaction may also be relevant factors for both caring and emotional intelligence.

CONCLUSIONS: This review provides evidence that developing emotional intelligence in nurses may positively impact upon certain caring behaviours, and that there may be differences within groups that warrant further investigation. Understanding more about which aspects of emotional intelligence are most relevant for intervention is important, and directions for further large scale

research have been identified.

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10. J Intell. 2020 Nov 19;8(4):40. doi: 10.3390/jintelligence8040040.

Communicating Intelligence Research.

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Despite intelligence research being among the most replicable bodies of empirical findings—a Rosetta stone across the social sciences—the communication of intelligence research with non-intelligence researchers and the public remains a challenge, especially given ongoing public controversies throughout the history of the field. Hunt argued that "we have a communication problem." This article is a call for intelligence researchers to consider communication at multiple levels—communication with other intelligence researchers, communication with non-intelligence researchers, and communication with the public, defined here as policymakers, practitioners, students, and general readers. It discusses ongoing tensions between academic freedom and social responsibility and provides suggestions for thinking about communication and effective research translation and implementation of intelligence research from the frameworks of science and policy research communication. It concludes with some recommendations for effective communication and stresses the importance of incentivizing more scholars to responsibly seek to educate and engage with multiple publics about the science of intelligence.

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11. Front Artif Intell. 2021 Mar 25;4:622364. doi: 10.3389/frai.2021.622364. eCollection 2021.

Human- versus Artificial Intelligence.

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AI is one of the most debated subjects of today and there seems little common understanding concerning the differences and similarities of human intelligence and artificial intelligence. Discussions on many relevant topics, such as trustworthiness, explainability, and ethics are characterized by implicit anthropocentric and anthropomorphistic conceptions and, for instance, the pursuit of human-like intelligence as the golden standard for Artificial

Intelligence. In order to provide more agreement and to substantiate possible future research objectives, this paper presents three notions on the similarities and differences between human- and artificial intelligence: 1) the fundamental constraints of human (and artificial) intelligence, 2) human intelligence as one of many possible forms of general intelligence, and 3) the high potential impact of multiple (integrated) forms of narrow-hybrid AI applications. For the time being, AI systems will have fundamentally different cognitive qualities and abilities than biological systems. For this reason, a most prominent issue is how we can use (and "collaborate" with) these systems as effectively as possible? For what tasks and under what conditions, decisions are safe to leave to AI and when is human judgment required? How can we capitalize on the specific strengths of human- and artificial intelligence? How to deploy AI systems effectively to complement and compensate for the inherent constraints of human cognition (and vice versa)? Should we pursue the development of AI "partners" with human (-level) intelligence or should we focus more at supplementing human limitations? In order to answer these questions, humans working with AI systems in the workplace or in policy making have to develop an adequate mental model of the underlying 'psychological' mechanisms of AI. So, in order to obtain well-functioning human-AI systems, Intelligence Awareness in humans should be addressed more vigorously. For this purpose a first framework for educational content is proposed.

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12. Front Neurosci. 2022 Oct 6;16:1024316. doi: 10.3389/fnins.2022.1024316. eCollection 2022.

Cognitive psychology-based artificial intelligence review.

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Most of the current development of artificial intelligence is based on brain cognition, however, this replication of biology cannot simulate the subjective emotional and mental state changes of human beings. Due to the imperfections of existing artificial intelligence, this manuscript summarizes and clarifies that artificial intelligence system combined with cognitive psychology is the research direction of artificial intelligence. It aims to promote the development of artificial intelligence and give computers human advanced cognitive abilities, so that computers can recognize emotions, understand human feelings, and eventually achieve dialog and empathy with humans and other artificial intelligence. This paper emphasizes the development potential and importance of artificial intelligence to understand, possess and discriminate human mental states, and argues its application value with three typical

application examples of human-computer interaction: face attraction, affective computing, and music emotion, which is conducive to the further and higher level of artificial intelligence research.

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13. Mol Psychiatry. 2022 Jan;27(1):335-353. doi: 10.1038/s41380-021-01027-y. Epub 2021 Feb 2.

Genetic variation, brain, and intelligence differences.

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Individual differences in human intelligence, as assessed using cognitive test scores, have a well-replicated, hierarchical phenotypic covariance structure. They are substantially stable across the life course, and are predictive of educational, social, and health outcomes. From this solid phenotypic foundation and importance for life, comes an interest in the environmental, social, and genetic aetiologies of intelligence, and in the foundations of intelligence differences in brain structure and functioning. Here, we summarise and critique the last 10 years or so of molecular genetic (DNA-based) research on intelligence, including the discovery of genetic loci associated with intelligence, DNA-based heritability, and intelligence's genetic correlations with other traits. We summarise new brain imaging-intelligence findings, including whole-brain associations and grey and white matter associations. We summarise regional brain imaging associations with intelligence and interpret these with respect to theoretical accounts. We address research that combines genetics and brain imaging in studying intelligence differences. There are new, though modest, associations in all these areas, and mechanistic accounts are lacking. We attempt to identify growing points that might contribute toward a more integrated 'systems biology' account of some of the between-individual differences in intelligence.

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14. Curr Opin Oncol. 2022 Jan 1;34(1):44-53. doi: 10.1097/CCO.0000000000000796.

Artificial intelligence: opportunities in lung cancer.

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PURPOSE OF REVIEW: In this article, we focus on the role of artificial intelligence in the management of lung cancer. We summarized commonly used algorithms, current applications and challenges of artificial intelligence in lung cancer.

RECENT FINDINGS: Feature engineering for tabular data and computer vision for image data are commonly used algorithms in lung cancer research. Furthermore, the use of artificial intelligence in lung cancer has extended to the entire clinical pathway including screening, diagnosis and treatment. Lung cancer screening mainly focuses on two aspects: identifying high-risk populations and the automatic detection of lung nodules. Artificial intelligence diagnosis of lung cancer covers imaging diagnosis, pathological diagnosis and genetic diagnosis. The artificial intelligence clinical decision-support system is the main application of artificial intelligence in lung cancer treatment. Currently, the challenges of artificial intelligence applications in lung cancer mainly focus on the interpretability of artificial intelligence models and limited annotated datasets; and recent advances in explainable machine learning, transfer learning and federated learning might solve these problems.

SUMMARY: Artificial intelligence shows great potential in many aspects of the management of lung cancer, especially in screening and diagnosis. Future studies on interpretability and privacy are needed for further application of artificial intelligence in lung cancer.

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Artificial intelligence technologies in nuclear medicine.

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The use of artificial intelligence plays a crucial role in developing precision medicine in nuclear medicine. Artificial intelligence refers to a field of computer science aimed at imitating the performance of tasks typically requiring human intelligence. From machine learning to generative adversarial networks, artificial intelligence automatized the workflow of medical imaging. In this mini-review, we encapsulate artificial intelligence models and their use in nuclear medicine imaging workflow.

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Artificial Intelligence and Mechanical Circulatory Support.

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Advances in machine learning algorithms and computing power have fueled a rapid increase in artificial intelligence research in health care, including mechanical circulatory support. In this review, we highlight the needs for artificial intelligence in the mechanical circulatory support field and summarize existing artificial intelligence applications in 3 areas: identifying patients appropriate for mechanical circulatory support therapy, predicting risks after mechanical circulatory support device implantation, and monitoring for adverse events. We address the challenges of incorporating artificial intelligence in daily clinical practice and recommend demonstration of artificial intelligence tools' clinical efficacy, reliability, transparency, and equity to drive implementation.

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Applications of artificial intelligence in neuro-oncology.

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PURPOSE OF REVIEW: To discuss recent applications of artificial intelligence within the field of neuro-oncology and highlight emerging challenges in integrating artificial intelligence within clinical practice.

RECENT FINDINGS: In the field of image analysis, artificial intelligence has shown promise in aiding clinicians with incorporating an increasing amount of data in genomics, detection, diagnosis, classification, risk stratification, prognosis, and treatment response. Artificial intelligence has also been applied in epigenetics, pathology, and natural language processing.

SUMMARY: Although nascent, applications of artificial intelligence within neuro-oncology show significant promise. Artificial intelligence algorithms will likely improve our understanding of brain tumors and help drive future innovations in neuro-oncology.

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18. Trends Cogn Sci. 2020 Nov;24(11):873-883. doi: 10.1016/j.tics.2020.09.001. Epub 2020 Oct 8.

Understanding Human Intelligence through Human Limitations.

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Recent progress in artificial intelligence provides the opportunity to ask the question of what is unique about human intelligence, but with a new comparison class. I argue that we can understand human intelligence, and the ways in which it may differ from artificial intelligence, by considering the characteristics of the kind of computational problems that human minds have to solve. I claim that these problems acquire their structure from three fundamental limitations that apply to human beings: limited time, limited computation, and limited communication. From these limitations we can derive many of the properties we associate with human intelligence, such as rapid learning, the ability to break down problems into parts, and the capacity for cumulative cultural evolution.

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Artificial Intelligence Enabling Radiology Reporting.

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The radiology reporting process is beginning to incorporate structured, semantically labeled data. Tools based on artificial intelligence technologies using a structured reporting context can assist with internal report consistency and longitudinal tracking. To-do lists of relevant issues could be assembled by artificial intelligence tools, incorporating components of the patient's history. Radiologists will review and select artificial intelligence-generated and other data to be transmitted to the electronic health record and generate feedback for ongoing improvement of artificial intelligence tools. These technologies should make reports more valuable by making reports more accessible and better able to integrate into care pathways.

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20. Hematol Oncol Clin North Am. 2019 Dec;33(6):1095-1104. doi: 10.1016/j.hoc.2019.08.003. Epub 2019 Sep 11.

Artificial Intelligence in Radiation Oncology.

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The integration of artificial intelligence in the radiation oncologist's workflow has multiple applications and significant potential. From the initial patient encounter, artificial intelligence may aid in pretreatment disease outcome and toxicity prediction. It may subsequently aid in treatment planning, and enhanced dose optimization. Artificial intelligence may also optimize the quality assurance process and support a higher level of safety, quality, and efficiency of care. This article describes components of the radiation consultation, planning, and treatment process and how the thoughtful integration of artificial intelligence may improve shared decision making, planning efficiency, planning quality, patient safety, and patient outcomes.

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21. AJR Am J Roentgenol. 2019 May;212(5):997-1001. doi: 10.2214/AJR.18.20771. Epub 2019 Feb 19.

Artificial Intelligence in Cardiothoracic Radiology.

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OBJECTIVE. The goal of this article is to examine some of the current cardiothoracic radiology applications of artificial intelligence in general and deep learning in particular. **CONCLUSION.** Artificial intelligence has been used for the analysis of medical images for decades. Recent advances in computer algorithms and hardware, coupled with the availability of larger labeled datasets, have brought about rapid advances in this field. Many of the more notable recent advances have been in the artificial intelligence subfield of deep learning.

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22. Front Psychol. 2020 Oct 14;11:568049. doi: 10.3389/fpsyg.2020.568049. eCollection 2020.

Arthropod Intelligence? The Case for Portia.

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Macphail's "null hypothesis," that there are no differences in intelligence, qualitative, or quantitative, between non-human vertebrates has been controversial. This controversy can be useful if it encourages interest in acquiring a detailed understanding of how non-human animals express flexible problem-solving capacity ("intelligence"), but limiting the discussion to vertebrates is too arbitrary. As an example, we focus here on Portia, a spider with an especially intricate predatory strategy and a preference for other spiders as prey. We review research on pre-planned detours, expectancy violation, and a capacity to solve confinement problems where, in each of these three contexts, there is experimental evidence of innate cognitive capacities and reliance on internal representation. These cognitive capacities are related to, but not identical to, intelligence. When discussing intelligence, as when discussing cognition, it is more useful to envisage a continuum instead of something that is simply present or not; in other words, a continuum pertaining to flexible problem-solving capacity for "intelligence" and a continuum pertaining to reliance on internal representation for "cognition." When envisaging a continuum pertaining to intelligence, Daniel Dennett's notion of four Creatures (Darwinian, Skinnerian, Popperian, and Gregorian) is of interest, with the distinction between Skinnerian and Popperian Creatures being especially relevant when considering Portia. When we consider these distinctions, a case can be made for Portia being a Popperian Creature. Like Skinnerian Creatures, Popperian Creatures express flexible problem solving capacity, but the manner in which this capacity is expressed by Popperian Creatures is more distinctively cognitive.

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23. Epilepsy Behav. 2019 Dec;101(Pt A):106597. doi: 10.1016/j.yebeh.2019.106597. Epub 2019 Nov 13.

Intelligence and epilepsy: The early era.

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This contribution to the commemoration of the 20th anniversary of Epilepsy & Behavior addresses the topic of epilepsy and intelligence, an early focus of interest in the history of the neuropsychology of epilepsy. The path through which the earliest measures of intelligence found their way to epilepsy research is reviewed followed by an overview of the subsequent themes of research, points of disagreement, advances in research using measures of intelligence, and developing awareness of the limitations associated with reliance on intelligence tests. Special Issue: Epilepsy & Behavior's 20th Anniversary.

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24. Indian J Dermatol Venereol Leprol. 2023 Jul-Aug;89(4):549-552. doi: 10.25259/IJDVL_725_2021.

Artificial intelligence: Its role in dermatopathology.

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Artificial intelligence (AI), a major frontier in the field of medical research, can potentially lead to a paradigm shift in clinical practice. A type of artificial intelligence system known as convolutional neural network points to the possible utility of deep learning in dermatopathology. Though pathology has been traditionally restricted to microscopes and glass slides, recent advancement in digital pathological imaging has led to a transition making it a potential branch for the implementation of artificial intelligence. The current application of artificial intelligence in dermatopathology is to complement the diagnosis and requires a well-trained dermatopathologist's guidance for better designing and development of deep learning algorithms. Here we review the recent advances of artificial intelligence in dermatopathology, its applications in disease diagnosis and in research, along with its limitations and future potential.

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25. Curr Diabetes Rev. 2023;19(9):e050922208561. doi:
10.2174/1573399819666220905163940.

Artificial Intelligence in Efficient Diabetes Care.

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Diabetes is a chronic disease that is not easily curable but can be managed efficiently. Artificial Intelligence is a powerful tool that may help in diabetes prediction, continuous glucose monitoring, Insulin injection guidance, and other areas of diabetes care. Diabetes, if not appropriately managed, leads to secondary complications like retinopathy, nephropathy, and neuropathy. Artificial intelligence helps minimize the risk of these complications through software and Artificial Intelligence-based devices. Artificial Intelligence can also help physicians in the early diagnosis and management of diabetes while reducing medical errors. Here we review the advancement of Artificial Intelligence in diabetes management.

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26. Curr Opin Pulm Med. 2024 Jan 1;30(1):92-98. doi: 10.1097/MCP.0000000000001024.
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Artificial intelligence in interventional pulmonology.

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PURPOSE OF REVIEW: In recent years, there has been remarkable progress in the field of artificial intelligence technology. Artificial intelligence applications have been extensively researched and actively implemented across various domains within healthcare. This study reviews the current state of artificial intelligence research in interventional pulmonology and engages in a discussion to comprehend its capabilities and implications.

RECENT FINDINGS: Deep learning, a subset of artificial intelligence, has found extensive applications in recent years, enabling highly accurate identification and labeling of bronchial segments solely from intraluminal bronchial images. Furthermore, research has explored the use of artificial intelligence for the analysis of endobronchial ultrasound images, achieving a high degree of accuracy in distinguishing between benign and malignant targets within ultrasound images. These advancements have become possible due to the increased computational power of modern systems and the utilization of vast datasets, facilitating detections

and predictions with greater precision and speed.

SUMMARY: Artificial intelligence integration into interventional pulmonology has the potential to enhance diagnostic accuracy and patient safety, ultimately leading to improved patient outcomes. However, the clinical impacts of artificial intelligence enhanced procedures remain unassessed. Additional research is necessary to evaluate both the advantages and disadvantages of artificial intelligence in the field of interventional pulmonology.

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27. Radiol Clin North Am. 2021 Nov;59(6):1085-1095. doi: 10.1016/j.rcl.2021.07.008.

Future Directions in Artificial Intelligence.

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No one knows what the paradigm shift of artificial intelligence will bring to medical imaging. In this article, we attempt to predict how artificial intelligence will impact radiology based on a critical review of current innovations. The best way to predict the future is to anticipate, prepare, and create it. We anticipate that radiology will need to enhance current infrastructure, collaborate with others, learn the challenges and pitfalls of the technology, and maintain a healthy skepticism about artificial intelligence while embracing its potential to allow us to become more productive, accurate, secure, and impactful in the care of our patients.

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28. Curr Opin Ophthalmol. 2020 Sep;31(5):318-323. doi: 10.1097/ICU.0000000000000676.

Big data requirements for artificial intelligence.

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PURPOSE OF REVIEW: To summarize how big data and artificial intelligence technologies have evolved, their current state, and next steps to enable future generations of artificial intelligence for ophthalmology.

RECENT FINDINGS: Big data in health care is ever increasing in volume and variety, enabled by the widespread adoption of electronic health records (EHRs) and standards for health data information exchange, such as Digital Imaging and Communications in Medicine and Fast Healthcare Interoperability Resources.

Simultaneously, the development of powerful cloud-based storage and computing architectures supports a fertile environment for big data and artificial intelligence in health care. The high volume and velocity of imaging and structured data in ophthalmology and is one of the reasons why ophthalmology is at the forefront of artificial intelligence research. Still needed are consensus labeling conventions for performing supervised learning on big data, promotion of data sharing and reuse, standards for sharing artificial intelligence model architectures, and access to artificial intelligence models through open application program interfaces (APIs).

SUMMARY: Future requirements for big data and artificial intelligence include fostering reproducible science, continuing open innovation, and supporting the clinical use of artificial intelligence by promoting standards for data labels, data sharing, artificial intelligence model architecture sharing, and accessible code and APIs.

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PMID: 32657996 [Indexed for MEDLINE]

29. Bull Cancer. 2022 Jan;109(1):83-88. doi: 10.1016/j.bulcan.2021.09.009. Epub 2021 Nov 12.

[Artificial intelligence and medical imaging].

[Article in French]

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The use of artificial intelligence methods for image recognition is one of the most developed branches of the AI field and these technologies are now commonly used in our daily lives. In the field of medical imaging, approaches based on artificial intelligence are particularly promising, with numerous applications

and a strong interest in the search for new biomarkers. Here, we will present the general methods used in these approaches as well as the potential areas of application.

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30. Appl Neuropsychol Child. 2017 Jul-Sep;6(3):193-203. doi: 10.1080/21622965.2017.1317480. Epub 2017 May 16.

Fluid intelligence: A brief history.

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The concept of fluid and crystallized intelligence was introduced to the psychological community approximately 75 years ago by Raymond B. Cattell, and it continues to be an area of active research and controversy. The purpose of this paper is to provide a brief overview of the origin of the concept, early efforts to define intelligence and uses of intelligence tests to address pressing social issues, and the ongoing controversies associated with fluid intelligence and the structure of intelligence. The putative neuropsychological underpinnings and neurological substrates of fluid intelligence are discussed.

DOI: 10.1080/21622965.2017.1317480
PMID: 28506124 [Indexed for MEDLINE]

31. J Pathol Transl Med. 2019 Jan;53(1):1-12. doi: 10.4132/jptm.2018.12.16. Epub 2018 Dec 28.

Artificial Intelligence in Pathology.

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As in other domains, artificial intelligence is becoming increasingly important in medicine. In particular, deep learning-based pattern recognition methods can advance the field of pathology by incorporating clinical, radiologic, and genomic data to accurately diagnose diseases and predict patient prognoses. In this review, we present an overview of artificial intelligence, the brief history of artificial intelligence in the medical domain, recent advances in artificial intelligence applied to pathology, and future prospects of pathology driven by artificial intelligence.

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32. Interface Focus. 2017 Jun 6;7(3):20160108. doi: 10.1098/rsfs.2016.0108. Epub 2017 Apr 21.

The evolution of intelligence in mammalian carnivores.

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Although intelligence should theoretically evolve to help animals solve specific types of problems posed by the environment, it is unclear which environmental challenges favour enhanced cognition, or how general intelligence evolves along with domain-specific cognitive abilities. The social intelligence hypothesis posits that big brains and great intelligence have evolved to cope with the labile behaviour of group mates. We have exploited the remarkable convergence in social complexity between cercopithecine primates and spotted hyaenas to test predictions of the social intelligence hypothesis in regard to both cognition and brain size. Behavioural data indicate that there has been considerable convergence between primates and hyaenas with respect to their social cognitive abilities. Moreover, compared with other hyaena species, spotted hyaenas have larger brains and expanded frontal cortex, as predicted by the social intelligence hypothesis. However, broader comparative study suggests that domain-general intelligence in carnivores probably did not evolve in response to selection pressures imposed specifically in the social domain. The cognitive buffer hypothesis, which suggests that general intelligence evolves to help animals cope with novel or changing environments, appears to offer a more robust explanation for general intelligence in carnivores than any hypothesis invoking selection pressures imposed strictly by sociality or foraging demands.

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PMCID: PMC5413890

PMID: 28479979

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33. Curr Opin Psychiatry. 2017 May;30(3):197-200. doi: 10.1097/YCO.0000000000000323.

Ability-based emotional intelligence in schizophrenia.

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PURPOSE OF REVIEW: As one part of social cognition, emotional intelligence is a controversially discussed construct. Although well founded critique on the conceptualization of emotional intelligence has emerged over the last years, studies about emotional intelligence - especially the ability-based approach by Mayer and Salovey - can persistently be found in schizophrenia research.

RECENT FINDINGS: Studies published between October 2015 and October 2016 were included in this review. The majority of the studies addressed the associations between ability-based emotional intelligence and other clinical or neuropsychological features, for example symptom severity or executive functioning. One study investigated the effect of oxytocin on emotional intelligence and another dealt with the question, whether emotional intelligence could be an endophenotype for schizophrenia.

SUMMARY: The reviewed literature reveals that patients with schizophrenia exhibit impairments in ability-based emotional intelligence. In this context, non-social cognition, positive symptoms, and anomalous-self experiences seem to be of major relevance. The potential endophenotypic role of ability-based emotional intelligence in schizophrenia remains to be clarified.

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PMID: 28212171 [Indexed for MEDLINE]

34. PET Clin. 2022 Jan;17(1):85-94. doi: 10.1016/j.cpet.2021.06.011.

Artificial Intelligence and Cardiac PET/Computed Tomography Imaging.

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Artificial intelligence is an important technology, with rapidly expanding applications for cardiac PET. We review the common terminology, including methods for training and testing, which are fundamental to understanding artificial intelligence. Next, we highlight applications to improve image acquisition, reconstruction, and segmentation. Computed tomographic imaging is commonly acquired in conjunction with PET and various artificial intelligence methods have been applied, including methods to automatically extract anatomic information or generate synthetic attenuation images. Last, we describe methods to automate disease diagnosis or risk stratification. This summary highlights the current and future clinical applications of artificial intelligence to cardiovascular PET imaging.

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35. Curr Opin Urol. 2021 Jul 1;31(4):430-435. doi: 10.1097/MOU.0000000000000883.

Artificial intelligence in prostate histopathology: where are we in 2021?

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PURPOSE OF REVIEW: Artificial intelligence has made an entrance into mainstream applications of daily life but the clinical deployment of artificial intelligence-supported histological analysis is still at infancy. Recent years have seen a surge in technological advance regarding the use of artificial intelligence in pathology, in particular in the diagnosis of prostate cancer.

RECENT FINDINGS: We review first impressions of how artificial intelligence impacts the clinical performance of pathologists in the analysis of prostate tissue. Several challenges in the deployment of artificial intelligence remain to be overcome. Finally, we discuss how artificial intelligence can help in generating new knowledge that is interpretable by humans.

SUMMARY: It is evident that artificial intelligence has the potential to outperform most pathologists in detecting prostate cancer, and does not suffer from inherent interobserver variability. Nonetheless, large clinical validation studies that unequivocally prove the benefit of artificial intelligence support in pathology are necessary. Regardless, artificial intelligence may soon automate and standardize many facets of routine work, including qualitative (i.e. Gleason Grading) and quantitative measures (i.e. portion of Gleason Grades and tumor volume). For the near future, a model where pathologists are enhanced by second-review or real-time artificial intelligence systems appears to be the most promising approach.

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PMID: 33965977 [Indexed for MEDLINE]

36. Curr Opin Obstet Gynecol. 2022 Aug 1;34(4):159-163. doi: 10.1097/GCO.0000000000000796. Epub 2022 Jun 27.

Current trends in artificial intelligence in reproductive endocrinology.

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PURPOSE OF REVIEW: Artificial Intelligence, a tool that integrates computer science and machine learning to mimic human decision-making processes, is transforming the world and changing the way we live. Recently, the healthcare industry has gradually adopted artificial intelligence in many applications and obtained some degree of success. In this review, we summarize the current applications of artificial intelligence in Reproductive Endocrinology, in both laboratory and clinical settings.

RECENT FINDINGS: Artificial Intelligence has been used to select the embryos

with high implantation potential, proper ploidy status, to predict later embryo development, and to increase pregnancy and live birth rates. Some studies also suggested that artificial intelligence can help improve infertility diagnosis and patient management. Recently, it has been demonstrated that artificial intelligence also plays a role in effective laboratory quality control and performance.

SUMMARY: In this review, we discuss various applications of artificial intelligence in different areas of reproductive medicine. We summarize the current findings with their potentials and limitations, and also discuss the future direction for research and clinical applications.

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37. Expert Rev Gastroenterol Hepatol. 2022 Jun;16(6):493-498. doi: 10.1080/17474124.2022.2083604. Epub 2022 Jun 14.

Artificial intelligence implementation in pancreaticobiliary endoscopy.

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INTRODUCTION: Artificial intelligence has been rapidly deployed in gastroenterology and endoscopy. The acceleration of deep convolutional neural networks along with hardware development has allowed implementation of artificial intelligence algorithms into real-time endoscopy, particularly colonoscopy. However, artificial intelligence implementation in pancreaticobiliary endoscopy is nascent.

AREAS COVERED: Initial studies have been conducted in endoscopic retrograde pancreatography (ERCP), endoscopic ultrasound (EUS), and digital single operator cholangioscopy (DSOC). Machine learning has been implemented in identifying significant landmarks, including the ampulla on ERCP, and the bile duct, pancreas, and portal confluence on EUS. Moreover, artificial intelligence algorithms have been deployed in differentiating pathology including pancreas cancer, autoimmune pancreatitis, pancreatic cystic lesions, and biliary strictures.

EXPERT OPINION: There have been relatively few studies with limited sample sizes in developing these machine learning algorithms. Despite the early successful demonstration of artificial intelligence in pancreaticobiliary endoscopy, additional research needs to be conducted with larger data sets to improve generalizability and assessed in real-time endoscopy before clinical implementation. However, pancreaticobiliary endoscopy remains a promising avenue of artificial intelligence application with the potential to improve clinical practice and outcomes.

