

Pattern-based formulation: a methodology for psychiatric case formulation

Irosh Fernando, Martin Cohen and Frans Henskens

Australas Psychiatry 2012 20: 121 originally published online 28 March 2012

DOI: 10.1177/1039856212437255

The online version of this article can be found at:

<http://apy.sagepub.com/content/20/2/121>

Published by:



<http://www.sagepublications.com>

On behalf of:



[The Royal Australian and New Zealand College of Psychiatrists](http://www.ranzcp.org)

Additional services and information for *Australasian Psychiatry* can be found at:

Email Alerts: <http://apy.sagepub.com/cgi/alerts>

Subscriptions: <http://apy.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

>> [Version of Record](#) - Apr 23, 2012

[OnlineFirst Version of Record](#) - Mar 28, 2012

[What is This?](#)

Pattern-based formulation: a methodology for psychiatric case formulation

Australasian Psychiatry
20(2) 121–126
© The Royal Australian and
New Zealand College of Psychiatrists 2012
Reprints and permission: [sagepub.co.uk/
journalsPermissions.nav](http://sagepub.co.uk/journalsPermissions.nav)
DOI: 10.1177/1039856212437255
apy.sagepub.com



Irosh Fernando Staff Specialist Psychiatrist, Gosford Mental Health Centre, Gosford Hospital, Central Coast Local Health District, Gosford, NSW, Australia; PhD candidate, School of Electrical Engineering and Computer Science, University of Newcastle, Callaghan, NSW, Australia

Martin Cohen Director of Training and Staff Specialist Psychiatrist, The Mater Hospital, Hunter New England Area Health Service, Waratah, NSW, and Conjoint Senior Lecturer, School of Medicine and Public Health, University of Newcastle, Callaghan, NSW, Australia

Frans Henskens Associate Professor and Assistant Dean IT, Faculty of Engineering and Built Environment, and Deputy Head, School of Electrical Engineering and Computer Science, University of Newcastle, Callaghan, NSW, Australia

Abstract

Objective: Psychiatric formulation is often considered a challenging task, particularly for trainees and students in psychiatry. The process of arriving at a good psychiatric formulation involves identifying major issues of the patient, and developing an explanatory system, which can be derived using known theoretical models in psychiatry. A good explanatory system should provide a high degree of coherence by linking the most relevant data, justification for the proposed management plan, and its feasibility. Unfortunately, the literature on ‘how’ to develop psychiatric formulation is limited, and for the trainees, psychiatric formulation remains a challenging task.

Method: Based on the clinical reasoning strategy known as pattern recognition, a methodology for psychiatric case formulation has been proposed. The methodology uses a repository of templates, which are derived from major theoretical models in psychiatry. Developing a formulation involves a process of selecting, prioritising and combining templates according to the elicited set of main issues or psychopathology. The pattern resulting from the combination of different templates provides a degree of uniqueness to the explanatory system.

Conclusion: It is expected that this methodology will help trainees and students to develop a broader understanding and skills in psychiatric formulation.

Keywords: case formulation, formulation methodology, pattern recognition

In psychiatry, the term ‘formulation’ tends to have different meanings, as it has been described in relation to many different perspectives. Often, it has been described from the perspective of a particular psychotherapy model, for example psychodynamic psychotherapy,^{1–3} cognitive behavioural therapy (CBT),^{4,5} interpersonal psychotherapy⁶ and dialectical behaviour therapy.⁷ These models have often served as the basis for planning the therapy.^{8,9} Also, formulation has often been described in terms of a broader bio-psychosocial perspective,^{10–12} or a comprehensive overview of the case.¹³

From the perspective of the Fellowship examination, the Royal Australian and New Zealand College of Psychiatrists (RANZCP) has defined psychiatric formulation as a set of explanatory hypotheses that answer the question: ‘Why does this patient suffer from these problems at this point in time?’ Based on this definition, candidates are expected to demonstrate a sophisticated understanding

of the patient as a unique individual, by highlighting the linkages between different aspects of the case.¹⁴

Unarguably, the skills required to formulate or conceptualise a patient are considered one of the highly important set of skills acquired, and are continuously refined throughout one’s psychiatry career. Good formulation skills demonstrate the ability to integrate and dynamically apply the acquired knowledge to various practical situations. From the perspective of learning and education theories, formulation skills reflect higher-order thinking, which encompasses the abilities to understand, apply, analyse and synthesise knowledge,¹⁵ that are acquired during psychiatric training.

Correspondence:

Dr Irosh Fernando, Gosford Mental Health Centre, Gosford Hospital, Holden Street, Gosford, NSW, 2250, Australia
Email: ifernando@nsccha.health.nsw.gov.au, irosh.fernando@uon.edu.au

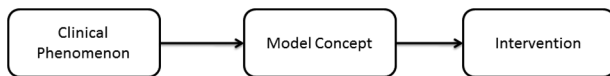


Figure 1: A template for case formulation

Unfortunately, the literature on psychiatric formulation is limited, and psychiatric formulation is a daunting task for most trainees,^{10,16–18} a fact evident from reports on previous clinical examinations, in which the number of times examiners recorded a deficit in relation to data synthesis and formulation have been relatively high.¹⁹

In an attempt to remedy this situation, we introduce a formal methodology, based on the clinical reasoning strategy known as pattern recognition.

Knowledge base for psychiatric formulation

Formulation requires model-based knowledge that spans across the bio-psycho-social domains. This knowledge uses a set of hypotheses, which can be derived from diverse theoretical models, to help us understand a given clinical situation. For example, in order to hypothesise the aetiological basis of a particular psychiatric disorder, we may use biological theories such as genetic predisposition, and organic bases related to physical illnesses. Similarly, we can draw hypotheses from an array of elaborated psychological theories, which include self-psychology;²⁰ object-relations;^{21–23} ego-psychology;²⁴ attachment;^{25–27} Erikson's theory;²⁸ cognitive-schema therapy;²⁹ CBT;³⁰ interpersonal therapy;³¹ dialectical behaviour therapy;³² and family therapy.³³ We may also use social theories to generate hypotheses for certain clinical situations. As described later, one example is Oberg's model on adaptation to a new culture.³⁴

Psychiatric formulation, then, involves the ability to link salient information gathered from the patient with those theoretical models that have most explanatory power, with the aim of achieving a seamless integration of the linked components. The way we structure and organise model-based knowledge plays a key role in the acquisition of this skill.

Structure and organisation of the knowledge

Research in the area of medical diagnostic reasoning has revealed pattern recognition to be a key strategy used by expert clinicians when solving clinical problems.^{35–37} A pattern is an organised knowledge structure acquired and evolved through learning and extensive clinical experience. Pattern recognition involves complex processes in which salient features of a given clinical situation are identified and then matched with patterns (which are stored in memory), resulting in rapid retrieval of the matched patterns. It has been described that

before becoming expert clinicians, learners progress through several stages characterised by different knowledge structures. Expert clinicians use a repertoire of what are referred to as 'illness scripts', which store information about prototypical or actual patients.^{35,36} Pattern recognition can also be considered the principle underlying what are known as clinical rules (clinical prediction rules or clinical decision rules), which involve formulating clinical knowledge in the form of statistical relationships between clinical variables.^{38–40} Examples of well-known clinical rules are the Ottawa Ankle Rules for diagnosing ankle injuries,⁴¹ and the Canadian C-Spine rule for managing trauma patients.⁴²

We believe that pattern recognition strategies, in which patterns are derived from model-based knowledge, are of key importance to successful formulation. Because of the subjective nature of psychiatric knowledge, especially the model-based knowledge involving psychological theories, pattern recognition is a challenging task. A template structure using a diagrammatic technique known as semantic networks^{43,44} is proposed, which involves graphical representation of different entities and their relationships. For example, a template that involves three entities and two relationships for representing model-based knowledge is described in Figure 1. Even though diagrammatic techniques such as flow-charting have been described in the literature for case formulation,¹¹ the need for pattern recognition has not been previously emphasised.

Clinical phenomena can be considered the core pathological features, because they provide gateways for connecting a given patient situation with model-based knowledge. Clinical phenomena may correspond to a set of related clinical symptoms, and to certain concepts in a given model. As is evident from the following examples, entities in templates can be nested or expanded to contain a number of sub-entities.

Example 1: Low self-esteem from a perspective of cognitive schema therapy

Low self-esteem is an example of a clinical phenomenon that is often observed in patients with depressive, anxiety and/or personality disorders. It is characterised by a number of symptoms including low self-confidence, oversensitivity to criticism and social anxiety. One way to conceptualise this clinical phenomenon is to use a cognitive-schema-based model,²⁹ as shown in Figure 2. When testing using this model, the interviewer would explore developmental history to elicit knowledge of events that may have predisposed, and reinforced, the formation of the Defectiveness cognitive schema. In addition, the interviewer would explore more recent events that may have activated this cognitive schema, leading to the patient's current predicament. Finally, the events could be directly linked to CBT-based therapy, in which the technique of cognitive restructuring is applied to deal with the patient's cognitive schema.