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PMID: 35639864 [Indexed for MEDLINE]

38. Ther Adv Gastrointest Endosc. 2021 Feb 15;14:2631774521993059. doi: 10.1177/2631774521993059. eCollection 2021 Jan-Dec.

Application of artificial intelligence in pancreaticobiliary diseases.

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The role of artificial intelligence and its applications has been increasing at a rapid pace in the field of gastroenterology. The application of artificial intelligence in gastroenterology ranges from colon cancer screening and characterization of dysplastic and neoplastic polyps to the endoscopic ultrasonographic evaluation of pancreatic diseases. Artificial intelligence has been found to be useful in the evaluation and enhancement of the quality measure for endoscopic retrograde cholangiopancreatography. Similarly, artificial intelligence techniques like artificial neural networks and faster region-based convolution network are showing promising results in early and accurate diagnosis of pancreatic cancer and its differentiation from chronic pancreatitis. Other artificial intelligence techniques like radiomics-based computer-aided diagnosis systems could help to differentiate between various types of cystic pancreatic lesions. Artificial intelligence and computer-aided systems also showing promising results in the diagnosis of cholangiocarcinoma and the prediction of choledocholithiasis. In this review, we discuss the role of artificial intelligence in establishing diagnosis, prognosis, predicting response to treatment, and guiding therapeutics in the pancreaticobiliary system.

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39. Curr Pharm Des. 2022;28(26):2150-2160. doi: 10.2174/1381612828666220520112240.

A Review on an Artificial Intelligence Based Ophthalmic Application.

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Artificial intelligence is the leading branch of technology and innovation. The utility of artificial intelligence in the field of medicine is also remarkable. From drug discovery and development to introducing products to the market, artificial intelligence can play its role. As people age, they are more prone to be affected by eye diseases around the globe. Early diagnosis and detection help minimize the risk of vision loss and provide a quality life. With the help of artificial intelligence, the workload of humans and manmade errors can be reduced to an extent. The need for artificial intelligence in the area of ophthalmic is also significant. In this review, we elaborated on the use of artificial intelligence in the field of pharmaceutical product development, mainly with its application in ophthalmic care. AI in the future has a high potential to increase the success rate in the drug discovery phase has already been established. The application of artificial intelligence for drug development, diagnosis, and treatment is also reported with the scientific evidence in this paper.

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40. Perspect Psychol Sci. 2015 Nov;10(6):753-7. doi: 10.1177/1745691615598511.

Improving Intelligence Analysis With Decision Science.

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Intelligence analysis plays a vital role in policy decision making. Key functions of intelligence analysis include accurately forecasting significant events, appropriately characterizing the uncertainties inherent in such forecasts, and effectively communicating those probabilistic forecasts to stakeholders. We review decision research on probabilistic forecasting and uncertainty communication, drawing attention to findings that could be used to reform intelligence processes and contribute to more effective intelligence oversight. We recommend that the intelligence community (IC) regularly and quantitatively monitor its forecasting accuracy to better understand how well it is achieving its functions. We also recommend that the IC use decision science to improve these functions (namely, forecasting and communication of intelligence estimates made under conditions of uncertainty). In the case of forecasting, decision research offers suggestions for improvement that involve interventions on data (e.g., transforming forecasts to debias them) and behavior (e.g., via selection, training, and effective team structuring). In the case of uncertainty communication, the literature suggests that current intelligence procedures, which emphasize the use of verbal probabilities, are ineffective. The IC should, therefore, leverage research that points to ways in which verbal probability use may be improved as well as exploring the use of numerical

probabilities wherever feasible.

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DOI: 10.1177/1745691615598511

PMID: 26581731 [Indexed for MEDLINE]

41. Front Comput Neurosci. 2017 Dec 7;11:112. doi: 10.3389/fncom.2017.00112. eCollection 2017.

Computational Foundations of Natural Intelligence.

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(1)Computational Cognitive Neuroscience Lab, Department of Artificial Intelligence, Donders Institute for Brain, Cognition and Behaviour, Radboud University, Nijmegen, Netherlands.

New developments in AI and neuroscience are revitalizing the quest to understanding natural intelligence, offering insight about how to equip machines with human-like capabilities. This paper reviews some of the computational principles relevant for understanding natural intelligence and, ultimately, achieving strong AI. After reviewing basic principles, a variety of computational modeling approaches is discussed. Subsequently, I concentrate on the use of artificial neural networks as a framework for modeling cognitive processes. This paper ends by outlining some of the challenges that remain to fulfill the promise of machines that show human-like intelligence.

DOI: 10.3389/fncom.2017.00112

PMCID: PMC5770642

PMID: 29375355

42. Diagnosis (Berl). 2023 Feb 20;10(2):158-163. doi: 10.1515/dx-2022-0090. eCollection 2023 May 1.

Collective intelligence improves probabilistic diagnostic assessments.

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OBJECTIVES: Collective intelligence, the "wisdom of the crowd," seeks to improve the quality of judgments by aggregating multiple individual inputs. Here, we evaluate the success of collective intelligence strategies applied to probabilistic diagnostic judgments.

METHODS: We compared the performance of individual and collective intelligence judgments on two series of clinical cases requiring probabilistic diagnostic assessments, or "forecasts". We assessed the quality of forecasts using Brier

scores, which compare forecasts to observed outcomes.

RESULTS: On both sets of cases, the collective intelligence answers outperformed nearly every individual forecaster or team. The improved performance by collective intelligence was mediated by both improved resolution and calibration of probabilistic assessments. In a secondary analysis looking at the effect of varying number of individual inputs in collective intelligence answers from two different data sources, nearly identical curves were found in the two data sets showing 11-12% improvement when averaging two independent inputs, 15% improvement averaging four independent inputs, and small incremental improvements with further increases in number of individual inputs.

CONCLUSIONS: Our results suggest that the application of collective intelligence strategies to probabilistic diagnostic forecasts is a promising approach to improve diagnostic accuracy and reduce diagnostic error.

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PMID: 36797838 [Indexed for MEDLINE]

43. Br J Haematol. 2022 Sep;198(5):805-806. doi: 10.1111/bjh.18358. Epub 2022 Jul 13.

Artificial intelligence: Training the trainer.

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Including artificial intelligence in haematological education is compulsory but should not be limited to students. Experienced haematologist and decision-makers in the clinical environment have at least similar needs. This is because of the tremendous potential, opportunities and benefits the timely inclusion of artificial intelligence offers in diagnosis, prediction and personalised therapy. Commentary on: Chai et al. Integrating artificial intelligence into haematology training and practice: opportunities, threats and proposed solutions. Br J Hematol 2022;198:807-811.

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PMID: 35822904 [Indexed for MEDLINE]

44. Brain Commun. 2020 Jul 9;2(2):fcaa096. doi: 10.1093/braincomms/fcaa096. eCollection 2020.

Artificial intelligence for clinical decision support in neurology.

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Artificial intelligence is one of the most exciting methodological shifts in our era. It holds the potential to transform healthcare as we know it, to a system where humans and machines work together to provide better treatment for our patients. It is now clear that cutting edge artificial intelligence models in conjunction with high-quality clinical data will lead to improved prognostic and diagnostic models in neurological disease, facilitating expert-level clinical decision tools across healthcare settings. Despite the clinical promise of artificial intelligence, machine and deep-learning algorithms are not a one-size-fits-all solution for all types of clinical data and questions. In this article, we provide an overview of the core concepts of artificial intelligence, particularly contemporary deep-learning methods, to give clinician and neuroscience researchers an appreciation of how artificial intelligence can be harnessed to support clinical decisions. We clarify and emphasize the data quality and the human expertise needed to build robust clinical artificial intelligence models in neurology. As artificial intelligence is a rapidly evolving field, we take the opportunity to iterate important ethical principles to guide the field of medicine as it moves into an artificial intelligence enhanced future.

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PMID: 33134913

45. Expert Rev Gastroenterol Hepatol. 2022 Jan;16(1):21-31. doi: 10.1080/17474124.2022.2020646. Epub 2021 Dec 27.

Application and prospect of artificial intelligence in digestive endoscopy.

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INTRODUCTION: With the progress of science and technology, artificial intelligence represented by deep learning has gradually begun to be applied in the medical field. Artificial intelligence has been applied to benign gastrointestinal lesions, tumors, early cancer, inflammatory bowel disease, gallbladder, pancreas, and other diseases. This review summarizes the latest research results on artificial intelligence in digestive endoscopy and discusses the prospect of artificial intelligence in digestive system diseases.

AREAS COVERED: We retrieved relevant documents on artificial intelligence in digestive tract diseases from PubMed and Medline. This review elaborates on the knowledge of computer-aided diagnosis in digestive endoscopy.

EXPERT OPINION: Artificial intelligence significantly improves diagnostic accuracy, reduces physicians' workload, and provides a shred of evidence for clinical diagnosis and treatment. Shortly, artificial intelligence will have high application value in the field of medicine.

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PMID: 34937459 [Indexed for MEDLINE]

46. Curr Opin Cardiol. 2021 Sep 1;36(5):637-643. doi: 10.1097/HCO.0000000000000888.

The cardiac surgeon's guide to artificial intelligence.

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PURPOSE OF REVIEW: Artificial intelligence is the ability for machines to perform intelligent tasks. Artificial intelligence is already penetrating many aspects of medicine including cardiac surgery. Here, we offer a platform introduction to artificial intelligence for cardiac surgeons to understand the implementations of this transformative tool.

RECENT FINDINGS: Artificial intelligence has contributed greatly to the automation of cardiac imaging, including echocardiography, cardiac computed tomography, cardiac MRI and most recently, in radiomics. There are also several artificial intelligence based clinical prediction tools that predict complex outcomes after cardiac surgery. Waveform analysis, specifically, automated electrocardiogram analysis, has seen significant strides with promise in wearables and remote monitoring. Experimentally, artificial intelligence has also entered the operating room in the form of augmented reality and automated robotic surgery.

SUMMARY: Artificial intelligence has many potential exciting applications in cardiac surgery. It can streamline physician workload and help make medicine more human again by placing the physician back at the bedside. Here, we offer cardiac surgeons an introduction to this transformative tool so that they may actively participate in creating clinically relevant implementations to improve our practice.

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DOI: 10.1097/HCO.0000000000000888

PMID: 34397469 [Indexed for MEDLINE]

47. J Psychiatr Pract. 2023 Nov 1;29(6):476-479. doi: 10.1097/PRA.0000000000000748.

Psychotherapy and Artificial Intelligence.

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This column explores the challenges involved in providing psychotherapy through artificial intelligence. It reviews artificial intelligence's capacity across schools of therapy to address relevant issues related to privacy, the use of technical interventions, and the therapeutic relationship.

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48. Front Psychol. 2023 Aug 17;14:1209761. doi: 10.3389/fpsyg.2023.1209761. eCollection 2023.

Intelligence across humans and machines: a joint perspective.

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This paper aims to address the divergences and contradictions in the definition of intelligence across different areas of knowledge, particularly in computational intelligence and psychology, where the concept is of significant interest. Despite the differences in motivation and approach, both fields have contributed to the rise of cognitive science. However, the lack of a standardized definition, empirical evidence, or measurement strategy for intelligence is a hindrance to cross-fertilization between these areas, particularly for semantic-based applications. This paper seeks to equalize the definitions of intelligence from the perspectives of computational intelligence and psychology, and offer an overview of the methods used to measure intelligence. We argue that there is no consensus for intelligence, and the term is interchangeably used with similar, opposed, or even contradictory definitions in many fields. This paper concludes with a summary of its central considerations and contributions, where we state intelligence is an agent's ability to process external and internal information to find an optimum adaptation (decision-making) to the environment according to its ontology and then decode this information as an output action.

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PMID: 37663348

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49. Curr Opin Ophthalmol. 2020 Jul;31(4):253-260. doi: 10.1097/ICU.0000000000000673.

Artificial intelligence in cornea, refractive, and cataract surgery.

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PURPOSE OF REVIEW: The subject of artificial intelligence has recently been responsible for the advancement of many industries including aspects of medicine and many of its subspecialties. Within ophthalmology, artificial intelligence technology has found ways of improving the diagnostic and therapeutic processes in cornea, glaucoma, retina, and cataract surgery. As demands on the modern ophthalmologist grow, artificial intelligence can be utilized to help address increased demands of modern medicine and ophthalmology by adding to the physician's clinical and surgical acumen. The purpose of this review is to highlight the integration of artificial intelligence into ophthalmology in recent years in the areas of cornea, refractive, and cataract surgery.

RECENT FINDINGS: Within the realms of cornea, refractive, and cataract surgery, artificial intelligence has played a major role in identifying ways of improving diagnostic detection. In keratoconus, artificial intelligence algorithms may help with the early detection of keratoconus and other ectatic disorders. In cataract surgery, artificial intelligence may help improve the performance of intraocular lens (IOL) calculation formulas. Further, with its potential integration into automated refraction devices, artificial intelligence can help provide an improved framework for IOL formula optimization that is more accurate and customized to a specific cataract surgeon.

SUMMARY: The future of artificial intelligence in ophthalmology is a promising prospect. With continued advancement of mathematical and computational algorithms, corneal disease processes can be diagnosed sooner and IOL calculations can be made more accurate.

DOI: 10.1097/ICU.0000000000000673

PMID: 32487811 [Indexed for MEDLINE]

50. Front Hum Neurosci. 2019 Feb 15;13:44. doi: 10.3389/fnhum.2019.00044. eCollection 2019.

Genes, Cells and Brain Areas of Intelligence.

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What is the neurobiological basis of human intelligence? The brains of some people seem to be more efficient than those of others. Understanding the

biological foundations of these differences is of great interest to basic and applied neuroscience. Somehow, the secret must lie in the cells in our brain with which we think. However, at present, research into the neurobiology of intelligence is divided between two main strategies: brain imaging studies investigate macroscopic brain structure and function to identify brain areas involved in intelligence, while genetic associations studies aim to pinpoint genes and genetic loci associated with intelligence. Nothing is known about how properties of brain cells relate to intelligence. The emergence of transcriptomics and cellular neuroscience of intelligence might, however, provide a third strategy and bridge the gap between identified genes for intelligence and brain function and structure. Here, we discuss the latest developments in the search for the biological basis of intelligence. In particular, the recent availability of very large cohorts with hundreds of thousands of individuals have propelled exciting developments in the genetics of intelligence. Furthermore, we discuss the first studies that show that specific populations of brain cells associate with intelligence. Finally, we highlight how specific genes that have been identified generate cellular properties associated with intelligence and may ultimately explain structure and function of the brain areas involved. Thereby, the road is paved for a cellular understanding of intelligence, which will provide a conceptual scaffold for understanding how the constellation of identified genes benefit cellular functions that support intelligence.

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PMCID: PMC6384251

PMID: 30828294

51. Psychon Bull Rev. 2017 Aug;24(4):1022-1031. doi: 10.3758/s13423-016-1196-1.

Effects of cognitive training on the structure of intelligence.

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Targeted cognitive training, such as n-back or speed of processing training, in the hopes of raising intelligence is of great theoretical and practical importance. The most important theoretical contribution, however, is not about the malleability of intelligence. Instead, I argue the most important and novel theoretical contribution is understanding the causal structure of intelligence. The structure of intelligence, most often taken as a hierarchical factor structure, necessarily prohibits transfer from subfactors back up to intelligence. If this is the true structure, targeted cognitive training interventions will fail to increase intelligence not because intelligence is immutable, but simply because there is no causal connection between, say, working memory and intelligence. Seeing the structure of intelligence for what it is, a causal measurement model, allows us to focus testing on the presence and absence of causal links. If we can increase subfactors without transfer to other facets, we may be confirming the correct causal structure more than testing malleability. Such a blending into experimental psychometrics is a strong theoretical pursuit.

DOI: 10.3758/s13423-016-1196-1

PMID: 27844294 [Indexed for MEDLINE]

52. Indian J Dermatol Venereol Leprol. 2021 [SEASON];87(4):457-467. doi: 10.25259/IJDVL_518_19.

Artificial intelligence in dermatology and healthcare: An overview.

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Many aspects of our life are affected by technology. One of the most discussed advancements of modern technologies is artificial intelligence. It involves computational methods which in some way mimic the human thought process. Just like other branches, the medical field also has come under the ambit of artificial intelligence. Almost every field in medicine has been touched by its effect in one way or the other. Prominent among them are medical diagnosis, medical statistics, robotics, and human biology. Medical imaging is one of the foremost specialties with artificial intelligence applications, wherein deep learning methods like artificial neural networks are commonly used. artificial intelligence application in dermatology was initially restricted to the analysis of melanoma and pigmentary skin lesions, has now expanded and covers many dermatoses. Though the applications of artificial intelligence are ever increasing, large data requirements, interpretation of data and ethical concerns are some of its limitations in the present day.

DOI: 10.25259/IJDVL_518_19

PMID: 34114421 [Indexed for MEDLINE]

53. World J Psychiatry. 2022 Oct 19;12(10):1287-1297. doi: 10.5498/wjp.v12.i10.1287. eCollection 2022 Oct 19.

Artificial intelligence-assisted psychosis risk screening in adolescents: Practices and challenges.

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Artificial intelligence-based technologies are gradually being applied to psych-iatric research and practice. This paper reviews the primary literature concerning artificial intelligence-assisted psychosis risk screening in adolescents. In terms of the practice of psychosis risk screening, the application of two artificial intelligence-assisted screening methods, chatbot and large-scale social media data analysis, is summarized in detail. Regarding the challenges of psychiatric risk screening, ethical issues constitute the first challenge of psychiatric risk screening through artificial intelligence, which must comply with the four biomedical ethical principles of respect for autonomy, nonmaleficence, beneficence and impartiality such that the development of artificial intelligence can meet the moral and ethical requirements of human beings. By reviewing the pertinent literature concerning current artificial intelligence-assisted adolescent psychosis risk screens, we propose that assuming they meet ethical requirements, there are three directions worth considering in the future development of artificial intelligence-assisted

psychosis risk screening in adolescents as follows: nonperceptual real-time artificial intelligence-assisted screening, further reducing the cost of artificial intelligence-assisted screening, and improving the ease of use of artificial intelligence-assisted screening techniques and tools.

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54. Crit Rev Clin Lab Sci. 2019 Mar;56(2):98-110. doi: 10.1080/10408363.2018.1561640. Epub 2019 Mar 28.

Automation and artificial intelligence in the clinical laboratory.

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The daily operation of clinical laboratories will be drastically impacted by two disruptive technologies: automation and artificial intelligence (the development and use of computer systems able to perform tasks that normally require human intelligence). These technologies will also expand the scope of laboratory medicine. Automation will result in increased efficiency but will require changes to laboratory infrastructure and a shift in workforce training requirements. The application of artificial intelligence to large clinical datasets generated through increased automation will lead to the development of new diagnostic and prognostic models. Together, automation and artificial intelligence will support the move to personalized medicine. Changes in pathology and clinical doctoral scientist training will be necessary to fully participate in these changes. KEYWORDS: Automation; artificial intelligence; deep learning; laboratory medicine.

DOI: 10.1080/10408363.2018.1561640
PMID: 30922144 [Indexed for MEDLINE]

55. Front Psychol. 2022 Jun 10;13:853239. doi: 10.3389/fpsyg.2022.853239. eCollection 2022.

Intelligence Instruments Applied to South African School Learners: A Critical Review.

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To establish reliability and validity of formal intelligence assessment instruments in a multicultural and multilingual society such as South Africa, context needs to be taken into consideration and existing psychological intelligence test instruments need to be surveyed carefully for cultural bias. The aim of this critical review of scientific literature was to critically appraise and synthesize data regarding intelligence instruments applied to South African school learners. The search initially yielded 405 studies of which 15 were finally included for thematic analysis. The following three main themes emerged from the included studies: Applicability of intelligence instruments administered to South African school learners; Contextual and demographic influences affecting performance on administered intelligence instruments; and Intellectual measuring instruments related to developmental and cognitive ability levels. It is recommended that the findings of this research study should be considered in the possible development of a strategic guideline to design an intelligence instrument applicable to South African school learners.

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56. Curr Opin Urol. 2020 Nov;30(6):748-753. doi: 10.1097/MOU.0000000000000819.

Clinical applications of artificial intelligence in urologic oncology.

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PURPOSE OF REVIEW: This review aims to shed light on recent applications of artificial intelligence in urologic oncology.

RECENT FINDINGS: Artificial intelligence algorithms harness the wealth of patient data to assist in diagnosing, staging, treating, and monitoring genitourinary malignancies. Successful applications of artificial intelligence in urologic oncology include interpreting diagnostic imaging, pathology, and genomic annotations. Many of these algorithms, however, lack external validity and can only provide predictions based on one type of dataset.

SUMMARY: Future applications of artificial intelligence will need to incorporate several forms of data in order to truly make headway in urologic oncology. Researchers must actively ensure future artificial intelligence developments encompass the entire prospective patient population.

DOI: 10.1097/MOU.0000000000000819
PMID: 32941255 [Indexed for MEDLINE]

57. Soins. 2019 Jul-Aug;64(837):24-27. doi: 10.1016/j.soin.2019.05.002.

[Artificial intelligence, philosophical reflection].

[Article in French]

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The use of artificial intelligence and robotics in health care means ethical principles need to be established. Artificial and human intelligence must be implemented in such a way as to complement each other. From humanism to anthropotechnics, the definitions of human and humanism are not set in stone. A philosophical reflection can enable their definition to be shaped.

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58. Sensors (Basel). 2020 Jan 23;20(3):633. doi: 10.3390/s20030633.

Computational Intelligence in Remote Sensing: An Editorial.

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Computational intelligence is a very active and fruitful research of artificial intelligence with a broad spectrum of applications. Remote sensing data has been a salient field of application of computational intelligence algorithms, both for the exploitation of the data and for the research/development of new data analysis tools. In this editorial paper we provide the setting of the special issue "Computational Intelligence in Remote Sensing" and an overview of the published papers. The 11 accepted and published papers cover a wide spectrum of applications and computational tools that we try to summarize and put in perspective in this editorial paper.

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PMID: 31979240

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59. J Obstet Gynaecol India. 2018 Aug;68(4):326-327. doi: 10.1007/s13224-018-1118-4.

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Artificial Intelligence: The Future of Obstetrics and Gynecology.

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BACKGROUND: Artificial intelligence or 'big data' comprises of algorithms which aid in decision making. It has made an impact on a number of professions including obstetrics and gynecology.

OBJECTIVE: To make readers aware of where artificial intelligence has a role in obstetrics and gynecology.

MATERIAL AND METHODS: A comprehensive review of the literature was undertaken to compile a list of instances where artificial intelligence was applied to obstetrics and gynecology.

CONCLUSION: Artificial intelligence should be utilized to benefit patient care and assist the physician in providing data for decision making.

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PMID: 30065551

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60. Acta Neurochir Suppl. 2022;134:313-318. doi: 10.1007/978-3-030-85292-4_35.

Artificial Intelligence in Adult Spinal Deformity.

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Artificial Intelligence is gaining traction in medicine for its ease of use and advancements in technology. This study evaluates the current literature on the use of artificial intelligence in adult spinal deformity.

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PMID: 34862555 [Indexed for MEDLINE]

61. Am J Clin Dermatol. 2020 Feb;21(1):41-47. doi: 10.1007/s40257-019-00462-6.

Artificial Intelligence in Dermatology-Where We Are and the Way to the Future: A Review.

Hogarty DT(1), Su JC(2)(3), Phan K(4), Attia M(5), Hossny M(5), Nahavandi S(5),

Lenane P(6)(7), Moloney FJ(6)(7), Yazdabadi A(2)(8)(9)(10).

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Although artificial intelligence has been available for some time, it has garnered significant interest recently and has been popularized by major companies with its applications in image identification, speech recognition and problem solving. Artificial intelligence is now being increasingly studied for its potential uses in medicine. A sound understanding of the concepts of this emerging field is essential for the dermatologist as dermatology has abundant medical data and images that can be used to train artificial intelligence for patient care. There are already a number of artificial intelligence studies focusing on skin disorders such as skin cancer, psoriasis, atopic dermatitis and onychomycosis. This article aims to present a basic introduction to the concepts of artificial intelligence as well as present an overview of the current research into artificial intelligence in dermatology, examining both its current applications and its future potential.

DOI: 10.1007/s40257-019-00462-6

PMID: 31278649 [Indexed for MEDLINE]

62. Dig Endosc. 2021 Jan;33(2):290-297. doi: 10.1111/den.13896. Epub 2020 Dec 27.

Artificial intelligence and deep learning for small bowel capsule endoscopy.

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Capsule endoscopy is ideally suited to artificial intelligence-based interpretation given its reliance on pattern recognition in still images. Time saving viewing modes and lesion detection features currently available rely on machine learning algorithms, a form of artificial intelligence. Current software necessitates close human supervision given poor sensitivity relative to an expert reader. However, with the advent of deep learning, artificial intelligence is becoming increasingly reliable and will be increasingly relied upon. We review the major advances in artificial intelligence for capsule endoscopy in recent publications and briefly review artificial intelligence development for historical understanding. Importantly, recent advancements in artificial intelligence have not yet been incorporated into practice and it is

immature to judge the potential of this technology based on current platforms. Remaining regulatory and standardization hurdles are being overcome and artificial intelligence-based clinical applications are likely to proliferate rapidly.

© 2020 Japan Gastroenterological Endoscopy Society.

DOI: 10.1111/den.13896

PMID: 33211357 [Indexed for MEDLINE]

63. Health Psychol Open. 2020 Nov 6;7(2):2055102920970416. doi: 10.1177/2055102920970416. eCollection 2020 Jul-Dec.

Emotional intelligence and its relationship with stress coping style.

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This study investigated the relationship between emotional intelligence and stress coping style in a group of 265 students, using Goleman's Theory of Emotional Intelligence. Findings indicated highest mean value of emotional intelligence for motivation and empathy. Majority students showed active problem and emotional coping behavior; however, a strong, positive correlation between emotional intelligence and stress coping style was found for the domains associated with Active Emotional and Problem Coping ($\alpha \leq 0.05$). It revealed that students are efficient in utilizing stress coping strategies and recommended that professors should provide guidance to students regarding emotional intelligence and stress coping styles.

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PMID: 33224513

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64. Semin Ophthalmol. 2021 May 19;36(4):341-345. doi: 10.1080/08820538.2021.1901123. Epub 2021 Mar 18.

Artificial Intelligence (AI) and Retinal Optical Coherence Tomography (OCT).

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Ophthalmology has been at the forefront of medical specialties adopting artificial intelligence. This is primarily due to the "image-centric" nature of

the field. Thanks to the abundance of patients' OCT scans, analysis of OCT imaging has greatly benefited from artificial intelligence to expand patient screening and facilitate clinical decision-making. In this review, we define the concepts of artificial intelligence, machine learning, and deep learning and how different artificial intelligence algorithms have been applied in OCT image analysis for disease screening, diagnosis, management, and prognosis. Finally, we address some of the challenges and limitations that might affect the incorporation of artificial intelligence in ophthalmology. These limitations mainly revolve around the quality and accuracy of datasets used in the algorithms and their generalizability, false negatives, and the cultural challenges around the adoption of the technology.

DOI: 10.1080/08820538.2021.1901123
PMID: 33734928 [Indexed for MEDLINE]

65. Micromachines (Basel). 2023 Apr 22;14(5):897. doi: 10.3390/mi14050897.

A Review of Artificial Intelligence in Embedded Systems.

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Advancements in artificial intelligence algorithms and models, along with embedded device support, have resulted in the issue of high energy consumption and poor compatibility when deploying artificial intelligence models and networks on embedded devices becoming solvable. In response to these problems, this paper introduces three aspects of methods and applications for deploying artificial intelligence technologies on embedded devices, including artificial intelligence algorithms and models on resource-constrained hardware, acceleration methods for embedded devices, neural network compression, and current application models of embedded AI. This paper compares relevant literature, highlights the strengths and weaknesses, and concludes with future directions for embedded AI and a summary of the article.

DOI: 10.3390/mi14050897
PMCID: PMC10220566
PMID: 37241521

Conflict of interest statement: The authors declare no conflict of interest.

66. Ultrasonography. 2023 Jan;42(1):2-9. doi: 10.14366/usg.22063. Epub 2022 Jul 20.

Applications of artificial intelligence in obstetrics.

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Artificial intelligence, which has been applied as an innovative technology in multiple fields of healthcare, analyzes large amounts of data to assist in disease prediction, prevention, and diagnosis, as well as in patient monitoring. In obstetrics, artificial intelligence has been actively applied and integrated into our daily medical practice. This review provides an overview of artificial intelligence systems currently used for obstetric diagnostic purposes, such as fetal cardiotocography, ultrasonography, and magnetic resonance imaging, and demonstrates how these methods have been developed and clinically applied.

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PMCID: PMC9816710

PMID: 36588179

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67. Am J Pharm Educ. 2022 Dec;86(10):ajpe8674. doi: 10.5688/ajpe8674. Epub 2021 Oct 25.

Evidence and Strategies for Including Emotional Intelligence in Pharmacy Education.

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Objective. This integrative review summarizes the literature addressing emotional intelligence among health care professionals and students to better define and incorporate it into the pharmacy curricula. **Findings.** Emotional intelligence is an essential attribute for relationship building, stress management, and self-regulation. Pharmacy students must develop and improve their emotional intelligence to support their development of successful relationships with patients, pharmacy colleagues, and other health care providers. In addition, awareness of one's own biases and emotions can help with behavioral regulation, which can facilitate enhanced communications with others. Increasing evidence suggests that emotional intelligence can influence academic success, the ability to provide compassionate and competent patient care, the ability to lead and influence others, and the ability to manage stress, all of which are important in pharmacy education. Educators can help learners develop emotional intelligence by designing activities that directly identify and target areas of weakness while leveraging areas of strength. **Summary.** This article

discusses key background studies on emotional intelligence in the health professions literature and identifies specific methods and strategies to develop learners' emotional intelligence within the curriculum.

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PMCID: PMC10159398

PMID: 34697015 [Indexed for MEDLINE]

68. J Intell. 2022 Dec 13;10(4):123. doi: 10.3390/jintelligence10040123.

Types of Intelligence and Academic Performance: A Systematic Review and Meta-Analysis.

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The concept of intelligence has been extensively studied, undergoing an evolution from a unitary concept to a more elaborate and complex multidimensional one. In addition, several research studies have focused their efforts for decades on the study of intelligence as a predictor of academic performance of students at different educational stages, being a stable and highly relevant predictor along with other variables such as executive functions, social context, culture or parental guardianship. Thus, the present study, based on a systematic review and meta-analysis, includes 27 studies with a total sample of 42,061 individuals. The main objective was to analyse the relationship between intelligence and academic performance using different predictive models that include moderating variables such as country of origin, type of intelligence, gender and age. The findings of this research highlight the significant, positive and moderate relationship between intelligence and academic performance ($r = 0.367$; $p < 0.001$), highlighting the predictive capacity on school performance when the type of intelligence (general and implicit; 35%) or the country of origin (45%) is taken as a moderating variable, with the explanatory models on age or sex not being significant. Therefore, it can be concluded that intelligence, in addition to being a good predictor of academic performance, is influenced depending on the type of intelligence or theoretical model taken as a reference, and also depending on the country or culture of origin.

DOI: 10.3390/jintelligence10040123

PMCID: PMC9785329

PMID: 36547510

Conflict of interest statement: The authors declare no conflict of interest.

69. Appl Neuropsychol Child. 2017 Jul-Sep;6(3):228-236. doi: 10.1080/21622965.2017.1317489. Epub 2017 May 10.

Touching the elephant: The search for fluid intelligence.

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Many constructs that we take for granted in modern neuropsychology, fluid intelligence among them, can best be explained by conceptualizing them as a collection of task specific processes engaged in by an integrated recruited network involved in problem solving. Fractionalizing the network in an attempt to describe elements of its function leads to arbitrarily defined segments that may be interesting to discuss abstractly, but never occur independently in the real world operation of the system. We will seek to demonstrate that the construct of fluid intelligence is like that. It is a description of a type of operation of a network dedicated to solving problems and the composition of the network that is responsible for the activity changes in a task specific manner. As a result, fluid intelligence is not an independent skill, or a thing that lives on its own, or can be measured independently of the other things that contribute to the overall operation of the network as it seeks to solve problems.

DOI: 10.1080/21622965.2017.1317489

PMID: 28489432 [Indexed for MEDLINE]

70. J Intell. 2023 Feb 14;11(2):35. doi: 10.3390/jintelligence11020035.

The Evolution of Intelligence: Analysis of the Journal of Intelligence and Intelligence.

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What are the current trends in intelligence research? This parallel bibliometric analysis covers the two premier journals in the field: Intelligence and the Journal of Intelligence (JOI) between 2013 and 2022. Using Scopus data, this paper extends prior bibliometric articles reporting the evolution of the journal Intelligence from 1977 up to 2018. It includes JOI from its inception, along with Intelligence to the present. Although the journal Intelligence's growth has declined over time, it remains a stronghold for traditional influential research (average publications per year = 71.2, average citations per article = 17.07, average citations per year = 2.68). JOI shows a steady growth pattern in the number of publications and citations (average publications per year = 33.2, average citations per article = 6.48, total average citations per year = 1.48) since its inception in 2013. Common areas of study across both journals include cognitive ability, fluid intelligence, psychometrics-statistics, g-factor, and working memory. Intelligence includes core themes like the Flynn effect, individual differences, and geographic IQ variability. JOI addresses themes such as creativity, personality, and emotional intelligence. We discuss research

trends, co-citation networks, thematic maps, and their implications for the future of the two journals and the evolution and future of the scientific study of intelligence.

DOI: 10.3390/jintelligence11020035

PMCID: PMC9961905

PMID: 36826933

Conflict of interest statement: The authors declare no conflict of interest.

71. Urol Clin North Am. 2022 Feb;49(1):65-117. doi: 10.1016/j.ucl.2021.07.009. Epub 2021 Oct 23.

Artificial Intelligence Applications in Urology: Reporting Standards to Achieve Fluency for Urologists.

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The growth and adoption of artificial intelligence has led to impressive results in urology. As artificial intelligence grows more ubiquitous, it is important to establish artificial intelligence literacy in the workforce. To this end, we present a narrative review of the literature of artificial intelligence and machine learning in urology and propose a checklist of reporting standards to improve readability and evaluate the current state of the literature. The listed article demonstrated heterogeneous reporting of methodologies and outcomes, limiting generalizability of research. We hope that this review serves as a foundation for future evaluation of medical research in artificial intelligence.

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72. J Clin Ultrasound. 2022 Nov;50(9):1414-1431. doi: 10.1002/jcu.23321. Epub 2022 Sep 7.

Artificial intelligence, machine learning and deep learning in musculoskeletal imaging: Current applications.

D'Angelo T(1)(2), Caudo D(1)(3), Blandino A(1), Albrecht MH(4), Vogl TJ(5), Gruenewald LD(4), Gaeta M(1), Yel I(4), Koch V(4), Martin SS(4), Lenga L(4), Muscogiuri G(6)(7), Sironi S(6)(8), Mazziotti S(1), Booz C(4).

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Artificial intelligence is rapidly expanding in all technological fields. The medical field, and especially diagnostic imaging, has been showing the highest developmental potential. Artificial intelligence aims at human intelligence simulation through the management of complex problems. This review describes the technical background of artificial intelligence, machine learning, and deep learning. The first section illustrates the general potential of artificial intelligence applications in the context of request management, data acquisition, image reconstruction, archiving, and communication systems. In the second section, the prospective of dedicated tools for segmentation, lesion detection, automatic diagnosis, and classification of musculoskeletal disorders is discussed.

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PMID: 36069404 [Indexed for MEDLINE]

73. Echocardiography. 2022 Aug;39(8):1044-1053. doi: 10.1111/echo.15417. Epub 2022 Jul 9.

Artificial intelligence in echocardiography: Review and limitations including epistemological concerns.

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BACKGROUND AND PURPOSE: In this review we describe the use of artificial intelligence in the field of echocardiography. Various aspects and terminologies used in artificial intelligence are explained in an easy-to-understand manner and supplemented with illustrations related to echocardiography. Limitations of artificial intelligence, including epistemologic concerns from a philosophical standpoint, are also discussed.

METHODS: A narrative review of relevant papers was conducted.

CONCLUSION: We provide an overview of the usefulness of artificial intelligence

in echocardiography and focus on how it can supplement current day-to-day clinical practice in the assessment of various cardiovascular disease entities. On the other hand, there are significant limitations, including epistemological concerns, which need to be kept in perspective.

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DOI: 10.1111/echo.15417

PMID: 35808922 [Indexed for MEDLINE]

74. Nurse Educ Today. 2015 Mar;35(3):510-7. doi: 10.1016/j.nedt.2014.11.009. Epub 2014 Nov 26.

Emotional intelligence education in pre-registration nursing programmes: an integrative review.

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OBJECTIVE: To investigate the state of knowledge on emotional intelligence (EI) education in pre-registration nursing programmes.

DESIGN: Integrative literature review.

DATA SOURCES: CINAHL, Medline, Scopus, ERIC, and Web of Knowledge electronic databases were searched for abstracts published in English between 1992-2014.

REVIEW METHODS: Data extraction and constant comparative analysis of 17 articles.

RESULTS: Three categories were identified: Constructs of emotional intelligence; emotional intelligence curricula components; and strategies for emotional intelligence education.

CONCLUSIONS: A wide range of emotional intelligence constructs were found, with a predominance of trait-based constructs. A variety of strategies to enhance students' emotional intelligence skills were identified, but limited curricula components and frameworks reported in the literature. An ability-based model for curricula and learning and teaching approaches is recommended.

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DOI: 10.1016/j.nedt.2014.11.009

PMID: 25499529 [Indexed for MEDLINE]

75. Behav Brain Sci. 2017 Jan;40:e200. doi: 10.1017/S0140525X16001606.

Domains of generality.

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Comment in

Behav Brain Sci. 2017 Jan;40:e224.

Comment on

Behav Brain Sci. 2017 Jan;40:e195.

We argue that general intelligence, as presented in the target article, generates multiple distinct and non-equivalent characterisations. Clarifying this central concept is necessary for assessing Burkart et al.'s proposal that the cultural intelligence hypothesis is the best explanation for the evolution of general intelligence. We assess this claim by considering two characterisations of general intelligence presented in the article.

DOI: 10.1017/S0140525X16001606

PMID: 29342655 [Indexed for MEDLINE]

76. Psicothema. 2018 May;30(2):159-164. doi: 10.7334/psicothema2017.329.

Is intelligence equivalent to executive functions?

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BACKGROUND: Since the mid 19th century, cognitive and behavioral neurosciences have attempted to find the neurological bases of intellectual abilities. During the early 20th century the psychometric concept of "intelligence" was coined; and toward the end of the 20th century the neuropsychological concept of "executive functions" was introduced. Controversies, however, remain about the unity or heterogeneity of so-called executive functions.

METHODS: It is proposed that two major executive functions could be separated: metacognitive -or intellectual- and emotional/motivational. A similar distinction has been suggested by several authors. Standard definitions of intelligence implicitly assume that executive functions represent the fundamental components of intelligence.

RESULTS: Research has demonstrated that, if considered as a whole, executive functions only partially correspond to the psychometric concept of intelligence; whereas some specific executive functions clearly correspond to intelligence, some others do not involve intelligence.

CONCLUSIONS: If using a major distinction between metacognitive -or simply "intellectual"-executive functions, and emotional/ motivational -or simply non-intellectual-executive functions, it becomes evident that general intelligence can be equated with metacognitive executive functions but not with emotional/ motivational executive functions.

DOI: 10.7334/psicothema2017.329
PMID: 29694315 [Indexed for MEDLINE]

77. J Cosmet Dermatol. 2022 Nov;21(11):5993-6004. doi: 10.1111/jocd.15323. Epub 2022 Sep 20.

Artificial intelligence in melanoma: A systematic review.

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BACKGROUND: Melanoma accounts for the majority of skin cancer deaths. Artificial intelligence has been applied in many types of cancers, and in melanoma in recent years. However, no systematic review summarized the application of artificial intelligence in melanoma.

AIMS: This study aims to systematically review previously published articles to explore the application of artificial intelligence in melanoma.

MATERIALS & METHODS: PubMed database was used to search the eligible publications on August 1, 2020. The query term was "artificial intelligence" and "melanoma."

RESULTS: A total of 51 articles were included in this review. Artificial intelligence technique is mainly used in the evaluation of dermoscopic images, other image segmentation and processing, and artificial intelligence diagnosis system.

DISCUSSION: Artificial intelligence is also applied in metastasis prediction, drug response prediction, and prognosis of melanoma. Besides, patients' perspectives of artificial intelligence and collaboration of human and artificial intelligence in melanoma also attracted attention. The query term might not include all articles, and we could not examine the algorithms that were built without publication.

CONCLUSION: The performance of artificial intelligence in melanoma is satisfactory and the future for potential applications is enormous.

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DOI: 10.1111/jocd.15323
PMID: 36001057 [Indexed for MEDLINE]

78. Int J Environ Res Public Health. 2019 Aug 21;16(17):3008. doi: 10.3390/ijerph16173008.

Characterization of Intelligence in Children with Exotropia.

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The effect of exotropia on the intelligence of children is unknown. This study aimed to assess the intelligence in children with exotropia and investigate the influence of the main clinical indexes of strabismus on intelligence. Eighty-four participants aged 8-12 years were enrolled, including 37 patients with exotropia (exotropia group) and 47 normal individuals (normal group). Intelligence was assessed by the Wechsler Intelligence Scale for Children-Fourth Edition (WISC-IV), including the Verbal Comprehension Index (VCI), Perceptual Reasoning Index (PRI), Working Memory Index (WMI), Processing Speed Index (PSI), and Full-Scale Intelligence Quotient (FSIQ). The exotropia group had a significantly lower PRI score but a higher PSI score than the normal group. However, there was no significant difference in the WMI, VCI, and FSIQ between groups. Multiple linear regression showed that PRI-WMI and PRI-PSI differences were significantly lower in the exotropia group. Inter-subscale correlations analysis showed that the pattern of intelligence structure was different between groups. The type of exotropia, angle of deviation, duration of symptoms, and stereoaquity had no effect on the intelligence of children with exotropia. Children with exotropia had a relatively worse performance in the perceptual reasoning skill but a better processing speed and a different pattern of intelligence structure.

DOI: 10.3390/ijerph16173008
PMCID: PMC6747520
PMID: 31438468 [Indexed for MEDLINE]

Conflict of interest statement: The authors declare that there are no conflicts of interest.

79. J Am Acad Psychiatry Law. 2021 Sep;49(3):335-337. doi: 10.29158/JAAPL.210066-21.
Epub 2021 Jul 30.

Ethics, Artificial Intelligence, and Risk Assessment.

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Comment on

J Am Acad Psychiatry Law. 2021 Sep;49(3):326-334.

A considerable number of papers have been published on the ethics of artificial intelligence for the purposes of violence risk assessment. In this issue of The

Journal, Hogan and colleagues argue that artificial intelligence introduces novel concerns for violence risk assessment that require consideration. While the concerns that have been raised are entirely valid and require consideration, we argue that artificial intelligence does not herald a more serious or unique challenge in these areas relative to other forms of violence risk assessment.

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DOI: 10.29158/JAAPL.210066-21

PMID: 34330750 [Indexed for MEDLINE]

80. Br J Psychiatry. 2021 Mar;218(3):131-134. doi: 10.1192/bjp.2019.245.

Will artificial intelligence eventually replace psychiatrists?

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The dystopian scenario of an 'artificial intelligence takeover' imagines artificial intelligence (AI) becoming the dominant form of intelligence on Earth, rendering humans redundant. As a society we have become increasingly familiar with AI and robots replacing humans in many tasks, certain jobs and even some areas of medicine, but surely this is not the fate of psychiatry? Here a computational neuroscientist (Janaina Mourão-Miranda) and psychiatrist (Justin Taylor Baker) suggest that psychiatry as a profession is relatively safe, whereas psychiatrists Christian Brown and Giles William Story predict that robots will be taking over the asylum.

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81. Clin Exp Optom. 2023 Sep 6:1-17. doi: 10.1080/08164622.2023.2235346. Online ahead of print.

Artificial intelligence in the diagnosis of glaucoma and neurodegenerative diseases.

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Artificial Intelligence is a rapidly expanding field within computer science that encompasses the emulation of human intelligence by machines. Machine learning and deep learning - two primary data-driven pattern analysis approaches under the umbrella of artificial intelligence - has created considerable interest in the last few decades. The evolution of technology has resulted in a substantial amount of artificial intelligence research on ophthalmic and neurodegenerative disease diagnosis using retinal images. Various artificial intelligence-based techniques have been used for diagnostic purposes, including traditional machine learning, deep learning, and their combinations. Presented here is a review of the literature covering the last 10 years on this topic, discussing the use of artificial intelligence in analysing data from different modalities and their combinations for the diagnosis of glaucoma and neurodegenerative diseases. The performance of published artificial intelligence methods varies due to several factors, yet the results suggest that such methods can potentially facilitate clinical diagnosis. Generally, the accuracy of artificial intelligence-assisted diagnosis ranges from 67-98%, and the area under the sensitivity-specificity curve (AUC) ranges from 0.71-0.98, which outperforms typical human performance of 71.5% accuracy and 0.86 area under the curve. This indicates that artificial intelligence-based tools can provide clinicians with useful information that would assist in providing improved diagnosis. The review suggests that there is room for improvement of existing artificial intelligence-based models using retinal imaging modalities before they are incorporated into clinical practice.

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82. Dev Med Child Neurol. 2013 Oct;55(10):911-8. doi: 10.1111/dmcn.12157. Epub 2013 May 11.

Intelligence assessments for children with cerebral palsy: a systematic review.

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AIM: Cerebral palsy (CP) is defined as a primary disorder of posture and movement; however, approximately 45% of children with CP also have an intellectual impairment. Prevalence estimates are limited by a lack of guidelines for intelligence testing. This systematic review aims to identify and examine intelligence assessments for children with CP.

METHOD: Electronic databases (PubMed, PsycINFO, Web of Science, CINAHL, EMBASE, and ERIC) were searched to identify assessments that (1) measured intellectual function, (2) in children aged 4 to 18 years, (3) with CP, and (4) with psychometrics available.

RESULTS: Searches yielded 48 assessments, of which nine provided psychometric data for children with CP. The included tests were the Columbia Mental Maturity Scale, the Leiter International Performance Scale, the Peabody Picture Vocabulary Test, the Pictorial Test of Intelligence, the Raven's Coloured Progressive Matrices, the Stanford-Binet Intelligence Scales, the Wechsler Adult Intelligence Scale, the Wechsler Intelligence Scale for Children, and the Wechsler Preschool and Primary Scale of Intelligence.

INTERPRETATION: Intelligence assessments in children with CP lack reliability data, consensus regarding validity data, and population-specific norms. Research is required to establish psychometrics for children with CP. For children with higher motor involvement and/or communication and/or visual impairments, multiple options are required to assess intelligence appropriately.

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83. Nurse Educ Today. 2017 Jun;53:34-40. doi: 10.1016/j.nedt.2017.04.001. Epub 2017 Apr 7.

Emotional intelligence and affective events in nurse education: A narrative review.

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OBJECTIVE: To investigate the current state of knowledge about emotional intelligence and affective events that arise during nursing students' clinical placement experiences.

DESIGN: Narrative literature review.

DATA SOURCES: CINAHL, MEDLINE, PsycINFO, Scopus, Web of Science, ERIC and APAIS-Health databases published in English between 1990 and 2016.

REVIEW METHODS: Data extraction from and constant comparative analysis of ten (10) research articles.

RESULTS: We found four main themes: (1) emotional intelligence buffers stress; (2) emotional intelligence reduces anxiety associated with end of life care; (3) emotional intelligence promotes effective communication; and (4) emotional intelligence improves nursing performance.

CONCLUSIONS: The articles we analysed adopted a variety of emotional intelligence models. Using the Ashkanasy and Daus "three-stream" taxonomy (Stream 1: ability models; 2: self-report; 3: mixed models), we found that Stream 2 self-report measures were the most popular followed by Stream 3 mixed model measures. None of the studies we surveyed used the Stream 1 approach. Findings nonetheless indicated that emotional intelligence was important in maintaining physical and psychological well-being. We concluded that developing emotional intelligence should be a useful adjunct to improve academic and clinical performance and to reduce the risk of emotional distress during clinical placement experiences. We call for more consistency in the use of emotional intelligence tests as a means to create an empirical evidence base in the field of nurse education.

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84. Psychol Aging. 2022 Aug;37(5):649-666. doi: 10.1037/pag0000692. Epub 2022 May 19.

Intelligence and wisdom: Age-related differences and nonlinear relationships.

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Using data from two studies, we tested three predictions about the relationship between intelligence and wisdom: (a) Relationships between intelligence and wisdom are "triangular" rather than linear, that is, intelligence is a necessary but not sufficient condition for wisdom; (b) intelligence is primarily related to cognition-focused measures and performance measures of wisdom; (c) the relationship between wisdom and intelligence varies by intelligence domain and age-group. In Study 1, 318 participants from three age-groups (adolescents: 15-20 years; younger adults: 30-40 years; older adults: 60-70 years) completed measures of fluid and crystallized intelligence and the Berlin wisdom paradigm (BWP). Necessary-condition analyses showed "triangular" relationships between intelligence and wisdom. Crystallized intelligence was a necessary condition for wisdom in all age-groups; fluid intelligence was a necessary condition for wisdom in adolescents and young adults below a certain intelligence threshold. In Study 2, a life span sample of 155 participants (Age-group 1: 23-57 years, M = 45.0; Age-group 2: 58-90 years, M = 68.1) completed four measures of wisdom and measures of fluid and crystallized intelligence. Crystallized intelligence was a necessary but not sufficient condition for wisdom as measured by performance measures; fluid intelligence may also be a necessary condition for wisdom in advanced old age. Relationships with self-report measures of wisdom were zero for fluid and moderate and linear for crystallized intelligence. In other words, the role of intelligence for wisdom varies across conceptualizations of wisdom and across life phases. (PsycInfo Database Record (c) 2022 APA, all rights reserved).

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PMID: 35587418 [Indexed for MEDLINE]

85. Front Psychol. 2023 Apr 5;14:1096663. doi: 10.3389/fpsyg.2023.1096663. eCollection 2023.

Beyond emotional intelligence: The new construct of meta-emotional intelligence.

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Meta-emotional intelligence is a recently developed multidimensional construct that, starting from the original ability model of emotional intelligence, focuses on the cognitive aspects of emotional abilities and on the metacognitive and meta-emotional processes that influence our emotional life. Thus, meta-emotional intelligence is the combination of emotional abilities and meta-emotional dimensions, such as the beliefs about emotions, the self-concept about one's emotional abilities, and the self-evaluation of performance. This article aims to illustrate the theoretical and methodological background of this construct and to describe the IE-ACCME test, an original multi-method tool that

has been developed to measure the different variables that compose meta-emotional intelligence. Applications of this construct will be discussed, as well as future directions.

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86. Zhongguo Yi Xue Ke Xue Yuan Xue Bao. 2021 Dec 30;43(6):950-955. doi: 10.3881/j.issn.1000-503X.13931.

[Application of Artificial Intelligence in Clinical Genomics].

[Article in Chinese]

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Clinical genomics mainly studies the clinical application of genomics in diagnosis, treatment decision, and prognosis prediction. Artificial intelligence enables the processing of complex and massive data in genomics which are difficult to be dealt with traditional algorithms and techniques. At present, artificial intelligence is involved in many tasks of clinical genomics, such as variant calling and classification, imaging and genetic diagnosis, electronic health record-based genetic diagnosis, and prediction of drug effect and adverse reaction. This review elaborates the application of artificial intelligence in different aspects of clinical genomics.

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PMID: 34980336 [Indexed for MEDLINE]

87. Clin Imaging. 2020 Sep;65:96-99. doi: 10.1016/j.clinimag.2020.04.025. Epub 2020 Apr 23.

Understanding artificial intelligence based radiology studies: What is overfitting?

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Artificial intelligence (AI) is a broad umbrella term used to encompass a wide variety of subfields dedicated to creating algorithms to perform tasks that mimic human intelligence. As AI development grows closer to clinical integration, radiologists will need to become familiar with the principles of artificial intelligence to properly evaluate and use this powerful tool. This series aims to explain certain basic concepts of artificial intelligence, and their applications in medical imaging starting with a concept of overfitting.

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88. *Physiol Rev.* 2023 Oct 1;103(4):2423-2450. doi: 10.1152/physrev.00033.2022. Epub 2023 Apr 27.

Leveraging physiology and artificial intelligence to deliver advancements in health care.

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Artificial intelligence in health care has experienced remarkable innovation and progress in the last decade. Significant advancements can be attributed to the utilization of artificial intelligence to transform physiology data to advance health care. In this review, we explore how past work has shaped the field and defined future challenges and directions. In particular, we focus on three areas of development. First, we give an overview of artificial intelligence, with special attention to the most relevant artificial intelligence models. We then detail how physiology data have been harnessed by artificial intelligence to

advance the main areas of health care: automating existing health care tasks, increasing access to care, and augmenting health care capabilities. Finally, we discuss emerging concerns surrounding the use of individual physiology data and detail an increasingly important consideration for the field, namely the challenges of deploying artificial intelligence models to achieve meaningful clinical impact.

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89. Environ Chem Lett. 2023 May 9:1-31. doi: 10.1007/s10311-023-01604-3. Online ahead of print.

Artificial intelligence for waste management in smart cities: a review.