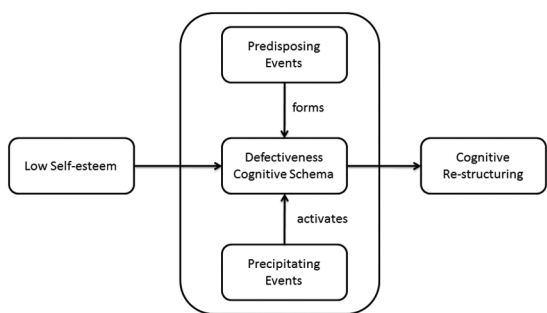


Figure 2: Formulation of low self-esteem using cognitive-schema model

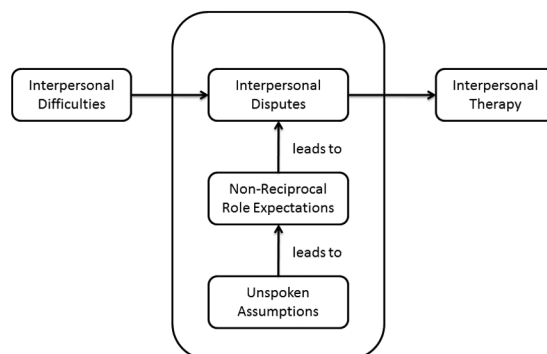


Figure 4: Formulation of interpersonal difficulties using the interpersonal therapy model

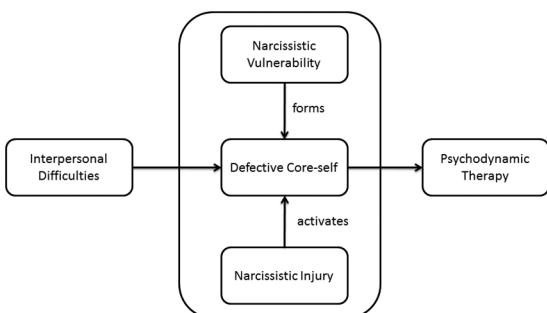


Figure 3: Formulation of interpersonal difficulties using self-psychology model

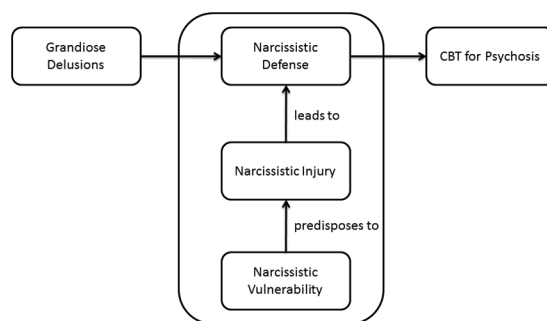


Figure 5: Formulation of grandiose delusions using the self-psychology model

Example 2: Interpersonal difficulties from a perspective of self psychology

‘Interpersonal difficulties’ is a clinical phenomenon that can be characterised by a number of clinical symptoms including excessive dependence, fear of abandonment and excessive reliance on others for self-object needs. One way to understand this situation would be to use a model based on self-psychology, as described in Figure 3. Assuming the interviewer hypothesises a defective core-self, he/she seeks evidence to support this hypothesis by exploring the patient’s developmental history, looking for events leading to narcissistic vulnerability. More recent events, indicative of a recurrence of a narcissistic injury leading to the current predicament, are also explored. In terms of interventions, this conceptualisation based on the self-psychology model could be easily related to psychodynamic psychotherapy. Alternately, interpersonal difficulties could be conceptualised using other models such as interpersonal therapy or CBT. For example, based on the interpersonal therapy model,³¹ interpersonal difficulties could be conceptualised using the model concepts interpersonal disputes, non-reciprocal role expectations and unspoken assumptions, as shown in Figure 4 (i.e. unspoken assumptions about each other leading to non-reciprocal role expectations causing interpersonal disputes). The clinician would then evaluate the alternative conceptualisations and

their related interventions, which could be determined based on each patient’s individual circumstances.