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The rising amount of waste generated worldwide is inducing issues of pollution, waste management, and recycling, calling for new strategies to improve the waste ecosystem, such as the use of artificial intelligence. Here, we review the application of artificial intelligence in waste-to-energy, smart bins, waste-sorting robots, waste generation models, waste monitoring and tracking, plastic pyrolysis, distinguishing fossil and modern materials, logistics, disposal, illegal dumping, resource recovery, smart cities, process efficiency, cost savings, and improving public health. Using artificial intelligence in waste logistics can reduce transportation distance by up to 36.8%, cost savings by up to 13.35%, and time savings by up to 28.22%. Artificial intelligence allows for identifying and sorting waste with an accuracy ranging from 72.8 to 99.95%. Artificial intelligence combined with chemical analysis improves waste pyrolysis, carbon emission estimation, and energy conversion. We also explain how efficiency can be increased and costs can be reduced by artificial intelligence in waste management systems for smart cities.

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90. J Intell. 2021 Mar 16;9(1):15. doi: 10.3390/jintelligence9010015.

Transformational vs. Transactional Deployment of Intelligence.

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The late James Flynn, to whom this Special Issue is dedicated, suggested that what will matter most to the future of the world is not levels of intelligence but rather how intelligence is deployed. In this article, I argue that we can distinguish between transactional and transformational deployments of intelligence. Loosely following Flynn, I suggest that we need to pay much more attention to the latter rather than the former.

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91. Neuropsychologia. 2022 Aug 13;173:108285. doi:

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Structural connectivity and intelligence in brain-injured children.

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In children, higher general intelligence corresponds with better processing speed ability. However, the relationship between structural brain connectivity and processing speed in the context of intelligence is unclear. Furthermore, the impact of brain injury on this relationship is also unknown. Structural networks were constructed for 36 brain tumor patients (mean age: 13.45 ± 2.73 , 58% males) and 35 typically developing children (13.30 ± 2.86 , 51% males). Processing speed and general intelligence scores were acquired using standard batteries. The

relationship between network properties, processing speed, and intelligence was assessed using a partial least squares analysis. Results indicated that structural networks in brain-injured children were less integrated ($\beta = -.38$, $p = 0.001$) and more segregated ($\beta = 0.4$, $p = 0.0005$) compared to typically developing children. There was an indirect effect of network segregation on general intelligence via processing speed, where greater network segregation predicted slower processing speed which in turn predicted worse general intelligence (GoF = 0.37). These findings provide the first evidence of relations between structural connectivity, processing speed, and intelligence in children. Injury-related disruption to the structural network may result in worse intelligence through impacts on information processing. Our findings are discussed in the context of a network approach to understanding brain-behavior relationships.

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92. Curr Cardiol Rev. 2022;18(3):e191121198124. doi: 10.2174/1573403X17666211119102220.

The Emergence of Artificial Intelligence in Cardiology: Current and Future Applications.

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Artificial intelligence technology is emerging as a promising entity in cardiovascular medicine, potentially improving diagnosis and patient care. In this article, we review the literature on artificial intelligence and its utility in cardiology. We provide a detailed description of concepts of artificial intelligence tools like machine learning, deep learning, and cognitive computing. This review discusses the current evidence, application, prospects, and limitations of artificial intelligence in cardiology.

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93. Curr Opin Neurol. 2023 Feb 1;36(1):51-58. doi: 10.1097/WCO.0000000000001130. Epub 2022 Nov 11.

Neurology education in the era of artificial intelligence.

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PURPOSE OF REVIEW: The practice of neurology is undergoing a paradigm shift because of advances in the field of data science, artificial intelligence, and machine learning. To ensure a smooth transition, physicians must have the knowledge and competence to apply these technologies in clinical practice. In this review, we describe physician perception and preparedness, as well as current state for clinical applications of artificial intelligence and machine learning in neurology.

RECENT FINDINGS: Digital health including artificial intelligence-based/machine learning-based technology has made significant inroads into various aspects of healthcare including neurological care. Surveys of physicians and healthcare stakeholders suggests an overall positive perception about the benefits of artificial intelligence/machine learning in clinical practice. This positive perception is tempered by concerns for lack of knowledge and limited opportunities to build competence in artificial intelligence/machine learning technology. Literature about neurologist's perception and preparedness towards artificial intelligence/machine learning-based technology is scant. There are very few opportunities for physicians particularly neurologists to learn about artificial intelligence/machine learning-based technology.

SUMMARY: Neurologists have not been surveyed about their perception and preparedness to adopt artificial intelligence/machine learning-based technology in clinical practice. We propose development of a practical artificial intelligence/machine learning curriculum to enhance neurologists' competence in these newer technologies.

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94. J Intell. 2022 Aug 5;10(3):54. doi: 10.3390/jintelligence10030054.

Cultural Intelligence: What Is It and How Can It Effectively Be Measured?

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We administered both maximum-performance and typical-performance assessments of cultural intelligence to 114 undergraduates in a selective university in the Northeast of the United States. We found that cultural intelligence could be measured by both maximum-performance and typical-performance tests of cultural intelligence. Cultural intelligence as assessed by a maximum-performance measure is largely distinct from the construct as assessed by a typical-performance measure. The maximum-performance test, the Sternberg Test of Cultural Intelligence (SCIT), showed high internal consistency and inter-rater reliability. Sections with problems from two content domains-Business (SCIT-B) and Leisure (SCIT-L) activities-were highly intercorrelated, suggesting they

measured largely the same construct. The SCIT showed substantial correlations with another maximum-performance measure of cultural intelligence, Views-on-Culture. It also was correlated, at more modest levels, with fluid intelligence and personal intelligence tests. Factorially, the (a) maximum-performance cultural intelligence tests, (b) typical-performance cultural intelligence test and a test of openness to experience, and (c) fluid intelligence tests formed three separate factors.

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95. Psychol Sci. 2018 Aug;29(8):1358-1369. doi: 10.1177/0956797618774253. Epub 2018 Jun 18.

How Much Does Education Improve Intelligence? A Meta-Analysis.

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Intelligence test scores and educational duration are positively correlated. This correlation could be interpreted in two ways: Students with greater propensity for intelligence go on to complete more education, or a longer education increases intelligence. We meta-analyzed three categories of quasiexperimental studies of educational effects on intelligence: those estimating education-intelligence associations after controlling for earlier intelligence, those using compulsory schooling policy changes as instrumental variables, and those using regression-discontinuity designs on school-entry age cutoffs. Across 142 effect sizes from 42 data sets involving over 600,000 participants, we found consistent evidence for beneficial effects of education on cognitive abilities of approximately 1 to 5 IQ points for an additional year of education. Moderator analyses indicated that the effects persisted across the life span and were present on all broad categories of cognitive ability studied. Education appears to be the most consistent, robust, and durable method yet to be identified for raising intelligence.

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96. Sci Rep. 2018 May 2;8(1):6896. doi: 10.1038/s41598-018-25289-9.

The Role of Intelligence in Social Learning.

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Studies in cultural evolution have uncovered many types of social learning strategies that are adaptive in certain environments. The efficiency of these strategies also depends on the individual characteristics of both the observer and the demonstrator. We investigate the relationship between intelligence and the ways social and individual information is utilised to make decisions in an uncertain environment. We measure fluid intelligence and study experimentally how individuals learn from observing the choices of a demonstrator in a 2-armed bandit problem with changing probabilities of a reward. Participants observe a demonstrator with high or low fluid intelligence. In some treatments they are aware of the intelligence score of the demonstrator and in others they are not. Low fluid intelligence individuals imitate the demonstrator more when her fluid intelligence is known than when it is not. Conversely, individuals with high fluid intelligence adjust their use of social information, as the observed behaviour changes, independently of the knowledge of the intelligence of the demonstrator. We provide evidence that intelligence determines how social and individual information is integrated in order to make choices in a changing uncertain environment.

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PMCID: PMC5932062

PMID: 29720699 [Indexed for MEDLINE]

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Artificial intelligence and radiomics in nuclear medicine: potentials and challenges.

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Erratum in

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Artificial intelligence involves a wide range of smart techniques that are applicable to medical services including nuclear medicine. Recent advances in computer power, availability of accumulated digital archives containing large amount of patient images, and records bring new opportunities for the implementation of artificial techniques in nuclear medicine. As a subset of artificial intelligence, machine learning is an emerging tool that possibly perform many clinical tasks. Nuclear medicine community needs to adapt to this fast approaching smart era, to exploit the opportunities and tackle the problems associated with artificial intelligence tools. It is aimed in this editorial to outline the potentials and challenges of artificial intelligence applications in nuclear medicine.

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98. J Assist Reprod Genet. 2021 Jul;38(7):1607-1612. doi:
10.1007/s10815-021-02272-4. Epub 2021 Jul 7.

Artificial intelligence-the future is now.

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The pros and cons of artificial intelligence in assisted reproductive technology
are presented.

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99. World J Diabetes. 2022 Oct 15;13(10):822-834. doi: 10.4239/wjd.v13.i10.822.

Everything real about unreal artificial intelligence in diabetic retinopathy and
in ocular pathologies.

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Artificial Intelligence is a multidisciplinary field with the aim of building
platforms that can make machines act, perceive, reason intelligently and whose
goal is to automate activities that presently require human intelligence. From
the cornea to the retina, artificial intelligence (AI) is expected to help
ophthalmologists diagnose and treat ocular diseases. In ophthalmology,
computerized analytics are being viewed as efficient and more objective ways to

interpret the series of images and come to a conclusion. AI can be used to diagnose and grade diabetic retinopathy, glaucoma, age-related macular degeneration, cataracts, IOL power calculation, retinopathy of prematurity and keratoconus. This review article intends to discuss various aspects of artificial intelligence in ophthalmology.

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100. Curr Oncol. 2023 Jan 29;30(2):1626-1647. doi: 10.3390/curroncol30020125.

Artificial Intelligence for Cancer Detection-A Bibliometric Analysis and Avenues for Future Research.

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After cardiovascular diseases, cancer is responsible for the most deaths worldwide. Detecting a cancer disease early improves the chances for healing significantly. One group of technologies that is increasingly applied for detecting cancer is artificial intelligence. Artificial intelligence has great potential to support clinicians and medical practitioners as it allows for the early detection of carcinomas. During recent years, research on artificial intelligence for cancer detection grew a lot. Within this article, we conducted a bibliometric study of the existing research dealing with the application of artificial intelligence in cancer detection. We analyzed 6450 articles on that topic that were published between 1986 and 2022. By doing so, we were able to give an overview of this research field, including its key topics, relevant outlets, institutions, and articles. Based on our findings, we developed a future research agenda that can help to advance research on artificial intelligence for cancer detection. In summary, our study is intended to serve as a platform and foundation for researchers that are interested in the potential of artificial intelligence for detecting cancer.

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101. Curr Opin Endocrinol Diabetes Obes. 2020 Oct;27(5):345-350. doi: 10.1097/MED.0000000000000557.

Use of artificial intelligence and machine learning for estimating malignancy risk of thyroid nodules.

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PURPOSE OF REVIEW: Current methods for thyroid nodule risk stratification are subjective, and artificial intelligence algorithms have been used to overcome this shortcoming. In this review, we summarize recent developments in the application of artificial intelligence algorithms for estimating the risks of malignancy in a thyroid nodule.

RECENT FINDINGS: Artificial intelligence have been used to predict malignancy in thyroid nodules using ultrasound images, cytopathology images, and molecular markers. Recent clinical trials have shown that artificial intelligence model's performance matched that of experienced radiologists and pathologists.

Explainable artificial intelligence models are being developed to avoid the black box problem. Risk stratification algorithms using artificial intelligence for thyroid nodules are now commercially available in many countries.

SUMMARY: Artificial intelligence models could become a useful tool in a thyroidologist's armamentarium as a decision support tool. Increased adoption of this emerging technology will depend upon increased awareness of the potential benefits and pitfalls in using artificial intelligence.

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PMID: 32740044 [Indexed for MEDLINE]

102. Front Hum Neurosci. 2016 Dec 15;10:606. doi: 10.3389/fnhum.2016.00606. eCollection 2016.

Hebb and Cattell: The Genesis of the Theory of Fluid and Crystallized Intelligence.

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Raymond B. Cattell is credited with the development of the theory of fluid and crystallized intelligence. The genesis of this theory is, however, vague. Cattell, in different papers, stated that it was developed in 1940, 1941 or 1942. Carroll (1984, Multivariate Behavioral Research, 19, 300-306) noted the similarity of Cattell's theory to "Hebb's notion of two types of intelligence," which was presented at the 1941 APA meeting, but the matter has been left at that. Correspondence between Cattell, Donald Hebb and George Humphrey of Queen's University, Kingston, Ontario, however, indicates that Cattell adopted Hebb's ideas of intelligence A and B and renamed them. This paper describes Hebb's two types of intelligence, and shows how Cattell used them to develop his ideas of crystallized and fluid intelligence. Hebb and Cattell exchanged a number of letters before Cattell's paper was rewritten in such a way that everyone was satisfied. This paper examines the work of Hebb and Cattell on intelligence, their correspondence, the development of the ideas of fluid and crystallized intelligence, and why Cattell (1943, p. 179) wrote that "Hebb has independently stated very clearly what constitutes two thirds of the present theory."

DOI: 10.3389/fnhum.2016.00606

PMCID: PMC5156710

PMID: 28018191

103. Brain Nerve. 2019 Jul;71(7):649-655. doi: 10.11477/mf.1416201337.

[Artificial Intelligence and Brain Science: the Present and the Future].

[Article in Japanese]

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Artificial intelligence and brain science have kept a swinging relationship with opposing views: "Artificial realization of intelligence should be free from biological constraints" and "We should reverse-engineer the best existing implementation of intelligence." In this article, we first review today's achievements of artificial intelligence and its impacts on brain and life sciences. We then discuss how progresses in brain science can contribute to future developments in artificial intelligence.

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PMID: 31289239 [Indexed for MEDLINE]

104. Behav Brain Sci. 2017 Jan;40:e195. doi: 10.1017/S0140525X16000959. Epub 2016 Jul 28.

The evolution of general intelligence.

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Comment in

Behav Brain Sci. 2017 Jan;40:e198.
Behav Brain Sci. 2017 Jan;40:e200.
Behav Brain Sci. 2017 Jan;40:e201.
Behav Brain Sci. 2017 Jan;40:e196.
Behav Brain Sci. 2017 Jan;40:e199.
Behav Brain Sci. 2017 Jan;40:e203.
Behav Brain Sci. 2017 Jan;40:e205.
Behav Brain Sci. 2017 Jan;40:e207.
Behav Brain Sci. 2017 Jan;40:e210.
Behav Brain Sci. 2017 Jan;40:e202.
Behav Brain Sci. 2017 Jan;40:e204.
Behav Brain Sci. 2017 Jan;40:e206.
Behav Brain Sci. 2017 Jan;40:e208.

Behav Brain Sci. 2017 Jan;40:e212.
 Behav Brain Sci. 2017 Jan;40:e214.
 Behav Brain Sci. 2017 Jan;40:e216.
 Behav Brain Sci. 2017 Jan;40:e213.
 Behav Brain Sci. 2017 Jan;40:e215.
 Behav Brain Sci. 2017 Jan;40:e217.
 Behav Brain Sci. 2017 Jan;40:e218.
 Behav Brain Sci. 2017 Jan;40:e222.
 Behav Brain Sci. 2017 Jan;40:e197.
 Behav Brain Sci. 2017 Jan;40:e220.
 Behav Brain Sci. 2017 Jan;40:e223.
 Behav Brain Sci. 2017 Jan;40:e209.
 Behav Brain Sci. 2017 Jan;40:e211.
 Behav Brain Sci. 2017 Jan;40:e221.
 Behav Brain Sci. 2017 Jan;40:e219.

The presence of general intelligence poses a major evolutionary puzzle, which has led to increased interest in its presence in nonhuman animals. The aim of this review is to critically evaluate this question and to explore the implications for current theories about the evolution of cognition. We first review domain-general and domain-specific accounts of human cognition in order to situate attempts to identify general intelligence in nonhuman animals. Recent studies are consistent with the presence of general intelligence in mammals (rodents and primates). However, the interpretation of a psychometric g factor as general intelligence needs to be validated, in particular in primates, and we propose a range of such tests. We then evaluate the implications of general intelligence in nonhuman animals for current theories about its evolution and find support for the cultural intelligence approach, which stresses the critical importance of social inputs during the ontogenetic construction of survival-relevant skills. The presence of general intelligence in nonhumans implies that modular abilities can arise in two ways, primarily through automatic development with fixed content and secondarily through learning and automatization with more variable content. The currently best-supported model, for humans and nonhuman vertebrates alike, thus construes the mind as a mix of skills based on primary and secondary modules. The relative importance of these two components is expected to vary widely among species, and we formulate tests to quantify their strength.

DOI: 10.1017/S0140525X16000959
 PMID: 27464851 [Indexed for MEDLINE]

105. Politics Life Sci. 2023 Apr;42(1):158-162. doi: 10.1017/pls.2023.2.

Epidemic intelligence studies: A research agenda for political scientists.

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This research letter introduces readers to health intelligence by conceptualizing critical components and providing a primer for research within political science broadly considered. Accordingly, a brief review of the literature is provided, concluding with possible future research agendas. The aim is to elaborate on the importance of public health intelligence to national security studies, and to political science more generally.

DOI: 10.1017/pls.2023.2

PMID: 37140229 [Indexed for MEDLINE]

106. Front Neurorobot. 2022 Apr 25;16:857614. doi: 10.3389/fnbot.2022.857614. eCollection 2022.

Self-Concern Across Scales: A Biologically Inspired Direction for Embodied Artificial Intelligence.

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Intelligence in current AI research is measured according to designer-assigned tasks that lack any relevance for an agent itself. As such, tasks and their evaluation reveal a lot more about our intelligence than the possible intelligence of agents that we design and evaluate. As a possible first step in remedying this, this article introduces the notion of "self-concern," a property of a complex system that describes its tendency to bring about states that are compatible with its continued self-maintenance. Self-concern, as argued, is the foundation of the kind of basic intelligence found across all biological systems, because it reflects any such system's existential task of continued viability. This article aims to cautiously progress a few steps closer to a better understanding of some necessary organisational conditions that are central to self-concern in biological systems. By emulating these conditions in embodied AI, perhaps something like genuine self-concern can be implemented in machines, bringing AI one step closer to its original goal of emulating human-like intelligence.

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PMCID: PMC9106101

PMID: 35574229

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107. Front Psychol. 2022 May 11;13:898107. doi: 10.3389/fpsyg.2022.898107. eCollection 2022.

Artificial Intelligence-Based Family Health Education Public Service System.

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Family health education is a must for every family, so that children can be taught how to protect their own health. However, in this era of artificial intelligence, many technical operations based on artificial intelligence are born, so the purpose of this study is to apply artificial intelligence technology to family health education. This paper proposes a fusion of artificial intelligence and IoT technologies. Based on the characteristics of

artificial intelligence technology, it combines ZigBee technology and RFID technology in the Internet of Things technology to design an artificial intelligence-based service system. Then it designs the theme of family health education by conducting a questionnaire on students' family education and analyzing the results of the questionnaire. And it designs database and performance analysis experiments to improve the artificial intelligence-based family health education public service system designed in this paper. Finally, a comparative experiment between the family health education public service system based on artificial intelligence and the traditional health education method will be carried out. The experimental results show that the family health education public service system based on artificial intelligence has improved by 21.74% compared with the traditional family health education method; compared with the traditional family health education method, the health education effect of the family health education public service system based on artificial intelligence has increased by 13.89%.

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PMCID: PMC9131935

PMID: 35645929

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108. J Intell. 2022 Dec 1;10(4):116. doi: 10.3390/jintelligence10040116.

The Intelligent Attitude: What Is Missing from Intelligence Tests.

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Intelligence, like creativity and wisdom, has an attitudinal component as well as an ability-based one. The attitudinal component is at least as important as the ability-based one. Theories of intelligence, in ignoring the attitudinal component of intelligence, have failed to account fully or accurately for why so many people who have relatively high levels of intelligence as an ability fail fully to deploy their ability, especially toward positive ends. The article reviews the need to view intelligence as comprising an attitude as well as an ability, and surveys reasons why people's lack of an intelligent attitude hinders their deployment of intelligence. Suggestions are made for how things could change in a positive way.

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PMCID: PMC9785166

PMID: 36547503

Conflict of interest statement: The author declares no conflict of interest.

109. Health Psychol Open. 2018 Aug 27;5(2):2055102918796610. doi: 10.1177/2055102918796610. eCollection 2018 Jul-Dec.

American psychologists, the Central Intelligence Agency, and enhanced interrogation.

Marks DF(1).

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(1)Journal of Health Psychology and Health Psychology Open, France.

In two commissioned articles, Health Psychology Open clarifies once and for all the role of two prominent American psychologists in the Central Intelligence Agency program of enhanced interrogation post 9/11. The Senate Select Committee on Intelligence Committee Study of the Central Intelligence Agency's Detention and Interrogation Program and the Hoffman Report produced more questions than answers. In these historically significant articles, Martin Seligman and Joseph Matarazzo assert the truth about their actions and the lessons learned.

DOI: 10.1177/2055102918796610

PMCID: PMC6111398

PMID: 30181893

110. Br J Pharmacol. 2023 May 10. doi: 10.1111/bph.16140. Online ahead of print.

The application of artificial intelligence to accelerate G protein-coupled receptor drug discovery.

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The application of artificial intelligence (AI) approaches to drug discovery for G protein-coupled receptors (GPCRs) is a rapidly expanding area. Artificial intelligence can be used at multiple stages during the drug discovery process, from aiding our understanding of the fundamental actions of GPCRs to the discovery of new ligand-GPCR interactions or the prediction of clinical responses. Here, we provide an overview of the concepts behind artificial intelligence, including the subfields of machine learning and deep learning. We summarise the published applications of artificial intelligence to different stages of the GPCR drug discovery process. Finally, we reflect on the benefits and limitations of artificial intelligence and share our vision for the exciting potential for further development of applications to aid GPCR drug discovery. In addition to making the drug discovery process "faster, smarter and cheaper," we anticipate that the application of artificial intelligence will create exciting new opportunities for GPCR drug discovery.

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PMID: 37161878

111. Clin Colon Rectal Surg. 2020 Jul;33(4):195-203. doi: 10.1055/s-0040-1709435.

Epub 2020 Jun 3.

Linking Emotional Intelligence to Successful Health Care Leadership: The Big Five Model of Personality.

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Research has identified emotional intelligence as the ability to understand and manage emotions. This is especially important for surgical leaders who must interact constructively with teams, administrators, patients, colleagues, and the community. Conventional intelligence emphasizes the rational and analytical brain. When one becomes aware of emotional intelligence, it adds to the repertoire of the surgical leader. It gives them insight into the dynamics of interpersonal relationships. This will allow the surgeon to control the emotional side of communication. Specifically, emotional intelligence focuses on self-awareness, self-management, social skills, and resiliency. With these skills, they are able to modulate their leadership style, allowing for increased conflict management and persuasiveness, more effective change management, and consensus-building. Emotional intelligence is not innate; these are learned skills. With practice and attention, it is possible to acquire the skills to enhance relationships.

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PMID: 32624714

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112. J Educ Eval Health Prof. 2016 Nov 8;13:40. doi: 10.3352/jeehp.2016.13.40. eCollection 2016.

Does emotional intelligence influence success during medical school admissions and program matriculation?: a systematic review.

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PURPOSE: It aimed at determining whether emotional intelligence is a predictor for success in a medical school program and whether the emotional intelligence construct correlated with other markers for admission into medical school.

METHODS: Three databases (PubMed, CINAHL, and ERIC) were searched up to and including July 2016, using relevant terms. Studies written in English were selected if they included emotional intelligence as a predictor for success in medical school, markers of success such as examination scores and grade point average and association with success defined through traditional medical school admission criteria and failures, and details about the sample. Data extraction included the study authors and year, population description, emotional intelligence I tool, outcome variables, and results. Associations between emotional intelligence scores and reported data were extracted and recorded.

RESULTS: Six manuscripts were included. Overall, study quality was high. Four of the manuscripts examined emotional intelligence as a predictor for success while in medical school. Three of these four studies supported a weak positive relationship between emotional intelligence scores and success during matriculation. Two of manuscripts examined the relationship of emotional intelligence to medical school admissions. There were no significant relevant correlations between emotional intelligence and medical school admission selection.

CONCLUSION: Emotional intelligence was correlated with some, but not all, measures of success during medical school matriculation and none of the measures associated with medical school admissions. Variability in success measures across studies likely explains the variable findings.

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PMCID: PMC5286212

PMID: 27838916 [Indexed for MEDLINE]

Conflict of interest statement: No potential conflict of interest relevant to this article was reported.

113. Curr Opin Anaesthesiol. 2023 Dec 1;36(6):691-697. doi:

10.1097/ACO.0000000000001318. Epub 2023 Oct 13.

Decision-making in anesthesiology: will artificial intelligence make intraoperative care safer?

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PURPOSE OF REVIEW: This article explores the impact of recent applications of artificial intelligence on clinical anesthesiologists' decision-making.

RECENT FINDINGS: Naturalistic decision-making, a rich research field that aims to understand how cognitive work is accomplished in complex environments, provides insight into anesthesiologists' decision processes. Due to the complexity of clinical work and limits of human decision-making (e.g. fatigue, distraction, and cognitive biases), attention on the role of artificial intelligence to support anesthesiologists' decision-making has grown. Artificial intelligence, a computer's ability to perform human-like cognitive functions, is increasingly used in anesthesiology. Examples include aiding in the prediction of intraoperative hypotension and postoperative complications, as well as enhancing structure localization for regional and neuraxial anesthesia through artificial intelligence integration with ultrasound.

SUMMARY: To fully realize the benefits of artificial intelligence in anesthesiology, several important considerations must be addressed, including its usability and workflow integration, appropriate level of trust placed on artificial intelligence, its impact on decision-making, the potential de-skilling of practitioners, and issues of accountability. Further research is needed to enhance anesthesiologists' clinical decision-making in collaboration with artificial intelligence.

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PMID: 37865848 [Indexed for MEDLINE]

114. Psychol Rep. 2023 Jan 14;332941231152388. doi: 10.1177/00332941231152388. Online ahead of print.

Measuring Sexual Intelligence for Evaluating Sexual Health.

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The current paper reports four consecutive studies that were conducted to link sexual health with a new construct of sexual intelligence by developing and validating a new scale to measure sexual intelligence. Sexual intelligence was defined as "the ability to perceive, understand and respond to sexual needs and desires in a personal and social context." Sexual Intelligence Scale (SIS), comprising of 8 items in English and 2 factors (sexual knowledge & sexual behavior), was developed and validated by involving 959 respondents in the process of 4 consecutive studies. The validity of SIS was tested step by step for its face, content, factorial, convergent, discriminant, and predictive validities. The reliability was measured through internal consistency and item-total & item-scale correlations. The study found significantly higher levels of sexual intelligence in men as compared to women. Sexual intelligence, moreover, had significant positive correlations with age, education, emotional intelligence, social intelligence, sexual health, and satisfaction with life. Sexual health was linked with sexual intelligence and the SIS was accepted as a reliable and valid tool to measure sexual intelligence.

DOI: 10.1177/00332941231152388

PMID: 36640115

115. Biosystems. 2021 Aug;206:104441. doi: 10.1016/j.biosystems.2021.104441. Epub 2021 May 12.

Reconfiguring SETI in the microbial context: Panspermia as a solution to Fermi's paradox.

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All SETI (Search for Extraterrestrial Intelligence) programmes that were conceived and put into practice since the 1960s have been based on anthropocentric ideas concerning the definition of intelligence on a cosmic-wide scale. Brain-based neuronal intelligence, augmented by AI, are currently thought of as being the only form of intelligence that can engage in SETI-type interactions, and this assumption is likely to be connected with the dilemma of the famous Fermi paradox. We argue that high levels of intelligence and cognition inherent in ensembles of bacteria are much more likely to be the dominant form of cosmic intelligence, and the transfer of such intelligence is enabled by the processes of panspermia. We outline the main principles of

bacterial intelligence, and how this intelligence may be used by the planetary-scale bacterial system, or the bacteriosphere, through processes of biological tropism, to connect to any extra-terrestrial microbial forms, independently of human interference.

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PMID: 33965445 [Indexed for MEDLINE]

116. J R Soc Med. 2016 Jul;109(7):269-73. doi: 10.1177/0141076816656483.

Medical intelligence, security and global health: the foundations of a new health agenda.

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Comment in

J R Soc Med. 2016 Jul;109(7):255.

Medical intelligence, security and global health are distinct fields that often overlap, especially as the drive towards a global health security agenda gathers pace. Here, we outline some of the ways in which this has happened in the recent past during the recent Ebola epidemic in West Africa and in the killing of Osama Bin Laden by US intelligence services. We evaluate medical intelligence and the role it can play in global health security; we also attempt to define a framework that illustrates how medical intelligence can be incorporated into foreign policy action in order delineate the boundaries and scope of this growing field.

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PMID: 27385714 [Indexed for MEDLINE]

117. Moving Toward Explainable Decisions of Artificial Intelligence Models for the Prediction of Functional Outcomes of Ischemic Stroke Patients.

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In: Linwood SL(4), editor. Digital Health [Internet]. Brisbane (AU): Exon Publications; 2022 Apr 29. Chapter 6.

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Artificial intelligence has the potential to assist clinical decision-making for the treatment of ischemic stroke. However, the decision processes encoded within complex artificial intelligence models, such as neural networks, are notoriously difficult to interpret and validate. The importance of explaining model decisions has resulted in the emergence of explainable artificial intelligence, which aims to understand the inner workings of artificial intelligence models. Here, we give examples of studies that apply artificial intelligence models to predict functional outcomes of ischemic stroke patients, evaluate existing models' predictive power, and discuss the challenges that limit their adaptation to the clinic. Furthermore, we identify the studies that explain which model features are essential in predicting functional outcomes. We discuss how these explanations can help mitigate concerns around the trustworthiness of artificial intelligence systems developed for the acute stroke setting. We conclude that explainable artificial intelligence is a must for the reliable deployment of artificial intelligence models in acute stroke care.

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PMID: 35605071

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118. Heart Lung Circ. 2023 Aug;32(8):894-904. doi: 10.1016/j.hlc.2023.06.703. Epub 2023 Jul 26.

Artificial Intelligence in Cardiology: An Australian Perspective.

Jaltotage B(1), Ihdayhid AR(2), Lan NSR(3), Pathan F(4), Patel S(5), Arnott C(5), Figtree G(6), Kritharides L(7), Shamsul Islam SM(8), Chow CK(9), Rankin JM(10), Nicholls SJ(11), Dwivedi G(12).

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Comment in
Heart Lung Circ. 2023 Aug;32(8):883-888.

Significant advances have been made in artificial intelligence technology in recent years. Many health care applications have been investigated to assist clinicians and the technology is close to being integrated into routine clinical practice. The high prevalence of cardiac disease in Australia places overwhelming demands on the existing health care system, challenging its capacity to provide quality patient care. Artificial intelligence has emerged as a promising solution. This discussion paper provides an Australian perspective on the current state of artificial intelligence in cardiology, including the benefits and challenges of implementation. This paper highlights some current artificial intelligence applications in cardiology, while also detailing challenges such as data privacy, ethical considerations, and integration within existing health infrastructures. Overall, this paper aims to provide insights into the potential benefits of artificial intelligence in cardiology, while also acknowledging the barriers that need to be addressed to ensure safe and effective implementation into an Australian health system.

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119. Front Psychol. 2020 Jul 8;11:1692. doi: 10.3389/fpsyg.2020.01692. eCollection 2020.

Macphail's Null Hypothesis of Vertebrate Intelligence: Insights From Avian Cognition.

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Macphail famously criticized two foundational assumptions that underlie the evolutionary approach to comparative psychology: that there are differences in intelligence across species, and that intelligent behavior in animals is based on more than associative learning. Here, we provide evidence from recent work in avian cognition that supports both these assumptions: intelligence across species varies, and animals can perform intelligent behaviors that are not guided solely by associative learning mechanisms. Finally, we reflect on the limitations of comparative psychology that led to Macphail's claims and suggest strategies researchers can use to make more advances in the field.

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120. Thorac Surg Clin. 2019 Aug;29(3):339-350. doi: 10.1016/j.thorsurg.2019.03.011.

Artificial Intelligence: Can Information be Transformed into Intelligence in Surgical Education?

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Artificial intelligence (AI) is being rapidly integrated into various medical applications. Although early application of AI has been achieved in image-based, as well as statistical computational models, translation into procedure-based specialties such as surgery may take longer to achieve. A potential application of AI in surgical education is as a teaching coach or mentor that interacts with the user via virtual and/or augmented reality. The question arises as to whether machines will achieve the wisdom and intelligence of human educators.

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121. J Intell. 2021 Dec 13;9(4):62. doi: 10.3390/jintelligence9040062.

A Model of How Shifting Intelligence Drives Social Movements.

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Based on the theory of social change, cultural evolution, and human development, we propose a mechanism whereby increased danger in society causes predictable shifts in valued forms of intelligence: 1. Practical intelligence rises in value relative to abstract intelligence; and 2. social intelligence shifts from measuring how well individuals can negotiate the social world to achieve their personal aims to measuring how well they can do so to achieve group aims. We document these shifts during the COVID-19 pandemic and argue that they led to an increase in the size and strength of social movements.

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PMCID: PMC8705832

PMID: 34940384

Conflict of interest statement: The authors declare no conflict of interest.

122. Environ Sci Pollut Res Int. 2023 Jul;30(33):79571-79586. doi: 10.1007/s11356-023-27964-5. Epub 2023 Jun 15.

Can the application of artificial intelligence in industry cut China's industrial carbon intensity?

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As an emerging technology, industrial intelligence focus on the integration of artificial intelligence and production, which creates a new access to achieve the goal of carbon emissions reduction. Using data on provincial panel data from 2006 to 2019 in China, we empirically analyze the impact and spatial effects of industrial intelligence on industrial carbon intensity from multiple dimensions. Results show an inverse proportionality between industrial intelligence and industrial carbon intensity, and the mechanism is to promote green technology innovation. Our results remain robust after accounting for endogenous issues. Viewed from spatial effect, industrial intelligence can inhibit not only the industrial carbon intensity of the region but also the surrounding areas. More strikingly, the impact of industrial intelligence in the eastern region is more obvious than that in the central and western regions. This paper effectively complements the research on the influencing factors of industrial carbon intensity and provides a reliable empirical basis for industrial intelligence to reduce industrial carbon intensity, as well as a policy reference for the green development of the industrial sector.

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123. J Intell. 2022 Jan 7;10(1):3. doi: 10.3390/jintelligence10010003.

How Is Cultural Intelligence Related to Human Behavior?

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Cultural intelligence is an individual's ability to recognize, understand, and

adapt to cross-cultural contexts in order to change his or her self-capacity. Hence, this study explores the relationship between cultural intelligence and interpersonal communication, psychological capital (PsyCap), and organizational citizenship behavior (OCB) among teachers in Indonesia and investigates the possibility of finding relevant new models. A Likert questionnaire was used to collect research data. The research participants included 450 Indonesian junior high school teachers selected by accidental sampling. Structural equation modeling (SEM) was used for data analysis, supported by descriptive statistics and correlational matrices. The results indicate that cultural intelligence is significantly related to teachers' interpersonal communication, PsyCap, and OCB. Additionally, this study also produces a new model regarding the relationship between cultural intelligence and a teacher's OCB, mediated by interpersonal communication and PsyCap. Therefore, researchers and practitioners can discuss and adopt a new empirical model to increase cultural intelligence.

DOI: 10.3390/jintelligence10010003

PMCID: PMC8788423

PMID: 35076565

Conflict of interest statement: The authors declare no conflict of interest.

124. J Nurs Manag. 2015 Sep;23(6):744-53. doi: 10.1111/jonm.12204. Epub 2014 Jun 19.

A reflective framework to foster emotionally intelligent leadership in nursing.

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AIM: To propose a reflective framework based on the perspective of emotional intelligence (EI) in nurse leadership literature.

BACKGROUND: Emotional intelligence is a self-development construct aimed at enhancing the management of feelings and interpersonal relationships, which has become increasingly popular in nurse leadership. Reflection is an established means to foster learning. Integrating those aspects of emotional intelligence pertinent to nurse leadership into a reflective framework might support the development of nurse leadership in a practical context.

METHOD: A sample of 22 articles, retrieved via electronic databases (Ovid/Medline, BNI, psycArticles, Zetoc and CINAHL) and published between January 1996 and April 2009, was analysed in a qualitative descriptive content analysis.

RESULT: Three dimensions that characterise emotional intelligence leadership in the context of nursing - the nurse leader as a 'socio-cultural architect', as a 'responsive carer' and as a 'strategic visionary' - emerged from the analysis. To enable practical application, these dimensions were contextualised into a reflective framework.

CONCLUSION: Emotional intelligence skills are regarded as essential for establishing empowering work environments in nursing. A reflective framework might aid the translation of emotional intelligence into a real-world context.

IMPLICATIONS FOR NURSING PRACTICE: The proposed framework may supplement learning about emotional intelligence skills and aid the integration of emotional intelligence in a clinical environment.

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PMID: 24942539 [Indexed for MEDLINE]

125. Curr Opin Ophthalmol. 2023 Sep 1;34(5):449-458. doi: 10.1097/ICU.0000000000000987. Epub 2023 Jul 17.

Recent evidence of economic evaluation of artificial intelligence in ophthalmology.

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PURPOSE OF REVIEW: Health economic evaluation (HEE) is essential for assessing value of health interventions, including artificial intelligence. Recent approaches, current challenges, and future directions of HEE of artificial intelligence in ophthalmology are reviewed.

RECENT FINDINGS: Majority of recent HEEs of artificial intelligence in ophthalmology were for diabetic retinopathy screening. Two models, one conducted in the rural USA (5-year period) and another in China (35-year period), found artificial intelligence to be more cost-effective than without screening for diabetic retinopathy. Two additional models, which compared artificial intelligence with human screeners in Brazil and Thailand for the lifetime of patients, found artificial intelligence to be more expensive from a healthcare system perspective. In the Thailand analysis, however, artificial intelligence was less expensive when opportunity loss from blindness was included. An artificial intelligence model for screening retinopathy of prematurity was cost-effective in the USA. A model for screening age-related macular degeneration in Japan and another for primary angle close in China did not find artificial intelligence to be cost-effective, compared with no screening. The costs of artificial intelligence varied widely in these models.

SUMMARY: Like other medical fields, there is limited evidence in assessing the value of artificial intelligence in ophthalmology and more appropriate HEE models are needed.

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PMID: 37459289 [Indexed for MEDLINE]

126. Rev Infirm. 2019 Jun-Jul;68(252):28. doi: 10.1016/j.revinf.2019.04.011.

[Artificial intelligence and the nursing profession].

[Article in French]

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New technologies have revolutionised our society. Artificial intelligence is bringing about radical changes to the healthcare sector.

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127. Curr Opin Ophthalmol. 2020 Sep;31(5):329-336. doi: 10.1097/ICU.0000000000000677.

Delivering personalized medicine in retinal care: from artificial intelligence algorithms to clinical application.

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PURPOSE OF REVIEW: To review the current status of artificial intelligence systems in ophthalmology and highlight the steps required for clinical translation of artificial intelligence into personalized health care (PHC) in retinal disease.

RECENT FINDINGS: Artificial intelligence systems for ophthalmological application have made rapid advances, but are yet to attain a state of technical maturity that allows their adoption into real-world settings. There remains an 'artificial intelligence chasm' in the spheres of validation, regulation, safe implementation, and demonstration of clinical impact that needs to be bridged before the full potential of artificial intelligence to deliver PHC can be realized.

SUMMARY: Ophthalmology is currently in a stage between the demonstration of the potential of artificial intelligence and widespread deployment. Next stages include aggregating and curating datasets, training and validating artificial intelligence systems, establishing the regulatory framework, implementation and adoption with ongoing evaluation and model adjustment, and finally, meaningful human-artificial intelligence interaction with clinically validated tools that have demonstrated measurable impact on patient and healthcare system outcomes. Ophthalmologists should leverage the ability of artificial intelligence systems to glean insights from large volumes of multivariate data, and to interpret artificial intelligence recommendations in a clinical context. In doing so, the field will be well positioned to lead the transformation of health care in a personalized direction. VIDEO ABSTRACT: <http://links.lww.com/COOP/A35>.

DOI: 10.1097/ICU.0000000000000677

PMID: 32740060 [Indexed for MEDLINE]

128. Cureus. 2020 May 9;12(5):e8041. doi: 10.7759/cureus.8041.

Artificial Intelligence in Modern Medicine - The Evolving Necessity of the

Present and Role in Transforming the Future of Medical Care.

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The dexterity of computer systems to resemble and mimic human intelligence is artificial intelligence. Artificial intelligence has reformed the diagnostic and therapeutic precision and competence in various fields of medicine. Artificial intelligence appears to play a bright role in medical diagnosis. Computer systems using artificial intelligence help in the assessment of medical images and enormous data. This research aims to identify how artificial intelligence-based technology is reforming the art of medicine. Artificial intelligence empowers providers in improving efficiency and overall healthcare. Newer machine learning techniques lead the automatic diagnostic systems. Areas of medicine such as medical imaging, automated clinical decision-making support have made significant advances with respect to artificial intelligence technology. With improved diagnosis and prognosis, artificial intelligence possesses the capability to revolutionize various fields of medicine. Artificial intelligence has its own limitations and cannot replace a bedside clinician. In the evolving modern medical digital world, physicians need to support artificial intelligence rather than fear it replacing trained physicians for improved healthcare.

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PMID: 32528777

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129. Camb Q Healthc Ethics. 2023 Feb 28;1-6. doi: 10.1017/S0963180122000755. Online ahead of print.

Against Intelligence: Rethinking Criteria for Medical School Admissions.

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Intelligence, as measured by grades and/or standardized test scores, plays a principal role in the medical school admissions process in most nations. Yet while sufficient intelligence is necessary to practice medicine effectively, no evidence suggests that surplus intelligence beyond that threshold is correlated with providing higher quality medical care. This paper argues that using perceived measures of intelligence to distinguish between applicants, at levels that exceed the level of intelligence required to practice medicine, is both unfair to applicants and fails to serve the interests of patients.

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PMID: 36852662

130. Fertil Steril. 2023 Jul;120(1):1-2. doi: 10.1016/j.fertnstert.2023.05.150. Epub 2023 May 19.

Artificial intelligence in assisted reproductive technology: how best to optimize this tool of the future.

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Artificial intelligence, at a simple level, involves the use of a computer that can perform "human" functions: learning from experience, adjusting to new inputs, and simulating human intelligence performing human tasks. This Views and Reviews brings together a diverse group of investigators to evaluate artificial intelligence and the roles it might play in the field of assisted reproductive technology.

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PMID: 37211065 [Indexed for MEDLINE]

131. J Intell. 2017 Aug 29;5(3):30. doi: 10.3390/jintelligence5030030.

From Cognitive Development to Intelligence: Translating Developmental Mental Milestones into Intellect.

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This special issue aimed to contribute to the unification of two disciplines focusing on cognition and intelligence: the psychology of cognitive development and the psychology of intelligence. The general principles of the organization and development of human intelligence are discussed first. Each paper is then summarized and discussed vis-à-vis these general principles. The implications for major theories of cognitive development and intelligence are briefly discussed.

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PMCID: PMC6526424

PMID: 31162421

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132. Arch Psychiatr Nurs. 2022 Apr;37:33-38. doi: 10.1016/j.apnu.2021.12.002. Epub

2021 Dec 9.

Emotional intelligence, alexithymia and suicidal ideation among depressive patients.

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BACKGROUND: Depression is more than just sentiment sad or passing a rough patch. It is a serious psychological wellbeing disorder that needs curative care and maintenance. Emotional Intelligence (EI) is a comprehensive personality construct denoting the capability to perceive and control affects within the self. Alexithymia is another personality construct that refers to the difficulty of recognizing and expressing feelings, with an outside oriented thinking style. Suicidal ideation is defined as thinking of appealing in conduct intentional to end one's life.

AIM: The current study aimed to examine the relationship between emotional intelligence, alexithymia and suicidal ideation among depressive patients.

DESIGN: A descriptive correlation design was utilized.

SETTING: This study was conducted at the Psychiatric Outpatient Clinic in El Ahrar Hospital, Alsharkia Governorate, Egypt.

SUBJECTS: A purposeful sample of 65 depressed patients was recruited for this study.

TOOLS: Data were collected by using four tools: Socio-demographic Data Sheet, Emotional Intelligence Scales, Toronto Alexithymia Scale (TAS-20) and Suicidal Ideation Scale.

RESULTS: The majority of depressed patients were having alexithymia and having low emotional intelligence. Emotional intelligence was statistically significantly negatively correlated with alexithymia and suicidal ideation. Nevertheless, alexithymia was statistically significantly positively correlated with suicidal ideation. It was statistically significantly positively predictor of suicidal ideation and alexithymia, while it was statistically significantly negatively predictor of suicidal ideation and emotional intelligence.

CONCLUSION: Lower emotional intelligence led to higher suicidal ideation in depressive patients. Increasing alexithymia in patients with depressive disorders caused an increase in their suicidal ideation. Therefore, it is recommended implementing a training program such as mindfulness and emotional intelligence skills for patients to enhance their emotional intelligence.

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133. J Intell. 2020 Feb 17;8(1):8. doi: 10.3390/jintelligence8010008.

The Many Faces of Intelligence: A Discussion of Geary's Mitochondrial Functioning Theory on General Intelligence.

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David Geary's article on intelligence (Geary, 2018) and the summary of his theory in Journal of Intelligence offer a refreshing and inspirational view on intelligence [...].

DOI: 10.3390/jintelligence8010008

PMCID: PMC7151089

PMID: 32079167

Conflict of interest statement: The authors declare no conflict of interest.

134. Zhonghua Zhong Liu Za Zhi. 2018 Dec 23;40(12):890-893. doi:

10.3760/cma.j.issn.0253-3766.2018.12.003.

[Application of artificial intelligence in diagnosis of medical endoscope].

[Article in Chinese; Abstract available in Chinese from the publisher]

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Through a brief overview of the origin and development of artificial intelligence, the research progress of artificial intelligence in digestive endoscopy, ophthalmoscopy and electronic colposcopy was summarized, and the importance of its application was clarified. This article induced the main problems and suggestions of artificial intelligence in the development of medical endoscopes, and prospected the future application of artificial intelligence in medical endoscopy diagnosis.

Publisher:

通过概述人工智能的起源与发展,归纳人工智能在消化内镜、眼底镜和电子阴道镜中的研究进展,阐明其应用的重要性。总结人工智能在医学内窥镜研发中的主要问题和建议,并对未来人工智能在医学内窥镜诊断中的应用进行展望。.

DOI: 10.3760/cma.j.issn.0253-3766.2018.12.003

PMID: 30605977 [Indexed for MEDLINE]

135. J Exp Psychol Gen. 2021 May;150(5):815-827. doi: 10.1037/xge0000980. Epub 2020 Oct 1.

Perceptions of the malleability of fluid and crystallized intelligence.

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There is significant variation in lay people's beliefs about the nature of intelligence: Some believe that intelligence is relatively fixed and innate, whereas others view intelligence as more malleable and affected by experience. However, most studies in this domain do not explicitly define intelligence when probing about beliefs about intelligence and aptitude. Thus, variation in beliefs may reflect variation in how intelligence is defined. To address this issue, we conducted 3 studies examining individuals' beliefs about fluid versus crystallized intelligence. Study 1 used a modified version of Dweck's (1999) mindset questionnaire and found that people have more fixed views about fluid intelligence than either crystallized intelligence or intelligence in general. Study 2 used a switched-at-birth paradigm and found that individuals hold more essentialist beliefs about fluid intelligence than crystallized intelligence. Study 3 added a survey that probed participants' beliefs about mathematics achievement. It found that when reasoning about mathematics achievements, participants' attributions of ability and effort were differentially associated with their crystallized and fluid mindset beliefs. Specifically, mindsets of fluid intelligence were more associated with effort for professional-level mathematics achievements, whereas mindsets of crystallized intelligence were more associated with elementary-level mathematics achievements. Together, the present studies highlight the importance of considering the definition of intelligence when assessing related beliefs about malleability, inheritance, and achievement. (PsycInfo Database Record (c) 2021 APA, all rights reserved).

DOI: 10.1037/xge0000980

PMID: 33001687 [Indexed for MEDLINE]

136. Am Surg. 2023 Jan;89(1):9-10. doi: 10.1177/00031348221117024. Epub 2022 Aug 15.

Artificial Intelligence and Machine Learning in Surgery.

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In the present era, the technology of artificial intelligence has started to rapidly gain popularity as a revolutionary innovation in healthcare. The following article serves as the introduction to our symposium on artificial intelligence in surgery.

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137. Curr Opin Psychol. 2019 Jun;27:6-12. doi: 10.1016/j.copsyc.2018.07.005. Epub 2018 Jul 23.

What genome-wide association studies reveal about the association between intelligence and physical health, illness, and mortality.

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The associations between higher intelligence test scores from early life and later good health, fewer illnesses, and longer life are recent discoveries. Researchers are mapping the extent of these associations and trying to understand them. Part of the intelligence-health association has genetic origins. Recent advances in molecular genetic technology and statistical analyses have revealed that: intelligence and many health outcomes are highly polygenic; and that modest but widespread genetic correlations exist between intelligence and health, illness and mortality. Causal accounts of intelligence-health associations are still poorly understood. The contribution of education and socio-economic status - both of which are partly genetic in origin - to the intelligence-health associations are being explored.

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PMCID: PMC6624475

PMID: 30071465 [Indexed for MEDLINE]

138. Front Psychol. 2022 Apr 25;13:611348. doi: 10.3389/fpsyg.2022.611348. eCollection 2022.

A Meta-Analysis of the Relationships Between Emotional Intelligence and Employee Outcomes.

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Emotional intelligence is an emerging field since the 1990s due to its important outcomes for employees. This study is a psychometric meta-analysis examining the links between emotional intelligence and organizational commitment, organizational citizenship behavior, job satisfaction, job performance, and job stress of employees. In this meta-analysis, carefully selected studies on emotional intelligence since the origin of the concept in 1990 were included along with studies examining its outcomes. For this analysis, three streams of emotional intelligence, consistent with previous meta-analyses, were considered: ability, self-report, and mixed emotional intelligence. This meta-analysis is an attempt to add to the literature by analyzing the relationships between emotional intelligence and selected employee outcomes over a period of time beginning in 1990. The three streams of emotional intelligence were separately analyzed to examine their relationship with employee outcomes. These outcomes were included in the study based on select research studies. Our study results showed that emotional intelligence and its three streams were positively related to organizational commitment, organizational citizenship behavior, job satisfaction, and job performance and negatively related to job stress.

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PMID: 35548499

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139. Gac Med Mex. 2021;157(3):298-301. doi: 10.24875/GMM.M21000561.

Reflections around ethics, human intelligence and artificial intelligence.

[Article in English]

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On the internet, artificial intelligence has grown to become a program with codes and algorithms that learn and reprogram themselves to carry out pre-established tasks with greater efficiency; although this translates into improvements, the scope of the results and reprogramming are unknown to the programmer. Given the risk of deviation from pre-established objectives and ethical regulations, filters must be installed at the beginning, during and at the end of the process, as alarms for detecting deviations with bioethical implications. The interaction of human intelligence with artificial intelligence has had negative and positive disagreements. Initially, adapting regulations, labor laws and human rights was enough; now it is necessary for ethical standards to be established, such as those formulated in the Barcelona Declaration for the Proper Development and Usage of Artificial Intelligence in Europe.

Publisher: En internet ha crecido la inteligencia artificial hasta convertirse en un programa con códigos y algoritmos que aprenden y se reprograman para efectuar tareas preestablecidas con mayor eficiencia; si bien lo anterior se traduce en mejoría, el programador desconoce los alcances de los resultados y de la reprogramación. Ante el riesgo de desviación de los objetivos preestablecidos y de los reglamentos éticos, se tienen que implementar filtros al inicio, durante y al final del proceso, como alarmas cuando existan desviaciones con implicación bioética. La interacción de la inteligencia humana con la inteligencia artificial ha tenido desencuentros negativos y positivos. Al principio, bastó con adecuar normas, leyes laborales y derechos humanos; ahora se requiere establecer normas éticas, como las formuladas en la Declaración de Barcelona para el Adecuado Desarrollo y Uso de la Inteligencia Artificial en Europa.

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140. Nucl Med Commun. 2021 Jun 1;42(6):592-601. doi: 10.1097/MNM.0000000000001381.

Emerging role of artificial intelligence in nuclear medicine.

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The role of artificial intelligence is increasing in all branches of medicine. The emerging role of artificial intelligence applications in nuclear medicine is going to improve the nuclear medicine clinical workflow in the coming years. Initial research outcomes are suggestive of increasing role of artificial intelligence in nuclear medicine workflow, particularly where selective automation tasks are of concern. Artificial intelligence-assisted planning, dosimetry and procedure execution appear to be areas for rapid and significant development. The role of artificial intelligence in more directly imaging-related tasks, such as dose optimization, image corrections and image reconstruction, have been particularly strong points of artificial intelligence research in nuclear medicine. Natural Language Processing (NLP)-based text processing task is another area of interest of artificial intelligence implementation in nuclear medicine.

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PMID: 33660696 [Indexed for MEDLINE]

141. J Ophthalmol. 2015;2015:271746. doi: 10.1155/2015/271746. Epub 2015 Jan 11.

A novel review of the evidence linking myopia and high intelligence.