Example 3: Grandiose delusions from a perspective of self psychology

Grandiose delusions, as seen in patients with schizophrenia, can often be understood using the self-psychology model as shown in Figure 5. The interviewer may find early life events causing narcissistic vulnerability, and later life events causing major narcissistic insults that precipitate psychotic episodes. It is possible to speculate that the patient has constructed a delusional world, in which grandiose delusions serve as a psychological defence, in order to deal with their painful reality. This kind of psychodynamic formulation is important, because it may serve as the stepping stone to CBT for psychosis, which has been successfully used in these types of patients.⁴⁵

Example 4: Self-punitive behaviour a perspective of object relations theory

Self-punitive behaviour can be observed in number of disorders including depression, anxiety and personality disorders. One possible way to conceptualise these

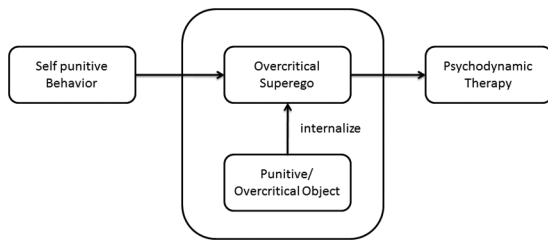


Figure 6: Formulation of self-punitive behaviour using object-relation theory

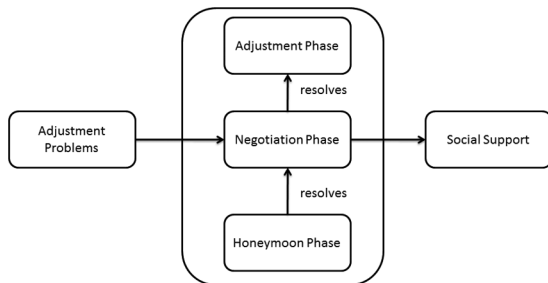


Figure 7: Formulation of adjustment problems using culture shock theory

clinical phenomena would be to use a model derived from object-relations theory, as depicted in Figure 6. Self-punitive behaviour may be understood to result from an overcritical superego, that itself may result from internalisation of an overcritical or punitive object, such as a parental figure during the patient's early life. This understanding, based on object-relations theory, may cause the clinician to decide on psychodynamic therapy as an intervention; the therapy would facilitate the internalisation of the therapist and restructuring of the superego.

Example 5: Adjustment difficulties from a perspective of culture shock theory

In countries such as Australia, which have a significant migrant population, clinicians may encounter patients who present with anxiety and depressive disorders in which adjustment difficulty is a core clinical phenomenon associated with the migratory experience. As shown in Figure 7, one may use a social model, for example cultural shock theory,³⁴ to conceptualise the predicament of the patient. After the initial 'honeymoon' period, as the patient realises the cultural differences, his or her 'deficits', and the challenges associated with integration into a new culture, severe anxiety and depressive symptoms may evolve. This template assists the clinician to identify a patient's strengths, and to organise the necessary social interventions that will facilitate the adjustment process and develop mastery over the new culture.

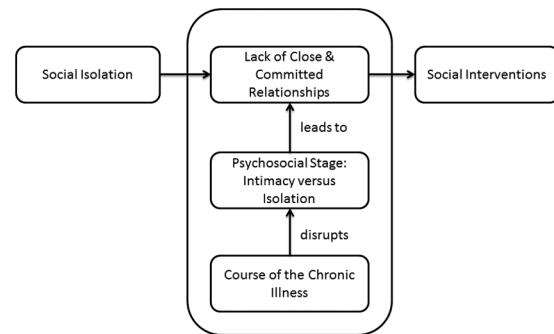


Figure 8: Formulation of social isolation using Erickson's theory

Example 6: Social Isolation from a perspective of Erickson's theory

Social isolation, which is often seen together with other social problems, including unemployment and financial, and accommodation problems, can be considered a clinical phenomenon observed in many patients with chronic psychotic illnesses. Whilst there are many contributing factors such as social stigma and residual symptoms, one possible way to conceptualise this predicament is using Erickson's theory of life-stages.²⁸ When an illness starts at a critical stage of development, for example in early adulthood, the process of resolving the conflicts inherent in this stage (i.e. 'intimacy versus isolation'), and in subsequent stages, can be disrupted. Therefore, social isolation can be seen as a result of failure to successfully resolve the 'intimacy versus isolation' conflict because of disruption of this process in the course of the illness. This situation is shown in Figure 8, which can be easily adapted to describe many other clinical phenomena. For example, depression in old age as a result of failure to resolve the conflict 'integrity versus despair', and paranoid personality traits as a result of failure to resolve the conflict 'trust versus mistrust' resulting from childhood abuse.