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The association between myopia and high intelligence has been the subject of much vexed debate in academic circles, particularly over the last two decades. This debate has risen from the observation that, over recent centuries, the prevalence of myopia amongst most populations has coincided with a marked increase in the average level of intelligence in these populations. The relationship between myopia and intelligence and theories surrounding this association is examined by the authors. Additionally, the various factors that confound the myopia and high intelligence debate, such as genetics, educational levels, ethnicity, and environmental factors were also explored by the authors. Whilst most studies found a positive correlation reaching statistical significance between myopia and high intelligence compared to emmetropes and hyperopes, further research is required to determine whether this association is causal.

DOI: 10.1155/2015/271746

PMCID: PMC4306218

PMID: 25653868

142. J Hum Genet. 2022 Sep;67(9):527-532. doi: 10.1038/s10038-022-01039-8. Epub 2022 May 9.

Inferring intelligence of ancient people based on modern genomic studies.

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Quantification of ancient human intelligence has become possible with recent advances in polygenic prediction. Intelligence is a complex trait that has both environmental and genetic components and high heritability. Large-scale genome-wide association studies based on ~270,000 individuals have demonstrated highly significant single-nucleotide polymorphisms (SNPs) associated with intelligence in present-day humans. We utilized those previously reported 12,037 SNPs to estimate a genetic component of intelligence in ancient Funadomari Jomon individual from 3700 years BP as well as four individuals of Afanasievo nuclear family from about 4100 years BP and who are considered anatomically modern humans. We have demonstrated that ancient individuals could have been not inferior in intelligence compared to present-day humans through assessment of the genetic component of intelligence. We have also confirmed that alleles associated with intelligence tend to spread equally between ancestral and derived origin suggesting that intelligence may be a neutral trait in human evolution.

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143. Perspect Psychiatr Care. 2022 Oct;58(4):1622-1631. doi: 10.1111/ppc.12970. Epub 2021 Nov 24.

Reflection of nurses' moral intelligence levels on care behaviors.

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PURPOSE: Moral intelligence is an important parameter that forms the basis and cornerstone of ethics in nursing. It is necessary to determine whether moral intelligence is reflected in the care that forms the basis of nursing. This

study was carried out with the aim of determining the reflections of nurses' moral intelligence levels on their care behaviors.

FINDINGS: This study was descriptive and cross-sectional in nature. The study's sample size is 200 nurses. A personal Information Form, Moral Intelligence Scale, and Caring Behaviors Scale were used to collect data. It was determined that nurses' moral intelligence levels and caring behavior average scores were high. There was a highly significant positive connection ($p=0.001$) between the mean scores of the moral intelligence total and subdimensions. And the mean scores of the caring behavior total and subdimensions.

PRACTICAL IMPLICATIONS: It is very important to determine the moral intelligence levels, which are acquired and developed ability and directly affect nursing care, and to take initiatives to improve the quality of the care provided.

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144. Front Psychol. 2022 Aug 29;13:995988. doi: 10.3389/fpsyg.2022.995988. eCollection 2022.

Intelligence, emotional intelligence, and emo-sensory intelligence: Which one is a better predictor of university students' academic success?

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The primary aim of this study was to determine the role of psychometric intelligence (IQ), emotional intelligence (EQ), and emo-sensory intelligence (ESQ) in university students' academic achievement. To this end, 212 university students at different academic levels, composed of 154 females and 58 males, were asked to complete the Raven's Progressive Matrices, the Bar-On Emotional Quotient Inventory, and the Emo-Sensory Intelligence Scale. Data were then matched with students' Grade Point Averages as a measure of their academic achievement. The results revealed that students' level of IQ and EQ could positively predict their academic achievement. In the case of their ESQ level, its auditory sub-component was found to be a positive predictor of academic success. Results were discussed, and possible implications and applications for increasing students' chances for success were presented.

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PMID: 36106040

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145. Heliyon. 2021 Apr 22;7(4):e06829. doi: 10.1016/j.heliyon.2021.e06829. eCollection 2021 Apr.

Role of emotional intelligence and grit in life satisfaction.

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BACKGROUND: There is a pressing need to study life satisfaction in the context of collectivistic culture, particularly of undergraduate students. Various socio-cultural factors influence the level of emotional intelligence and grit of an individual. Even though a wide array of research on life satisfaction is available, it hasn't been studied in relation to grit and emotional intelligence (as conceptualized by Bar On), both of which can be acquired and enhanced over time. To the best of researcher's knowledge, a research that collectively studies emotional intelligence, grit and life satisfaction in the context of a collectivistic culture has not been carried out.

METHOD: The study discusses the relationship between emotional intelligence (as conceptualized by Bar-On), grit and life satisfaction. Scales employed to investigate the relationship between each of the constructs include Scale of Emotional Intelligence (SEI), 12-item Grit scale and Satisfaction with Life Scale (SWLS). 350 undergraduate students were selected through random sampling. Statistical analyses included Pearson Product Moment Coefficient of correlation, Independent Sample t-test, one-way between group analysis of variance (ANOVA) and multiple regression.

RESULTS: The study concludes that the two constructs, i.e. emotional intelligence and grit, are weakly related to life satisfaction, $r(348) = .25$, $p < .01$ and $r(348) = .22$, $p < .01$ respectively. A moderately strong association is found between emotional intelligence and grit $r(348) = .46$, $p < .01$. Significant gender differences are found in emotional intelligence. Emotional intelligence and grit are not influenced by academic majors and academic years. Emotional intelligence and grit can influence life satisfaction by a variance of 15.6%. Participant's age ranged from 18 to 26 years ($M = 21.20$, $SD = 1.62$).

CONCLUSION: The study concludes that emotional intelligence and grit have a moderately strong association with one another. Emotional intelligence and grit positively influence the level of satisfaction experienced by an individual, however small it maybe. The study presents important insight into each of the primary constructs within the cultural context of Pakistan. The results also highlight the importance of educating Pakistani individuals regarding improving emotional intelligence and grit. Both emotional intelligence and grit are learnable and teachable, which means that individuals can be educated to help them improve their performance and subjective well-being. Parents, educators and health professionals can also benefit from findings of this study, in a way that they can identify areas of emotional intelligence and grit that can be enhanced in order for the children, students and clients, respectively, to achieve better well-being and individual effectiveness.

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146. Front Hum Neurosci. 2016 Oct 17;10:501. doi: 10.3389/fnhum.2016.00501. eCollection 2016.

The Structural and Functional Organization of Cognition.

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This article proposes that what have been historically and contemporarily defined as different domains of human cognition are served by one of four functionally- and structurally-distinct areas of the prefrontal cortex (PFC). Their contributions to human intelligence are as follows: (a) BA9, enables our emotional intelligence, engaging the psychosocial domain; (b) BA47, enables our practical intelligence, engaging the material domain; (c) BA46 (or BA46-9/46), enables our abstract intelligence, engaging the hypothetical domain; and (d) BA10, enables our temporal intelligence, engaging in planning within any of the other three domains. Given their unique contribution to human cognition, it is proposed that these areas be called the, social (BA9), material (BA47), abstract (BA46-9/46) and temporal (BA10) mind. The evidence that BA47 participates strongly in verbal and gestural communication suggests that language evolved primarily as a consequence of the extreme selective pressure for practicality; an observation supported by the functional connectivity between BA47 and orbital areas that negatively reinforce lying. It is further proposed that the abstract mind (BA46-9/46) is the primary seat of metacognition charged with creating adaptive behavioral strategies by generating higher-order concepts (hypotheses) from lower-order concepts originating from the other three domains of cognition.

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PMCID: PMC5065967

PMID: 27799901

147. Perspect Psychiatr Care. 2022 Oct;58(4):2423-2432. doi: 10.1111/ppc.13077. Epub 2022 Apr 1.

The effect of moral intelligence on cultural sensitivity in nurses.

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PURPOSE: This study was conducted to determine the relationship between the levels of moral intelligence and intercultural sensitivity in nurses.

METHODS: The cross-sectional study was conducted with 200 nurses working in a research and training hospital. The data were collected using the intercultural sensitivity scale and the scale for the measurement of moral intelligence in the provision of health services.

RESULTS: The mean total intercultural sensitivity score of the nurses was determined to be 89.34 ± 10.01 , while their moral intelligence score was found 201.22 ± 21.99 . There was a positive relationship between the nurses' mean total scores scales ($p < 0.000$).

PRACTICAL IMPLICATIONS: The nurses' intercultural sensitivity and moral

intelligence were at a moderate level. As the nurses' levels of moral intelligence increased, their intercultural sensitivity levels increased.

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148. Zhongguo Yi Xue Ke Xue Yuan Xue Bao. 2020 Feb 28;42(1):128-131. doi: 10.3881/j.issn.1000-503X.10961.

[Ethical Issues of Medical Artificial Intelligence].

[Article in Chinese]

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As an important branch of artificial intelligence, the emerging medical artificial intelligence (MAI) is facing many ethical issues. MAI may offer the optimal diagnosis and treatment for patients but may also bring adverse effects on society and human beings. This article discusses the ethical problems caused by MAI and elucidates its development in a direction that meets ethical principles and requirements.

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PMID: 32131952 [Indexed for MEDLINE]

149. Eur Psychiatry. 2021 Oct 13;64(1):e61. doi: 10.1192/j.eurpsy.2021.2237.

Causal associations of intelligence with schizophrenia and bipolar disorder: A Mendelian randomization analysis.

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BACKGROUND: Intelligence is inversely associated with schizophrenia (SCZ) and bipolar disorder (BD); it remains unclear whether low intelligence is a cause or consequence. We investigated causal associations of intelligence with SCZ or BD risk and a shared risk between SCZ and BD and SCZ-specific risk.

METHODS: To estimate putative causal associations, we performed multi-single nucleotide polymorphism (SNP) Mendelian randomization (MR) using generalized summary-data-based MR (GSMR). Summary-level datasets from five GWAS

(intelligence, SCZ vs. control [CON], BD vs. CON, SCZ + BD vs. CON, and SCZ vs. BD; sample sizes of up to 269,867) were utilized.

RESULTS: A strong bidirectional association between risks for SCZ and BD was observed (odds ratio; ORSCZ → BD = 1.47, $p = 2.89 \times 10^{-41}$, ORBD → SCZ = 1.44, $p = 1.85 \times 10^{-52}$). Low intelligence was bidirectionally associated with a high risk for SCZ, with a stronger effect of intelligence on SCZ risk (ORlower intelligence → SCZ = 1.62, $p = 3.23 \times 10^{-14}$) than the reverse (ORSCZ → lower intelligence = 1.06, $p = 3.70 \times 10^{-23}$). Furthermore, low intelligence affected a shared risk between SCZ and BD (OR lower intelligence → SCZ + BD = 1.23, $p = 3.41 \times 10^{-5}$) and SCZ-specific risk (ORlower intelligence → SCZvsBD = 1.64, $p = 9.72 \times 10^{-10}$); the shared risk (ORSCZ + BD → lower intelligence = 1.04, $p = 3.09 \times 10^{-14}$) but not SCZ-specific risk (ORSCZvsBD → lower intelligence = 1.00, $p = 0.88$) weakly affected low intelligence. Conversely, there was no significant causal association between intelligence and BD risk ($p > 0.05$).

CONCLUSIONS: These findings support observational studies showing that patients with SCZ display impairment in premorbid intelligence and intelligence decline. Moreover, a shared factor between SCZ and BD might contribute to impairment in premorbid intelligence and intelligence decline but SCZ-specific factors might be affected by impairment in premorbid intelligence. We suggest that patients with these genetic factors should be categorized as having a cognitive disorder SCZ or BD subtype.

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PMCID: PMC8516746

PMID: 34641990 [Indexed for MEDLINE]

150. AIMS Public Health. 2022 Sep 16;9(4):644-650. doi: 10.3934/publichealth.2022045. eCollection 2022.

Artificial intelligence, human intelligence, and the future of public health.

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In this paper, I have described the healthcare problem (maldistribution of doctors) in India. Later, I have introduced the concept of artificial intelligence (AI) and I have described AI technology with various examples, how it is rapidly changing the healthcare scenario across the world. I have also described the various advantages of artificial intelligence technology. At the end of the paper, I have raised some serious concerns regarding complete replacement of human based healthcare technology with artificial intelligence technology. I concluded that there is not the slightest question that AI will influence the future. People must be innovative, insightful, and context-aware for AI to work. This is because humans will continue to contribute value that cannot be reproduced by robots.

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151. Healthcare (Basel). 2022 Oct 14;10(10):2032. doi: 10.3390/healthcare10102032.

Emotional Intelligence among Nursing Students: Findings from a Longitudinal Study.

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Emotional intelligence is an important factor for nursing students' success and work performance. Although the level of emotional intelligence increases with age and tends to be higher in women, results of different studies on emotional intelligence in nursing students vary regarding age, study year, and gender. A longitudinal study was conducted in 2016 and 2019 among undergraduate nursing students to explore whether emotional intelligence changes over time. A total of 111 undergraduate nursing students participated in the study in the first year of their study, and 101 in the third year. Data were collected using the Trait Emotional Intelligence Questionnaire Short Form (TEIQue-SF) and Schutte Self Report Emotional Intelligence Test (SSEIT). There was a significant difference in emotional intelligence between students in their first ($M = 154.40$; 95% CI: 101.85-193.05) and third year ($M = 162.01$; 95% CI: 118.65-196.00) of study using TEIQue-SF questionnaire. There was a weak correlation ($r = 0.170$) between emotional intelligence and age measuring using the TEIQue-SF questionnaire, and no significant correlation when measured using SSEIT ($r = 0.34$). We found that nursing students' emotional intelligence changes over time with years of education and age, suggesting that emotional intelligence skills can be improved. Further research is needed to determine the gendered nature of emotional intelligence in nursing students.

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PMID: 36292477

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Personality, intelligence, and academic achievement: Charting their developmental interplay.

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OBJECTIVE: Although intelligence and personality traits have long been recognized as key predictors of students' academic achievement, little is known about their longitudinal and reciprocal associations. Here, we charted the developmental interplay of intelligence, personality (Big Five) and academic achievement in 3880 German secondary school students, who were assessed four

times between the ages 11 and 14 years (i.e., in grades 5, 6, 7, and 8).
METHOD: We fitted random intercept cross-lagged panel models (RI-CLPs) to investigate reciprocal within-person associations between (a) academic achievement and intelligence, (b) academic achievement and personality, as well as (c) intelligence and personality.

RESULTS: The results revealed negative within-person associations between Conscientiousness and Extraversion assessed at the first wave of measurement and intelligence assessed at the second wave. None of the reciprocal personality-achievement associations attained statistical significance. Academic achievement and intelligence showed reciprocal within-person relations, with the strongest coefficients found for achievement longitudinally predicting intelligence.

CONCLUSIONS: Our work contributes to developmental theorizing on interrelations between personality, intelligence, and academic achievement, as well as to within-person conceptualizations in personality research.

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153. J Pediatr Rehabil Med. 2023;16(3):433-434. doi: 10.3233/PRM-230039.

New kid on the block: Artificial intelligence just moved into town.

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This article describes the experience of a resident physician on the burnout-prone demands of postgraduate training during rapidly evolving integration of technology including artificial intelligence.

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154. J Pers. 2020 Dec;88(6):1129-1144. doi: 10.1111/jopy.12561. Epub 2020 Jun 29.

When people estimate their personal intelligence who is overconfident? Who is accurate?

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OBJECTIVE: We explore accurate self-knowledge versus overconfidence in personal

intelligence-a "broad" intelligence about personality. The theory of personal intelligence proposes that people vary in their ability to understand the traits, goals, plans, and actions of themselves and others. We wondered who accurately knew that they were higher in personal intelligence and who did not, and whether individuals with more accurate estimates were distinguishable from others in their psychological characteristics.

METHOD: Three archival data sets were identified that included both self-estimates and objective measures of personal intelligence: The measures were the Self-Estimated Personal Intelligence scale and the Test of Personal Intelligence.

RESULTS: People who were over-confident-overestimating their ability-level of personal intelligence-were positive in their outlook and more sociable. People who provided the most accurate self-estimates were higher in verbal and personal intelligences, more open, and more conscientious than others.

CONCLUSIONS: People who were accurate about themselves have not been studied before in this context but may, for example, serve as the monitors and thinkers who help keep themselves and others reasonable and on track.

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155. Eur Urol Focus. 2021 Jul;7(4):685-686. doi: 10.1016/j.euf.2021.03.022. Epub 2021 Apr 3.

Old-fashioned Intelligence Will Always Be Needed in Medicine.

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Artificial intelligence is new and enticing, but the idea that it will make physicians expendable is hyperbole. Medicine is a moral art that balances values and desires. Old-fashioned human intelligence will always be needed in medicine.

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156. Front Artif Intell. 2023 Jul 24;6:1220744. doi: 10.3389/frai.2023.1220744. eCollection 2023.

Artificial intelligence vs. evolving super-complex tumor intelligence: critical viewpoints.

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Recent developments in various domains have led to a growing interest in the potential of artificial intelligence to enhance our lives and environments. In particular, the application of artificial intelligence in the management of complex human diseases, such as cancer, has garnered significant attention. The evolution of artificial intelligence is thought to be influenced by multiple factors, including human intervention and environmental factors. Similarly, tumors, being heterogeneous and complex diseases, continue to evolve due to changes in the physical, chemical, and biological environment. Additionally, the concept of cellular intelligence within biological systems has been recognized as a potential attribute of biological entities. Therefore, it is plausible that the tumor intelligence present in cancer cells of affected individuals could undergo super-evolution due to changes in the pro-tumor environment. Thus, a comparative analysis of the evolution of artificial intelligence and super-complex tumor intelligence could yield valuable insights to develop better artificial intelligence-based tools for cancer management.

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157. J Intell. 2019 Oct 1;7(4):23. doi: 10.3390/jintelligence7040023.

A Theory of Adaptive Intelligence and Its Relation to General Intelligence.

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Intelligence typically is defined as consisting of "adaptation to the environment" or in related terms. Yet, it is not clear that "general intelligence" or g, traditionally conceptualized in terms of a general factor in a psychometrically-based hierarchical model of intelligence, provides an optimal way of defining intelligence as adaptation to the environment. Such a definition of adaptive intelligence would need to be biologically based in terms of evolutionary theory, would need to take into account the cultural context of adaptation, and would need to take into account whether thought and behavior labeled as "adaptively intelligent" actually contributed to the perpetuation of the human and other species, or whether it was indifferent or actually destructive to this perpetuation. In this article, I consider the similarities and differences between "general intelligence" and "adaptive intelligence," as well as the implications especially of the differences.

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158. Cereb Cortex. 2017 Apr 1;27(4):2607-2616. doi: 10.1093/cercor/bhw070.

Multivariate Associations of Fluid Intelligence and NAA.

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Understanding the neural and metabolic correlates of fluid intelligence not only aids scientists in characterizing cognitive processes involved in intelligence, but it also offers insight into intervention methods to improve fluid intelligence. Here we use magnetic resonance spectroscopic imaging (MRSI) to measure N-acetyl aspartate (NAA), a biochemical marker of neural energy production and efficiency. We use principal components analysis (PCA) to examine how the distribution of NAA in the frontal and parietal lobes relates to fluid intelligence. We find that a left lateralized frontal-parietal component predicts fluid intelligence, and it does so independently of brain size, another significant predictor of fluid intelligence. These results suggest that the left motor regions play a key role in the visualization and planning necessary for spatial cognition and reasoning, and we discuss these findings in the context of the Parieto-Frontal Integration Theory of intelligence.

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159. Biomedicines. 2023 Mar 3;11(3):771. doi: 10.3390/biomedicines11030771.

Discovering Themes in Deep Brain Stimulation Research Using Explainable Artificial Intelligence.

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Deep brain stimulation is a treatment that controls symptoms by changing brain activity. The complexity of how to best treat brain dysfunction with deep brain stimulation has spawned research into artificial intelligence approaches. Machine learning is a subset of artificial intelligence that uses computers to learn patterns in data and has many healthcare applications, such as an aid in diagnosis, personalized medicine, and clinical decision support. Yet, how machine learning models make decisions is often opaque. The spirit of

explainable artificial intelligence is to use machine learning models that produce interpretable solutions. Here, we use topic modeling to synthesize recent literature on explainable artificial intelligence approaches to extracting domain knowledge from machine learning models relevant to deep brain stimulation. The results show that patient classification (i.e., diagnostic models, precision medicine) is the most common problem in deep brain stimulation studies that employ explainable artificial intelligence. Other topics concern attempts to optimize stimulation strategies and the importance of explainable methods. Overall, this review supports the potential for artificial intelligence to revolutionize deep brain stimulation by personalizing stimulation protocols and adapting stimulation in real time.

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160. Proc Natl Acad Sci U S A. 2017 May 16;114(20):5295-5299. doi: 10.1073/pnas.1621147114. Epub 2017 May 1.

Complexity and compositionality in fluid intelligence.

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Compositionality, or the ability to build complex cognitive structures from simple parts, is fundamental to the power of the human mind. Here we relate this principle to the psychometric concept of fluid intelligence, traditionally measured with tests of complex reasoning. Following the principle of compositionality, we propose that the critical function in fluid intelligence is splitting a complex whole into simple, separately attended parts. To test this proposal, we modify traditional matrix reasoning problems to minimize requirements on information integration, working memory, and processing speed, creating problems that are trivial once effectively divided into parts. Performance remains poor in participants with low fluid intelligence, but is radically improved by problem layout that aids cognitive segmentation. In line with the principle of compositionality, we suggest that effective cognitive segmentation is important in all organized behavior, explaining the broad role of fluid intelligence in successful cognition.

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161. Postgrad Med. 2018 Sep;130(7):644-649. doi: 10.1080/00325481.2018.1515563.

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Emotional intelligence and leadership traits among family physicians.

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OBJECTIVES: High emotional intelligence and leadership traits are essential for physicians in managing their responsibilities and thus building successful interactions with patients. This study explored the relationship between emotional intelligence and leadership traits among family physicians.

METHODS: Participants (2975 men, 972 women, mean = 42.0 ages, SD = 7.47) were family physicians working at family health-care centers across the seven geographical regions of Turkey who were contacted by e-mail. The Trait Emotional Intelligence Questionnaire (TEIQue) and Leadership Traits Tool were used to collect data. Data were analyzed concerning physicians' sex, age, health-care experience, and geographical region. The correlation between Trait Emotional Intelligence (TEI) and leadership was also being examined.

RESULTS: Our findings suggest that family physicians' TEI differs based on sex, age, health-care experience, and the geographical region where they work. Women had higher mean values than did men for well-being, emotionality, and global TEI. Physicians aged younger than 29 years had the lowest mean values for emotional intelligence. As physicians' health-care experience increased, they received higher scores for emotional intelligence. Physicians working in the Mediterranean had the highest mean TEI scores. There was a positive correlation between family physicians' emotional intelligence and leadership traits. Higher emotional intelligence was correlated with increased leadership traits.

CONCLUSION: Emotional intelligence and leadership traits play crucial roles in increasing physicians' personal and professional development. This may also increase physicians' caregiving competencies and thus the quality of health services, as well as potentially decreasing physicians' burnout and health-related costs.

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162. J Intell. 2023 Jul 20;11(7):146. doi: 10.3390/jintelligence11070146.

Predicting School Grades: Can Conscientiousness Compensate for Intelligence?

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Intelligence and noncognitive factors such as conscientiousness are strongly related to academic performance. As theory and research differ with respect to their interplay in predicting performance, the present study examines whether conscientiousness compensates for intelligence or enhances the effect of

intelligence on performance in 3775 13th grade students from Germany. Latent moderation analyses show positive main effects of intelligence and conscientiousness on grades. Further, analyses reveal synergistic interactions in predicting grades in biology, mathematics, and German, but no interaction in predicting grades in English. Intelligence and grades are more strongly linked if students are conscientious. Multigroup models detected gender differences in biology, but no differences with respect to SES. In biology, conscientiousness has especially strong effects in intelligent men. Conscientiousness thus enhances the effect of intelligence on performance in several subjects.

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PMID: 37504789

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163. Bull World Health Organ. 2020 Apr 1;98(4):257-262. doi: 10.2471/BLT.19.237289. Epub 2020 Jan 27.

How to achieve trustworthy artificial intelligence for health.

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Artificial intelligence holds great promise in terms of beneficial, accurate and effective preventive and curative interventions. At the same time, there is also awareness of potential risks and harm that may be caused by unregulated developments of artificial intelligence. Guiding principles are being developed around the world to foster trustworthy development and application of artificial intelligence systems. These guidelines can support developers and governing authorities when making decisions about the use of artificial intelligence. The High-Level Expert Group on Artificial Intelligence set up by the European Commission launched the report Ethical guidelines for trustworthy artificial intelligence in 2019. The report aims to contribute to reflections and the discussion on the ethics of artificial intelligence technologies also beyond the countries of the European Union (EU). In this paper, we use the global health sector as a case and argue that the EU's guidance leaves too much room for local, contextualized discretion for it to foster trustworthy artificial intelligence globally. We point to the urgency of shared globalized efforts to safeguard against the potential harms of artificial intelligence technologies in health care.

Publisher: L'intelligence artificielle regorge de potentiel en matière d'interventions préventives et curatives précises, efficaces et bénéfiques. Mais par la même occasion, elle présente certains risques et peut s'avérer nocive si son développement n'est pas encadré par des règles. Partout dans le monde, des principes directeurs sont instaurés afin de promouvoir un niveau de fiabilité optimal dans l'évolution et l'application des systèmes basés sur l'intelligence artificielle. Ces principes peuvent aider les développeurs et les autorités gouvernementales à prendre des décisions relatives à l'intelligence artificielle. Le Groupe d'experts de haut niveau sur l'intelligence artificielle créé par la Commission européenne a récemment publié un rapport intitulé Lignes directrices en matière d'éthique pour une IA digne de confiance. Objectif de ce rapport : contribuer aux réflexions et discussions portant sur l'éthique des

technologies fondées sur l'intelligence artificielle, y compris dans les pays n'appartenant pas à l'Union européenne (UE). Dans ce document, nous utilisons le secteur mondial de la santé comme exemple et estimons que les directives de l'UE accordent un pouvoir discrétionnaire trop important aux autorités locales et au contexte pour véritablement encourager la fiabilité de l'intelligence artificielle dans le monde. Nous insistons également sur l'urgence de mettre en place une protection globale commune contre les éventuels préjudices liés aux technologies d'intelligence artificielle dans le domaine des soins de santé.

Publisher: La inteligencia artificial es muy prometedora en términos de intervenciones preventivas y curativas beneficiosas, precisas y eficaces. Al mismo tiempo, también hay conciencia de los posibles riesgos y daños que pueden causar los desarrollos no regulados de la inteligencia artificial. Se están elaborando principios fundamentales en todo el mundo para fomentar el desarrollo y la aplicación confiables de los sistemas de inteligencia artificial. Estas directrices pueden servir de apoyo a los desarrolladores y a las autoridades gobernantes en la toma de decisiones sobre el uso de la inteligencia artificial. El Grupo de Expertos de Alto Nivel sobre Inteligencia Artificial establecido por la Comisión Europea ha publicado recientemente el informe Ethical guidelines for trustworthy artificial intelligence (Directrices éticas para una inteligencia artificial confiable). El informe tiene por objeto contribuir a la reflexión y el debate sobre la ética de las tecnologías de inteligencia artificial incluso más allá de los países de la Unión Europea (UE). En este documento, se recurre al sector sanitario mundial como caso de referencia y se argumenta que las directrices de la UE conceden demasiado margen a la discreción local y contextualizada como para fomentar una inteligencia artificial confiable a nivel mundial. Se destaca la urgencia de compartir los esfuerzos internacionales para protegerse de los posibles daños de las tecnologías de inteligencia artificial en la atención sanitaria.

Publisher: يجمل الذكاء الاصطناعي بين طياته وعوداً جمة فيما يتعلق بالتدخلات الوقائية والعلاجية المفيدة والدقيقة والفعالة. وفي الوقت ذاته، هناك أيضاً وعي بالمخاطر والأضرار المحتملة التي قد تحدث بسبب التطورات غير المنظمة للذكاء الاصطناعي. يتم حالياً تطوير مبادئ توجيهية حول العالم لتعزيز تنمية جديرة بالثقة وتطبيق أنظمة الذكاء الاصطناعي. يمكن لهذه الإرشادات أن تدعم المطورين والسلطات الحاكمة عند اتخاذ القرارات بشأن استخدام الذكاء الاصطناعي. قامت مؤخراً مجموعة خبراء الذكاء الاصطناعي رفيعي المستوى، التي أسستها المفوضية الأوروبية، بإصدار تقرير بعنوان المبادئ التوجيهية الأخلاقية للذكاء الاصطناعي الجدير بالثقة. يهدف التقرير إلى المساهمة في الأفكار والمناقشة الخاصة بأخلاقيات تقنيات الذكاء وفي هذه الورقة، نحن نستخدم قطاع (EU) الاصطناعي كذلك خارج دول الاتحاد الأوروبي الصحة العالمي كحالة، ونؤمن بأن توجيهات الاتحاد الأوروبي تترك مجالاً كبيراً لتقدير محلي مقترن بالسياق لتعزيز ذكاء اصطناعياً جدير بالثقة على مستوى العالم. كما نشير إلى الحاجة الملحة لبذل جهود عالمية مشتركة للوقاية من الأضرار المحتملة لتكنولوجيات الذكاء الاصطناعي في الرعاية الصحية.

Publisher:

人工智能在有益、精准和有效的预防与治疗干预方面具有广阔的前景。同时，人们也意识到人工智能的无度发展可能会引起潜在的风险和危害。全世界正在制定指导原则，以促进可信赖的人工智能系统的开发和应用。这些准则可以支持开发人员和管理机构制定有关人工智能用途的决策。由欧盟委员会成立的人工智能高级专家小组最近发布了《可信赖的人工智能伦理准则》(Ethical guidelines for trustworthy artificial intelligence) 报告。该报告旨在促进欧盟 (EU) 以外的国家也开展人工智能技术伦理方面的反思和讨论。在本文中，我们以全球卫生部门为例并且认为欧盟的准则还有很大的完善空间，可以根据当地的具体情况自行决定，在全球范围内促进可信赖的人工智能。我们指出必须立即在全球范围内共同努力，防范人工智能技术在医疗保健领域的潜在危害。

Publisher: Искусственный интеллект открывает большие перспективы для имеющих практическую значимость, точных и эффективных мероприятий по профилактике и

лечению заболеваний. В то же самое время необходимо принимать во внимание потенциальные риски и вред, которые могут быть вызваны нерегулируемым развитием искусственного интеллекта. В настоящее время идет процесс глобальной разработки руководящих принципов, способствующих надежному и безопасному формированию и применению систем искусственного интеллекта. Данные рекомендации помогут разработчикам и руководящим органам в принятии решений относительно использования искусственного интеллекта. Созданная Европейской комиссией экспертная группа высокого уровня по искусственному интеллекту недавно выпустила отчет, озаглавленный «Этические рекомендации для надежного и безопасного использования искусственного интеллекта». Цель отчета – содействие процессу анализа и обсуждения этической стороны применения технологий искусственного интеллекта за пределами Европейского союза (ЕС). В этой статье авторы рассматривают в качестве примера сектор общественного здравоохранения и доказывают, что рекомендации ЕС предоставляют слишком большую свободу действий на локальном уровне в контексте имеющихся условий, что препятствует обеспечению надежного использования искусственного интеллекта во всем мире. Авторы подчеркивают настоятельную необходимость совместных глобальных усилий по защите от потенциального вреда, который может быть нанесен сфере здравоохранения в результате использования технологий искусственного интеллекта.

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Artificial intelligence in health care: accountability and safety.

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The prospect of patient harm caused by the decisions made by an artificial intelligence-based clinical tool is something to which current practices of accountability and safety worldwide have not yet adjusted. We focus on two aspects of clinical artificial intelligence used for decision-making: moral accountability for harm to patients; and safety assurance to protect patients against such harm. Artificial intelligence-based tools are challenging the standard clinical practices of assigning blame and assuring safety. Human clinicians and safety engineers have weaker control over the decisions reached by artificial intelligence systems and less knowledge and understanding of precisely how the artificial intelligence systems reach their decisions. We illustrate this analysis by applying it to an example of an artificial intelligence-based system developed for use in the treatment of sepsis. The paper ends with practical suggestions for ways forward to mitigate these concerns. We argue for a need to include artificial intelligence developers and systems safety engineers in our assessments of moral accountability for patient harm. Meanwhile, none of the actors in the model robustly fulfil the traditional conditions of moral accountability for the decisions of an artificial intelligence system. We should therefore update our conceptions of moral accountability in this context. We also need to move from a static to a dynamic

model of assurance, accepting that considerations of safety are not fully resolvable during the design of the artificial intelligence system before the system has been deployed.

Publisher: La perspective que les décisions prises par un outil clinique basé sur l'intelligence artificielle puissent porter préjudice aux patients est un concept dont les bonnes pratiques de responsabilité et de sécurité actuelles ne tiennent pas encore compte à travers le monde. Nous nous concentrons sur deux aspects qui caractérisent les décisions de l'intelligence artificielle à usage clinique : la responsabilité morale des préjudices aux patients, et la garantie de sécurité pour protéger les patients contre de tels préjudices. Les outils fondés sur l'intelligence artificielle remettent en cause les pratiques cliniques conventionnelles d'attribution des responsabilités et de garantie de la sécurité. Les décisions formulées par les systèmes d'intelligence artificielle sont de moins en moins soumises au contrôle des médecins et spécialistes de la sécurité, qui ne comprennent et ne maîtrisent pas toujours les subtilités régissant cette prise de décision. Nous illustrons notre analyse en l'appliquant à un exemple de système d'intelligence artificielle développé dans le cadre du traitement des infections. Le présent document se termine par une série de suggestions concrètes servant à identifier de nouveaux moyens de tempérer ces inquiétudes. Nous estimons qu'il est nécessaire d'inclure les développeurs à l'origine de l'intelligence artificielle ainsi que les spécialistes de la sécurité des systèmes dans notre évaluation de la responsabilité morale des préjudices causés aux patients. Car pour l'instant, aucun des acteurs impliqués dans le modèle ne remplit pleinement les conditions traditionnelles de responsabilité morale pour les décisions prises par un dispositif d'intelligence artificielle. Dans ce contexte, il est donc essentiel revoir notre conception de la responsabilité morale. Nous devons également passer d'un modèle de garantie statique à un modèle de garantie dynamique, et accepter que certains impératifs de sécurité ne puissent être entièrement résolus durant l'élaboration du système d'intelligence artificielle, avant sa mise en œuvre.

Publisher: La perspectiva de que los pacientes sufran daños a causa de por las decisiones tomadas por un instrumento clínico de inteligencia artificial es un aspecto al que todavía no se han ajustado las prácticas actuales de responsabilidad y seguridad en todo el mundo. El presente documento se centra en dos aspectos de la inteligencia artificial clínica utilizada para la toma de decisiones: la responsabilidad moral por el daño causado a los pacientes y la garantía de seguridad para proteger a los pacientes contra dicho daño. Las herramientas de inteligencia artificial están desafiando las prácticas clínicas estándar de asignación de responsabilidades y de garantía de seguridad. Los médicos clínicos y los ingenieros de seguridad de las personas tienen menos control sobre las decisiones que adoptan por los sistemas de inteligencia artificial y menos conocimiento y comprensión de la forma precisa en que los sistemas de inteligencia artificial adoptan sus decisiones. Este análisis se ilustra aplicándolo a un ejemplo de un sistema de inteligencia artificial desarrollado para su uso en el tratamiento de la sepsis. El documento termina con sugerencias prácticas sobre las vías de acción para mitigar estas preocupaciones. Se sostiene la necesidad de incluir a los desarrolladores de inteligencia artificial y a los ingenieros de seguridad de sistemas en las evaluaciones de la responsabilidad moral por los daños causados a los pacientes. Entretanto, ninguno de los actores del modelo cumple sólidamente las condiciones tradicionales de responsabilidad moral por las decisiones de un sistema de inteligencia artificial. En consecuencia, se debería actualizar nuestra concepción de la responsabilidad moral en este contexto. También es preciso pasar de un modelo de garantía estático a uno dinámico, aceptando que las consideraciones de seguridad no se pueden resolver plenamente durante el diseño del sistema de inteligencia artificial antes de que el sistema sea implementado.

Publisher: إن احتمال حدوث ضرر للمريض نتيجة للقرارات التي يتم اتخاذها بواسطة أداة سريرية تعتمد على الذكاء الاصطناعي، هو أمر لم يتم بعد ضبط ممارسات المساءلة والسلامة بالنسبة له في جميع أنحاء العالم. نحن نقوم بالتركيز على جانبين من الذكاء الاصطناعي السريري يتم استخدامهما لصنع القرار: المساءلة الأخلاقية عن الضرر الذي يلحق بالمرضى؛ وضمان السلامة لحماية المرضى من هذا الضرر. تتحدى الأدوات التي تعتمد على الذكاء الاصطناعي الممارسات السريرية القياسية الخاصة بتوجيه اللوم وضمان السلامة. الأطباء البشريون ومهندسو السلامة لديهم سيطرة أضعف على القرارات التي توصلت إليها أنظمة الذكاء الاصطناعي، كما أن لديهم معرفة وفهم أقل لكيفية وصول أنظمة الذكاء الاصطناعي بشكل محدد إلى هذه القرارات. نقوم بتوضيح هذا التحليل من خلال تطبيقه على مثال لنظام يعتمد على الذكاء الاصطناعي، تم تطويره للاستخدام في علاج الإنتان. يوجد بخاتمة الورقة اقتراحات عملية لطرق المضي قدماً لتخفيف هذه المخاوف. نحن ندافع عن الحاجة لتضمين مطوري الذكاء الاصطناعي، ومهندسي سلامة النظام في تقييماتنا للمساءلة الأخلاقية تجاه الأذى الذي يلحق بالمرضى. وفي نفس الوقت، لا تفني أي من الجهات الفاعلة في هذا النموذج، بشكل فعال بالشروط التقليدية للمساءلة الأخلاقية عن القرارات التي يتخذها نظام الذكاء الاصطناعي. وبالتالي، يجب علينا تحديث ما لدينا من مفاهيم بشأن المساءلة الأخلاقية في هذا السياق. كما نحتاج كذلك إلى الانتقال من نموذج استاتيكي إلى نموذج ديناميكي للتأكيد، وقبل أن هذه الاعتبارات الخاصة بالسلامة ليست قابلة للحل بشكل كامل أثناء تصميم نظام الذكاء الاصطناعي، قبل نشر هذا النظام.

Publisher:

بما أن قرارات الأدوات السريرية التي قد يتخذها الذكاء الاصطناعي يمكن أن تضر المرضى، فإننا نحتاج إلى ضمان سلامة المرضى. نحن ندافع عن الحاجة لتضمين مطوري الذكاء الاصطناعي، ومهندسي سلامة النظام في تقييماتنا للمساءلة الأخلاقية تجاه الأذى الذي يلحق بالمرضى. وفي نفس الوقت، لا تفني أي من الجهات الفاعلة في هذا النموذج، بشكل فعال بالشروط التقليدية للمساءلة الأخلاقية عن القرارات التي يتخذها نظام الذكاء الاصطناعي. وبالتالي، يجب علينا تحديث ما لدينا من مفاهيم بشأن المساءلة الأخلاقية في هذا السياق. كما نحتاج كذلك إلى الانتقال من نموذج استاتيكي إلى نموذج ديناميكي للتأكيد، وقبل أن هذه الاعتبارات الخاصة بالسلامة ليست قابلة للحل بشكل كامل أثناء تصميم نظام الذكاء الاصطناعي، قبل نشر هذا النظام.

Publisher: Вероятность причинения вреда пациентам в результате принятия решений с помощью клинических инструментов, основанных на использовании искусственного интеллекта, пока что не учитывается в нынешних мировых практиках обеспечения прозрачности и безопасности. Авторы уделяют особое внимание двум аспектам применения искусственного интеллекта в клинической практике для принятия решений: моральной ответственности за вред, причиненный пациентам, и обеспечению безопасности для защиты пациентов от такого вреда. Инструменты, основанные на использовании искусственного интеллекта, бросают вызов стандартной клинической практике распределения ответственности и обеспечения безопасности. Лечащие врачи и инженеры по технике безопасности имеют небольшое влияние на решения, принимаемые с использованием систем искусственного интеллекта, и не обладают полными знаниями и пониманием тонкостей процесса принятия решений системами искусственного интеллекта. С целью наглядной демонстрации такого анализа авторы приводят пример системы на основе искусственного интеллекта, разработанной для использования при лечении сепсиса. В конце документа приводятся практические предложения по решению этих проблем. Авторы настаивают на необходимости включения разработчиков искусственного интеллекта и инженеров систем безопасности в процесс оценки моральной ответственности за вред, причиненный пациенту. Между тем ни один из участников модели полностью не удовлетворяет традиционным условиям, предъявляемым к моральной ответственности за решения, принимаемые системой искусственного интеллекта. В связи с этим необходимо пересмотреть понятие моральной ответственности в данном контексте. Требуется также перейти от статической к динамической модели обеспечения гарантий, признав, что невозможно полностью учесть соображения безопасности при разработке системы искусственного интеллекта до ее развертывания.

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Technological machines and artificial intelligence in nursing practice.

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This article is a theoretical discourse about technological machines and artificial intelligence, highlighting their effective interactive outcomes in nursing. One significant influence is technological efficiency which positively affects nursing care time, enabling nurses to focus more on their patients as the core of nursing. The article examines the impact of technology and artificial intelligence on nursing practice in this era of rapid technological advancements and technological dependence. Strategic opportunities in nursing are advanced, exemplified by robotics technology and artificial intelligence. A survey of recent literature focused on what is known about the influence of technology, healthcare robotics, and artificial intelligence on nursing in the contexts of industrialization, societal milieu, and human living environments. Efficient, precision-driven machines with artificial intelligence support a technology-centered society in which hospitals and healthcare systems become increasingly technology-dependent, impacting healthcare quality and patient care satisfaction. As a result, higher levels of knowledge, intelligence, and recognition of technologies and artificial intelligence are required for nurses to render quality nursing care. Designers of health facilities should be particularly aware of nursing's increasing dependence on technological advancements in their practice.

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Intelligence decline across major depressive disorder, bipolar disorder, and schizophrenia.

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BACKGROUND: Major depressive disorder (MDD), bipolar disorder (BD), and schizophrenia (SCZ) are associated with impaired intelligence that predicts poor functional outcomes. However, little is known regarding the extent and severity of intelligence decline, that is, decreased present intelligence quotient (IQ) relative to premorbid levels, across psychiatric disorders and which clinical characteristics affect the decline.

METHODS: Premorbid IQ, present IQ, and intelligence decline were compared across patients with MDD (n = 45), BD (n = 30), and SCZ (n = 139), and healthy controls (HCs; n = 135). Furthermore, we investigated which factors contribute to the intelligence decline in each diagnostic group.

RESULTS: Significant differences were observed in premorbid IQ, present IQ, and intelligence decline across the diagnostic groups. Patients with each psychiatric disorder displayed lower premorbid and present IQ and more intelligence decline than HCs. Patients with SCZ displayed lower premorbid and present IQ and more intelligence decline than patients with MDD and BD, while there were no significant differences between patients with MDD and BD. When patients with BD were divided based on bipolar I disorder (BD-I) and bipolar II disorder (BD-II), degrees of intelligence decline were similar between MDD and BD-II and between BD-I and SCZ. Lower educational attainment was correlated with a greater degree of intelligence decline in patients with SCZ and BD but not MDD.

CONCLUSIONS: These findings confirm that although all psychiatric disorders display intelligence decline, the severity of intelligence decline differs across psychiatric disorders (SCZ, BD-I > BD-II, MDD > HCs). Higher educational attainment as cognitive reserve contributes to protection against intelligence decline in BD and SCZ.

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167. Top Cogn Sci. 2019 Apr;11(2):374-392. doi: 10.1111/tops.12341. Epub 2018 Jun 13.

A Simple Computational Theory of General Collective Intelligence.

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Researchers have recently demonstrated that group performance across tasks tends to be correlated, motivating the use of a single metric for the general collective intelligence of groups akin to general intelligence metrics for individuals. High general collective intelligence is achieved when a group performs well across a wide variety of tasks. A number of factors have been shown to be predictive of general collective intelligence, but there is sparse formal theory explaining the presence of correlations across tasks, betraying a fundamental gap in our understanding of what general collective intelligence is measuring. Here, we formally argue that general collective intelligence arises from groups achieving commitment to group goals, accurate shared beliefs, and coordinated actions. We then argue for the existence of generic mechanisms that help groups achieve these cognitive alignment conditions. The presence or absence of such mechanisms can potentially explain observed correlations in group performance across tasks. Under our view, general collective intelligence can be conceived as measuring group performance on classes of tasks that have particular combinations of cognitive alignment requirements.

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168. Int J Epidemiol. 2016 Feb;45(1):178-85. doi: 10.1093/ije/dyv112. Epub 2015 Jul 26.

The association between intelligence and lifespan is mostly genetic.

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Comment in

Int J Epidemiol. 2016 Apr;45(2):578-9.

Int J Epidemiol. 2016 Apr;45(2):576-7.

BACKGROUND: Several studies in the new field of cognitive epidemiology have shown that higher intelligence predicts longer lifespan. This positive correlation might arise from socioeconomic status influencing both intelligence and health; intelligence leading to better health behaviours; and/or some shared genetic factors influencing both intelligence and health. Distinguishing among these hypotheses is crucial for medicine and public health, but can only be accomplished by studying a genetically informative sample.

METHODS: We analysed data from three genetically informative samples containing information on intelligence and mortality: Sample 1, 377 pairs of male veterans from the NAS-NRC US World War II Twin Registry; Sample 2, 246 pairs of twins from the Swedish Twin Registry; and Sample 3, 784 pairs of twins from the Danish Twin Registry. The age at which intelligence was measured differed between the samples. We used three methods of genetic analysis to examine the relationship between intelligence and lifespan: we calculated the proportion of the more intelligent twins who outlived their co-twin; we regressed within-twin-pair lifespan differences on within-twin-pair intelligence differences; and we used the resulting regression coefficients to model the additive genetic covariance. We conducted a meta-analysis of the regression coefficients across the three samples.

RESULTS: The combined (and all three individual samples) showed a small positive phenotypic correlation between intelligence and lifespan. In the combined sample observed $r = .12$ (95% confidence interval .06 to .18). The additive genetic covariance model supported a genetic relationship between intelligence and lifespan. In the combined sample the genetic contribution to the covariance was 95%; in the US study, 84%; in the Swedish study, 86%, and in the Danish study, 85%.

CONCLUSIONS: The finding of common genetic effects between lifespan and intelligence has important implications for public health, and for those interested in the genetics of intelligence, lifespan or inequalities in health outcomes including lifespan.

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Four attributes of intelligence, a thousand questions.

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Jeff Hawkins is one of those rare individuals who speaks the languages of both AI and neuroscience. In his recent book, "A Thousand Brains: A New Theory of Intelligence", Hawkins proposes that current learning algorithms lack four attributes which will be necessary for true machine intelligence. Here we demonstrate that a minimal learning system which satisfies all four points can be constructed using only simple, classical machine learning techniques. We illustrate that such a system falls short of biological intelligence in some

important ways. We suggest that Hawkins' list is a useful model, but the "recipe" for true intelligence-if there is one-may not be so easily defined.

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170. Dev Psychopathol. 2021 May;33(2):522-532. doi: 10.1017/S0954579420000693.

"Social policy and intelligence" Redux: a tribute to Edward Zigler.

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I present a theory of adaptive intelligence and discuss why I believe adaptive intelligence, rather than general intelligence, is the kind of intelligence upon which we should focus in today's world. Adaptive intelligence is the ability to adapt to, shape, and select real-world environments in ways that result in positive outcomes not only for oneself, but also for others and the world. Edward Zigler was among the first to recognize the importance of levels of adaptation to intellectual deficiency, arguing from early on that intellectual challenges needed to be recognized not just in terms of IQ but also in terms of adaptive functioning. Adaptive intelligence is compared to and contrasted with general intelligence, which is usually defined as the first factor in a factor analysis of psychometric tests. I first introduce the main issues in the article. Then I discuss how one even would decide what intelligence is. Next I discuss broader theories of intelligence and especially the theory of adaptive intelligence. Then I talk about the perishability of theories of intelligence and other things-to what extent are they set up so that people are willing and able to move beyond them? Finally, I discuss how individual outcomes do not necessarily predict collective outcomes.

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Intelligence-Augmented Rat Cyborgs in Maze Solving.

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Cyborg intelligence is an emerging kind of intelligence paradigm. It aims to deeply integrate machine intelligence with biological intelligence by connecting machines and living beings via neural interfaces, enhancing strength by

combining the biological cognition capability with the machine computational capability. Cyborg intelligence is considered to be a new way to augment living beings with machine intelligence. In this paper, we build rat cyborgs to demonstrate how they can expedite the maze escape task with integration of machine intelligence. We compare the performance of maze solving by computer, by individual rats, and by computer-aided rats (i.e. rat cyborgs). They were asked to find their way from a constant entrance to a constant exit in fourteen diverse mazes. Performance of maze solving was measured by steps, coverage rates, and time spent. The experimental results with six rats and their intelligence-augmented rat cyborgs show that rat cyborgs have the best performance in escaping from mazes. These results provide a proof-of-principle demonstration for cyborg intelligence. In addition, our novel cyborg intelligent system (rat cyborg) has great potential in various applications, such as search and rescue in complex terrains.

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More than just emotional intelligence online: introducing "digital emotional intelligence".

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The ubiquitous nature of emotional intelligence, as a central theme in every aspect of our lives-be it at work, school, or home-coupled with the growing prevalence of digital interactions, makes it fundamental to develop our understanding of emotional intelligence in a digital world. However, the digital world represents more than just a contextual factor to consider, as interactions in digital environments require digital competence. The objective of this paper is to conceptualize "digital emotional intelligence" as the integration of both emotional intelligence and digital competence. The model we propose posits that trait emotional intelligence predicts attitudes toward digital competence, while digital ability emotional intelligence is predicted by digital competence skills and digital competence knowledge. Using a self-reported questionnaire on 503 respondents, a structural equation model highlights a positive relationship between trait emotional intelligence and attitudes toward digital competence.

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173. Front Psychol. 2019 Jun 6;10:1231. doi: 10.3389/fpsyg.2019.01231. eCollection 2019.

The Discrepancy of Parents' Theories of Intelligence and Parental Involvement.

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In families, mothers and fathers may hold the same or different levels of theories of intelligence. This congruence and discrepancy may influence parental involvement in children's education. The current study examined how both parents' theories of intelligence and the direction and degree of the discrepancy of parents' intelligence theories influence maternal and paternal involvement separately. We measured 1,694 matched pairs of parents' theories of intelligence and educational involvement, and examined the relationships using linear regressions and polynomial regressions with response surface analysis. The results showed that (1) the mother's intelligence theory positively related to both paternal involvement and maternal involvement, but the father's intelligence theory only positively related to paternal involvement; (2) when the parents' theories of intelligence reached congruence, the parents' theories of intelligence are positively related to both maternal and paternal involvement; (3) when the parents' theories of intelligence have discrepancy, the maternal involvement is higher while the mother's intelligence theory's level is more incremental than father's; and (4) when the parents' theories of intelligence have discrepancy, more discrepancy of parents' theories of intelligence is related to more paternal involvement. This study revealed the significance of mother's role in education, highlighted the importance of parents' congruence and discrepancies in beliefs, examined how parents' beliefs impact their own behavior and their couple's behavior.

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174. Behav Processes. 2017 Aug;141(Pt 2):141-151. doi: 10.1016/j.beproc.2016.10.005. Epub 2016 Oct 11.

Swarm intelligence in fish? The difficulty in demonstrating distributed and self-organised collective intelligence in (some) animal groups.

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Larger groups often have a greater ability to solve cognitive tasks compared to smaller ones or lone individuals. This is well established in social insects, navigating flocks of birds, and in groups of prey collectively vigilant for predators. Research in social insects has convincingly shown that improved cognitive performance can arise from self-organised local interactions between individuals that integrates their contributions, often referred to as swarm intelligence. This emergent collective intelligence has gained in popularity and been directly applied to groups of other animals, including fish. Despite being a likely mechanism at least partially explaining group performance in vertebrates, I argue here that other possible explanations are rarely ruled out in empirical studies. Hence, evidence for self-organised collective (or 'swarm') intelligence in fish is not as strong as it would first appear. These other explanations, the 'pool-of-competence' and the greater cognitive ability of individuals when in larger groups, are also reviewed. Also discussed is why improved group performance in general may be less often observed in animals such as shoaling fish compared to social insects. This review intends to highlight the difficulties in exploring collective intelligence in animal groups, ideally leading to further empirical work to illuminate these issues.

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Early-Life Intelligence Predicts Midlife Biological Age.

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OBJECTIVES: Early-life intelligence has been shown to predict multiple causes of death in populations around the world. This finding suggests that intelligence might influence mortality through its effects on a general process of physiological deterioration (i.e., individual variation in "biological age"). We examined whether intelligence could predict measures of aging at midlife before

the onset of most age-related disease.

METHODS: We tested whether intelligence assessed in early childhood, middle childhood, and midlife predicted midlife biological age in members of the Dunedin Study, a population-representative birth cohort.

RESULTS: Lower intelligence predicted more advanced biological age at midlife as captured by perceived facial age, a 10-biomarker algorithm based on data from the National Health and Nutrition Examination Survey (NHANES), and Framingham heart age ($r = 0.1-0.2$). Correlations between intelligence and telomere length were less consistent. The associations between intelligence and biological age were not explained by differences in childhood health or parental socioeconomic status, and intelligence remained a significant predictor of biological age even when intelligence was assessed before Study members began their formal schooling.

DISCUSSION: These results suggest that accelerated aging may serve as one of the factors linking low early-life intelligence to increased rates of morbidity and mortality.

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How Approaches to Animal Swarm Intelligence Can Improve the Study of Collective Intelligence in Human Teams.

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Researchers of team behavior have long been interested in the essential components of effective teamwork. Much existing research focuses on examining correlations between team member traits, team processes, and team outcomes, such as collective intelligence or team performance. However, these approaches are insufficient for providing insight into the dynamic, causal mechanisms through which the components of teamwork interact with one another and impact the emergence of team outcomes. Advances in the field of animal behavior have enabled a precise understanding of the behavioral mechanisms that enable groups to perform feats that surpass the capabilities of the individuals that comprise them. In this manuscript, we highlight how studies of animal swarm intelligence can inform research on collective intelligence in human teams. By improving the ability to obtain precise, time-varying measurements of team behaviors and outcomes and building upon approaches used in studies of swarm intelligence to analyze and model individual and group-level behaviors, researchers can gain insight into the mechanisms underlying the emergence of collective intelligence. Such understanding could inspire targeted interventions to improve team effectiveness and support the development of a comparative framework of group-level intelligence in animal and human groups.

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Linking Brain Biology to Intellectual Endowment: A Review on the Associations of Human Intelligence With Neuroimaging Data.

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Human intelligence has always been a fascinating subject for scientists. Since the inception of Spearman's general intelligence in the early 1900s, there has been significant progress towards characterizing different aspects of intelligence and its relationship with structural and functional features of the brain. In recent years, the invention of sophisticated brain imaging devices using Diffusion-Weighted Imaging (DWI) and functional Magnetic Resonance Imaging (fMRI) has allowed researchers to test hypotheses about neural correlates of intelligence in humans. This review summarizes recent findings on the associations of human intelligence with neuroimaging data. To this end, first, we review the literature that has related brain morphometry to intelligence. Next, we elaborate on the applications of DWI and restingstate fMRI on the investigation of intelligence. Then, we provide a survey of literature that has used multimodal DWI-fMRI to shed light on intelligence. Finally, we discuss the state-of-the-art of individualized prediction of intelligence from neuroimaging data and point out future strategies. Future studies hold promising outcomes for machine learning-based predictive frameworks using neuroimaging features to estimate human intelligence.

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178. Expert Rev Pharmacoecon Outcomes Res. 2021 Aug;21(4):601-623. doi: 10.1080/14737167.2021.1886083. Epub 2021 Feb 17.

Artificial intelligence in outcomes research: a systematic scoping review.

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Introduction: Despite the number of systematic reviews of how artificial intelligence is being used in different areas of medicine, there is no study on the scope of artificial intelligence methods used in outcomes research, the cornerstone of health technology assessment (HTA). This systematic scoping review aims to systematically capture the scope of artificial intelligence methods used in outcomes research to enhance decision-makers' knowledge and broaden perspectives for health technology assessment and adoption.Areas covered: The review identified 370 studies, consisted of artificial intelligence methods applied to adult patients who underwent any health/medical intervention and reported therapeutic, preventive, or prognostic outcomes. Artificial intelligence was mainly used for the prediction/prognosis of more frequently reported outcomes, efficacy/effectiveness, among morbidity outcomes. The predictive analysis was common in neoplastic disorders. Neural networks algorithm was predominantly found in surgical method studies, but a mixture of artificial intelligence algorithms was applied to the studies with the rest of the interventions.Expert opinion: There are certain gaps in artificial intelligence applications used in outcomes research across therapeutic areas and further considerations are needed by decision-makers before incorporating artificial intelligence usage into HTA decision-making processes.

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179. Lang Semiot Stud. 2023 Mar 28;9(1):1-13. doi: 10.1515/lass-2022-0006. Epub 2023 Jan 19.

The main tasks of a semiotics of artificial intelligence.

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The article indicates the essential tasks of a semiotics of artificial intelligence: studying the way it simulates the expression of intelligence; the way it produces content that is creatively endowed; the ideological assumptions of artificial intelligence within the culture that produces it. Artificial intelligence is, from a semiotic point of view, the predominant technology of fakery in the current era. On the strength of its studies on the false, semiotics can therefore also be applied to the analysis of the fake that, in increasingly sophisticated forms, is produced through artificial intelligence and through the deep learning of neural networks. The article focuses on the adversarial ones, trying to highlight their ideological assumptions and cultural developments, which seem to indicate the entry of human societies and cultures into the 'realm of the absolute fake'.

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180. J Exp Psychol Gen. 2021 Apr;150(4):609-632. doi: 10.1037/xge0000958. Epub 2020 Oct 29.

Intelligence and creativity share a common cognitive and neural basis.

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Are intelligence and creativity distinct abilities, or do they rely on the same cognitive and neural systems? We sought to quantify the extent to which intelligence and creative cognition overlap in brain and behavior by combining machine learning of fMRI data and latent variable modeling of cognitive ability data in a sample of young adults (N = 186) who completed a battery of intelligence and creative thinking tasks. The study had 3 analytic goals: (a) to assess contributions of specific facets of intelligence (e.g., fluid and crystallized intelligence) and general intelligence to creative ability (i.e., divergent thinking originality), (b) to model whole-brain functional connectivity networks that predict intelligence facets and creative ability, and (c) to quantify the degree to which these predictive networks overlap in the brain. Using structural equation modeling, we found moderate to large correlations between intelligence facets and creative ability, as well as a large correlation between general intelligence and creative ability ($r = .63$). Using connectome-based predictive modeling, we found that functional brain networks that predict intelligence facets overlap to varying degrees with a network that predicts creative ability, particularly within the prefrontal cortex of the executive control network. Notably, a network that predicted general intelligence shared 46% of its functional connections with a network that predicted creative ability—including connections linking executive control and salience/ventral attention networks—suggesting that intelligence and creative thinking rely on similar neural and cognitive systems. (PsycInfo Database Record (c) 2021 APA, all rights reserved).

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181. Psychol Res Behav Manag. 2022 Dec 30;15:3901-3913. doi: 10.2147/PRBM.S396469. eCollection 2022.

Emotional Intelligence: Emotional Expression and Emotional Regulation for Intrinsic and Extrinsic Emotional Satisfaction.

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PURPOSE: Theorists have constructed emotional intelligence differently, based on which the literature reveals different diversified scales to measure emotional intelligence. These scales are quite lengthy to respond and have been criticized for producing varying results. The current paper projects the findings of 3 consecutive studies carried out to summarize and simplify the existing models of emotional intelligence and to produce a brief measure in this regard.

METHODS: Based on the review of the earlier models of emotional intelligence, emotional intelligence was comprehended as an "ability to express and regulate emotions for intrinsic and extrinsic emotional satisfaction". "Emotional Intelligence Scale (EIS)", comprising 12 items in English, was developed and validated through principal component analysis, exploratory factor analysis, and confirmatory factor analysis through a series of 3 consecutive studies which involved 1894 participants from Pakistan. The validity of EIS was tested step by step for its face, content, factorial, convergent, and discriminant validity. The reliability was measured through internal consistency and item-total and item-scale correlations.

RESULTS: EIS was revealed to be a valid and reliable scale to measure emotional intelligence through 4 core factors, ie, emotional expression, emotional regulation, intrinsic emotional satisfaction, and extrinsic emotional satisfaction. The additional findings revealed significantly higher levels of emotional intelligence among men as compared to women; significantly positive correlation of emotional intelligence with social intelligence, positive emotional effects, age, and education; and a significantly inverse correlation between emotional intelligence and the negative emotional effects.

CONCLUSION: The current paper reported the development and validation of a new scale on emotional intelligence by comprehending and summarizing the earlier models of emotional intelligence.

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A New Layered Model on Emotional Intelligence.

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Emotional Intelligence (EI) has been an important and controversial topic during the last few decades. Its significance and its correlation with many domains of life has made it the subject of expert study. EI is the rudder for feeling, thinking, learning, problem-solving, and decision-making. In this article, we present an emotional-cognitive based approach to the process of gaining emotional intelligence and thus, we suggest a nine-layer pyramid of emotional

intelligence and the gradual development to reach the top of EI.

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Intelligence as a Developing Function: A Neuroconstructivist Approach.

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The concept of intelligence encompasses the mental abilities necessary to survival and advancement in any environmental context. Attempts to grasp this multifaceted concept through a relatively simple operationalization have fostered the notion that individual differences in intelligence can often be expressed by a single score. This predominant position has contributed to expect intelligence profiles to remain substantially stable over the course of ontogenetic development and, more generally, across the life-span. These tendencies, however, are biased by the still limited number of empirical reports taking a developmental perspective on intelligence. Viewing intelligence as a dynamic concept, indeed, implies the need to identify full developmental trajectories, to assess how genes, brain, cognition, and environment interact with each other. In the present paper, we describe how a neuroconstructivist approach better explains why intelligence can rise or fall over development, as a result of a fluctuating interaction between the developing system itself and the environmental factors involved at different times across ontogenesis.

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Does industrial intelligence improve resource misallocation? An empirical test based on China.

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Resource misallocation has become a new threat to China's high-quality economic development, and industrial intelligence may play an important role in optimizing resource allocation. Using panel data of 30 Chinese provinces from 2010 to 2020, the relationship between industrial intelligence and resource misallocation is studied using the spatial Durbin (SDM) model. To further explore the indirect effect of environmental pollution on resource misallocation, the interaction term between industrial intelligence and environmental pollution is added to test how environmental pollution affects the relationship between industrial intelligence and resource. The research results show that industrial intelligence in China has significant spatial correlation. Local industrial intelligence can improve the local resource allocation, but the intelligence of neighboring industries will intensify the resource misallocation in the region. The interaction between environmental pollution and industrial intelligence also further affects resource allocation, and the interaction term can intensify local capital allocation to improve local labor allocation, and the interaction term in the surrounding area will also improve capital and labor misallocation in the region. Heterogeneous results find that industrial intelligence exacerbates resource misallocation in regions with insufficient capital allocation, and the mediating effect of environmental pollution is not significant. However, in places with excess capital allocation, the development of industrial intelligence helps improve resource misallocation, while the mediating effect of environmental pollution is also present, and industrial intelligence can improve resource misallocation through the indirect effect of improving environmental pollution. Therefore, the policies of local industrial development policies need to fully consider the resource allocation situation in the region. At the same time, it needs to smooth the capital circulation mechanism, reduce the cost of capital allocation, establish a sound employment mechanism, and improve labor misallocation.

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Emotional Intelligence in Carriers of Different COMT, BDNF, DRD2 and HTR2A Genotypes.

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BACKGROUND: Emotional intelligence is the ability to quickly and correctly recognize the emotional expressions of other people and to express and manage one's own emotions. It contributes to the success of a person in activities related to communication and interaction with people. Emotional intelligence has been studied largely in the context of organizational and education psychology, but less is known about the influence of genetics on it.

OBJECTIVE: We aim to study emotional intelligence in carriers of different COMT, BDNF, DRD2, and HTR2A genotypes.

DESIGN: We used three methods to measure emotional intelligence.

Mayer-Salovey-Caruso Emotional Intelligence Test is a set of tasks with forced choice and frequency-based correct responses. We also applied two self-report questionnaires by Lyusin and Hall. We recruited 280 participants who took part in all three measures. We also identified their genotypes of the COMT, BDNF, DRD2, and HTR2A genes.

RESULTS: Carriers of the Val/Met genotype of the COMT gene, A/A genotype of the HTR2A gene and C/C genotype of the DRD2 gene showed the highest level of emotional intelligence, while no differences were found between carriers of the BDNF genotypes. These data were obtained by using the Mayer-Salovey-Caruso Emotional Intelligence Test. Self-report scores of emotional intelligence did not differ between carriers of different genotypes across all four of the genes in question.

CONCLUSION: Mayer-Salovey-Caruso Emotional Intelligence Test scores were differed for carriers of some genotypes, whereas self-reported emotional intelligence scores did not differ between according to genotype.

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Extraordinary intelligence and the care of infants.

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Comment in

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Comment on

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We present evidence that pressures for early childcare may have been one of the driving factors of human evolution. We show through an evolutionary model that runaway selection for high intelligence may occur when (i) altricial neonates require intelligent parents, (ii) intelligent parents must have large brains, and (iii) large brains necessitate having even more altricial offspring. We test a prediction of this account by showing across primate genera that the helplessness of infants is a particularly strong predictor of the adults' intelligence. We discuss related implications, including this account's ability to explain why human-level intelligence evolved specifically in mammals. This theory complements prior hypotheses that link human intelligence to social reasoning and reproductive pressures and explains how human intelligence may have become so distinctive compared with our closest evolutionary relatives.

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Associations between workplace emotional intelligence and micro expression recognition.

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We investigated relationships between emotional intelligence, micro expression recognition and professional performance in two pre-registered cross-sectional studies. Study 1 (N = 86) explored the relationship between micro expression recognition, emotional intelligence and self-reported subjective professional performance and interpersonal skills in an online sample. Study 2 (N = 125) also utilized an online study to determine if there are differences in micro expression recognition and emotional intelligence between two employment sectors proposed to involve differing levels of 'emotional labor', namely software development and retail. Results of Study 1 showed a positive association between emotional intelligence and micro expression recognition. There were no associations of micro expression recognition with interpersonal skills or professional performance. Study 2 replicated the association between emotional intelligence and micro expression recognition, but provided no evidence for differences in emotional intelligence between retail and software development workers. Retail workers showed marginally higher scores on micro expression recognition. There was also no association of micro expression recognition with self-estimated professional performance, regardless of the participants' profession. The findings indicate that micro expression recognition may be closely related to emotional intelligence, but that it may also have a separate component, which may differ across different professions.

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Conflict of interest statement: Declaration of competing interest Ian Penton-Voak is a co-director of Jericoe Ltd. a company that designs and sells software for psychological assessment. Kasia Wezowski is the co-founder of the Center for Body Language where she gives training and coaching. Both declare that they are acting to the best of their knowledge and are sincerely interested in the findings, whatever they may be.

188. PeerJ. 2019 Oct 21;7:e7891. doi: 10.7717/peerj.7891. eCollection 2019.

Threshold-like associations as a function of disturbance.

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According to the intelligence-creativity threshold hypothesis, there should be a positive association between intelligence and creative potential up to a certain point, the threshold, after which a further increase in intelligence should have no association with creativity. In the present simulation study, the measured intelligence and creativity of virtual subjects were affected by their true abilities as well as a disturbance factor that varied in magnitude between subjects. The results indicate that the hypothesized threshold-like association could be due to some disturbing factor, for example, low motivation, illness, or linguistic confusion, that varies between individuals and that affects both measured intelligence and measured creativity, especially if the actual association between intelligence and creativity is weak. This, together with previous negative findings, calls the validity of the intelligence-creativity threshold hypothesis into question.

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Challenges of Radiology education in the era of artificial intelligence.

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Artificial intelligence is a branch of computer science that is generating great expectations in medicine and particularly in radiology. Artificial intelligence will change not only the way we practice our profession, but also the way we teach it and learn it. Although the advent of artificial intelligence has led some to question whether it is necessary to continue training radiologists, there seems to be a consensus in the recent scientific literature that we should continue to train radiologists and that we should teach future radiologists about artificial intelligence and how to exploit it. The acquisition of competency in artificial intelligence should start in medical school, be

consolidated in residency programs, and be maintained and updated during continuing medical education. This article aims to describe some of the challenges that artificial intelligence can pose in the different stages of training in radiology, from medical school through continuing medical education.

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190. Cereb Cortex. 2022 Jul 12;32(14):3098-3109. doi: 10.1093/cercor/bhab403.

The ABCD Study: Brain Heterogeneity in Intelligence During a Neurodevelopmental Transition Stage.

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A complex curvilinear relationship exists between intelligence and age during the neurodevelopment of cortical thickness. To parse out a more fine-grained relationship between intelligence and cortical thickness and surface area, we used a large-scale data set focusing on a critical transition juncture in neurodevelopment in preadolescence. Cortical thickness was derived from T1-weighted structural magnetic resonance images of a large sample of 9- and 11-year-old children from the Adolescent Brain Cognitive Development study. The NIH Toolbox Cognition Battery composite scores, which included fluid, crystallized, and total scores, were used to assess intelligence. Using a double generalized linear model, we assessed the independent association between the mean and dispersion of cortical thickness/surface area and intelligence. Higher intelligence in preadolescents was associated with higher mean cortical thickness in orbitofrontal and primary sensory cortices but with lower thickness in the dorsolateral and medial prefrontal cortex and particularly in the rostral anterior cingulate. The rostral anterior cingulate findings were particularly evident across all subscales of intelligence. Higher intelligence was also associated with greater interindividual similarity in the rostral cingulate. Intelligence during this key transition juncture in preadolescence appears to reflect a dissociation between the cortical development of basic cognitive processes and higher-order executive and motivational processes.

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An architectural approach to modeling artificial general intelligence.

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This study presents an architectural approach for building a conceptual model of artificial general intelligence (AGI). The architectural approach is generally used to model information systems (IS) of enterprises and can be also used as part of a system-wide approach to describe other complex open systems. The paper suggests three layers and five levels of the AGI model. Two levels (entropy and process) are at the technological layer of AI functioning, two more levels (social and linguistic ones) are at the relationship layer responsible for the behavior of AI, and, finally, the uppermost level (actualization) supposes general intelligence. All the components of each upper layer are connected to the components of the lower layers forming the AGI model. The feature of the social layer is determined by the requirements to the subjectivity of the intellect, its ability to make decisions independently and be responsible for them. The task of the upper layer is self-identification of AGI and understanding its place. The hypothesis has been put forward that the limitation of the life cycle is an important condition for the actualization of intelligence.

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Adult Intelligence: The Construct and the Criterion Problem.

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Over 100 years have passed since Binet and Simon proposed scales for assessment of intelligence of children to predict academic success and failure. The extension of these assessments to adults largely resulted from efforts of psychologists to provide insights for military selection in World War I. At the time, relatively little thought was given to how adult intelligence might differ from child and adolescent intelligence. Traditional approaches for assessing adult intelligence have largely survived. However, there is little reference to adult intellectual functioning outside of laboratory-based tasks and clinical assessments of pathology. The result is that there are insufficient criterion measures for adult intelligence. Moreover, researchers have shifted from

treating intelligence tests as predictors to treating them as criterion measures. The result is a disconnection between basic research on one hand and understanding adult intelligence on the other hand. This lack of connection is a serious impediment for predicting individual differences in performance on tasks which adults perform in their day-to-day work and nonwork lives. This article explores how the field has come to the current situation, and what remedies might be explored. Ultimately, a fundamental reexamination of how adult intelligence is studied and applied is suggested.

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Momentary fluctuations in emotional intelligence and stress predict changes in disordered eating.

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Objective: Low emotional intelligence and symptoms of disordered eating are connected, however, whether daily fluctuations in emotional intelligence predict daily changes in disordered eating symptoms has not been examined, nor has stress been explored as a potential moderator of this relationship.

Participants: Participants were undergraduate students (n=100). Methods: Participants completed baseline questionnaires, then responded to random ecological momentary assessment prompts 3 times daily for 2 weeks. Results: Results indicated that when individuals had higher momentary emotional intelligence, they had lower disordered eating at the same time point (within subjects estimate = -0.30, $p < .001$) and following time point (within subjects estimate = -0.08, $p = 0.03$). Momentary stress moderated the relationship between baseline emotional intelligence and momentary disordered eating ($b = -0.02$, $p < .01$). Conclusions: Changes in emotional intelligence predict day-to-day changes in disordered eating, and stress moderates the connection between emotional intelligence and disordered eating.

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Indirect Self-Destructiveness and Emotional Intelligence.

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While emotional intelligence may have a favourable influence on the life and psychological and social functioning of the individual, indirect self-destructiveness exerts a rather negative influence. The aim of this study

has been to explore possible relations between indirect self-destructiveness and emotional intelligence. A population of 260 individuals (130 females and 130 males) aged 20-30 (mean age of 24.5) was studied by using the Polish version of the chronic self-destructiveness scale and INTE, i.e., the Polish version of the assessing emotions scale. Indirect self-destructiveness has significant correlations with all variables of INTE (overall score, factor I, factor II), and these correlations are negative. The intensity of indirect self-destructiveness differentiates significantly the height of the emotional intelligence and vice versa: the height of the emotional intelligence differentiates significantly the intensity of indirect self-destructiveness. Indirect self-destructiveness has negative correlations with emotional intelligence as well as its components: the ability to recognize emotions and the ability to utilize emotions. The height of emotional intelligence differentiates the intensity of indirect self-destructiveness, and vice versa: the intensity of indirect self-destructiveness differentiates the height of emotional intelligence. It seems advisable to use emotional intelligence in the prophylactic and therapeutic work with persons with various types of disorders, especially with the syndrome of indirect self-destructiveness.

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[Otolaryngology head and neck surgery in the age of artificial intelligence].

[Article in Chinese]

Qi J, Zhang L.

Artificial intelligence, as the forefront of science and technology, has been emerging in all walks of life, and has now become the main research direction of medical care. Many researchers have begun to research and develop this technology, and will use this technology to help clinical work. Due to otolaryngology head and neck surgery as a minimally invasive surgery with complex anatomy, artificial intelligence is bound to play a crucial role in otolaryngology. With the development of 5G network, artificial intelligence will develop with double force.

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Intelligence and Creativity: Mapping Constructs on the Space-Time Continuum.

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This theoretical article proposes a unified framework of analysis for the constructs of intelligence and creativity. General definitions for intelligence and creativity are provided, allowing fair comparisons between the two context-embedded constructs. A novel taxonomy is introduced to classify the contexts in which intelligent and/or creative behavior can be embedded, in terms of the tightness vs. looseness of the relevant conceptual space *S* and available time *T*. These two dimensions are used to form what is identified as the space-time continuum, containing four quadrants: tight space and tight time, loose space and tight time, tight space and loose time, loose space and loose time. The intelligence and creativity constructs can be mapped onto the four quadrants and found to overlap more or less, depending on the context characteristics. Measurement methodologies adapted to the four different quadrants are discussed. The article concludes with a discussion about future research directions based on the proposed theoretical framework, in terms of theories and hypotheses on intelligence and creativity, of eminent personalities and personality traits, as well as its consequences for developmental, educational, and professional environments.

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Lay representations of artificial intelligence and autonomous military machines.

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This study is about how lay persons perceive and represent artificial intelligence in general as well as its use in weaponised autonomous ground vehicles in the military context. We analysed the discourse of six focus groups in Estonia, using an automatic text analysis tool and complemented the results by a qualitative thematic content analysis. The findings show that representations of artificial intelligence-driven machines are anchored in the image of man. A cluster analysis revealed five dominant themes: artificial intelligence as programmed machines, artificial intelligence and the problem of control, artificial intelligence and its relation to human life, artificial intelligence used in wars and ethical problems in developing autonomous weaponised machines. The findings are discussed with regard to people's tendency

to anthropomorphise robots despite their lack of emotions, which can be seen as a last resort when confronting an autonomous machine where the usual interpersonal understanding of intentions does not apply.

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Education, intelligence and Alzheimer's disease: evidence from a multivariable two-sample Mendelian randomization study.

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OBJECTIVES: To examine whether educational attainment and intelligence have causal effects on risk of Alzheimer's disease (AD), independently of each other. **DESIGN:** Two-sample univariable and multivariable Mendelian randomization (MR) to estimate the causal effects of education on intelligence and vice versa, and the total and independent causal effects of both education and intelligence on AD risk.

PARTICIPANTS: 17 008 AD cases and 37 154 controls from the International Genomics of Alzheimer's Project (IGAP) consortium.

MAIN OUTCOME MEASURE: Odds ratio (OR) of AD per standardized deviation increase in years of schooling (SD=3.6years) and intelligence (SD = 15 points on intelligence test).

RESULTS: There was strong evidence of a causal, bidirectional relationship between intelligence and educational attainment, with the magnitude of effect being similar in both directions [OR for intelligence on education = 0.51 SD units, 95% confidence interval (CI): 0.49, 0.54; OR for education on intelligence = 0.57 SD units, 95% CI: 0.48, 0.66]. Similar overall effects were observed for both educational attainment and intelligence on AD risk in the univariable MR analysis; with each SD increase in years of schooling and intelligence, odds of AD were, on average, 37% (95% CI: 23-49%) and 35% (95% CI: 25-43%) lower, respectively. There was little evidence from the multivariable MR analysis that educational attainment affected AD risk once intelligence was taken into account (OR=1.15, 95% CI: 0.68-1.93), but intelligence affected AD risk independently of educational attainment to a similar magnitude observed in the univariate analysis (OR=0.69, 95% CI: 0.44-0.88).

CONCLUSIONS: There is robust evidence for an independent, causal effect of intelligence in lowering AD risk. The causal effect of educational attainment on

AD risk is likely to be mediated by intelligence.

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Criterion-Referenced Assessment of Intelligence as Adaptation to the Environment: Is It Possible, Plausible, or Practical?

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Criterion-referenced testing is usually applied to the assessment of achievement. In this article, we suggest how it can also be applied to the assessment of adaptive intelligence, that is, intelligence as adaptation to the environment. In the era of the Anthropocene, we argue that adaptive intelligence is what is most important not only for individual success, but also for success in terms of preservation of the world as we know it. We define criterion-referenced testing and compare it to norm-referenced testing. We then discuss two kinds of scoring of criterion-referenced testing, namely, with respect to external criteria and with respect to internal (theory-based) criteria. We then discuss past research on intelligence that could be viewed as criterion-referenced. Finally, we suggest how criterion-referencing could be applied to the assessment of adaptive intelligence.

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200. RETRACTED ARTICLE

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Rehabilitation Treatment of Muscle Strain in Athlete Training under Intelligent Intervention.

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Retraction in

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With the development of artificial intelligence technology in the medical field, clinical trials using artificial intelligence as an intervention method are constantly emerging. This article mainly introduces the intervention of artificial intelligence and emotional intelligence on the rehabilitation of athletes' muscle strains. Among them, artificial intelligence and emotional intelligence are a brand-new nursing intervention method. This article compares conventional rehabilitation therapy with these two new types of intelligent interventions to explore the effects of artificial intelligence intervention and emotional intelligence intervention in the rehabilitation of athletes. The experimental results show that the average number of muscle restrains under the intervention of artificial intelligence is 4.1 times, the average restrain rate of muscles is 27.7%, and the average recovery degree of athletes is 94.7%. The average SPB score under emotional intelligence intervention was 56 points. Artificial intelligence interventions can enhance rehabilitation through advanced technology, and emotional intelligence interventions can provide emotional support to effectively improve treatment outcomes and quality of life.

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