Discussion

The above examples demonstrate that it is possible to develop a repertoire of templates connecting clinical phenomena, model-based knowledge and treatment interventions. It is sometimes possible to explain the same clinical phenomena using more than one template or model. Moreover, according to the elicited set of common clinical phenomena, templates can be combined to enrich the formulation. For example, the self-punitive behaviour model described in example 4 may also be explained using a template derived from cognitive-schema therapy model and the interpersonal difficulties case described in example 2 can also be explained using a template derived from object-relation theory. Moreover, the same patient may exhibit all the clinical phenomena described in examples 1, 2 and 4. When there are many clinical phenomena, which can be explained using more

than one template, the clinician prioritises and chooses the template(s) that have greatest explanatory power for the given patient situation. The utility of developing templates that become integrated into the clinicians' repertoire is that treatment choices are linked to the process. The capacity to use multiple models to understand a patient's predicament affords greater depth in understanding their presentation, and additional flexibility in the implementation and evolution of treatment choices as the patient and therapist move through treatment phases. Graphing tools such as CMaps⁴⁶ may be of assistance in developing multiple patient-oriented problem templates that allow differing theoretical orientations to be brought together to deepen the clinician's understanding of the patient.

Conclusion

In this paper, we suggest and make explicit a methodology for psychiatric case formulation based on pattern recognition, which is a strategy known to be used by expert clinicians during clinical problem solving. Using templates derived from model-based knowledge, we used examples to demonstrate how clinical phenomena can be integrated with model-based knowledge and treatment interventions. It is hoped that this methodology will assist trainees, in particular, to develop their formulation skills, and to structure and organise their psychiatric knowledge in a more explicit form. Several templates are described in this paper as examples; we encourage trainees to develop their own repertoire of templates, which can be structured and organised according to their own preferences. Expert clinicians develop and consolidate similar patterns, largely implicitly and as a result of their extensive experience.

Even though they are very different disciplines, we believe the development of psychiatric formulation skills is very similar to the way mathematics students hone their mathematical skills by repeatedly practicing and solving mathematical problems on paper before applying this knowledge to the solution of real-world problems. The novice who wishes to follow the proposed approach will benefit from practice and repetition, to consolidate their model-based knowledge and to acquire the necessary formulation skills. We suggest that trainees first practice these techniques on paper, by attempting to integrate clinical phenomena, model-based knowledge, and treatment interventions in diverse ways using hypothetical and real clinical scenarios.

Disclosure

The authors report no conflict of interest. The authors alone are responsible for the content and writing of the paper.

References

- Perry S, Cooper A, Michels R. The psychodynamic formulation: its purpose, structure, and clinical application. *American Journal of Psychiatry* 1987; 144: 543–550.
- Mace C, Binyon S. Teaching psychodynamic formulation to psychiatric trainees: Part 1: Basics of formulation. *Advances in Psychiatric Treatment* 2005; 11: 416–423.
- McWilliams N. *Psychoanalytic case formulation*. New York: The Guilford Press, 1999.
- Bruch M, Bond FW. *Beyond diagnosis: case formulation approaches in CBT*. Chichester: Wiley, 1998.
- Persons JB. *The case formulation approach to cognitive-behavior therapy*. New York: Guilford Press, 2008.
- Markowitz JC, Swartz HA. Case formulation in interpersonal psychotherapy of depression. In: Eells TD (ed.) *Handbook of psychotherapy case formulation*. New York: Guilford, 1997, pp. 192–222.
- Koerner K, Linehan MM. Case formulation in dialectical behavior therapy for borderline personality disorder. In: Eells TD (ed.) *Handbook of psychotherapy case formulation*. New York: Guilford, 1997, pp. 340–368.
- Horowitz MJ. *Formulation as a basis for planning psychotherapy treatment*. Washington, DC: American Psychiatric Publishing, 1997.
- Ingram BL. *Clinical case formulations: matching the integrative treatment plan to the client*. New York: Wiley, 2006.
- McClain T, O'Sullivan PS, Clardy JA. Biopsychosocial formulation: recognizing educational shortcomings. *Academic Psychiatry* 2004; 28: 88–94.
- Guerrero APS, Hishinuma ES, Serrano AC, Ahmed I. Use of the mechanistic case diagramming technique to teach the biopsychosocial-cultural formulation to psychiatric clerks. *Academic Psychiatry* 2003; 27: 88–92.
- Campbell WH, Rohrbaugh RM. *The biopsychosocial formulation manual: a guide for mental health professionals*. New York: Routledge, 2006.
- Sperry L, Gudeman JE, Blackwell B, Faulkner LR. *Psychiatric case formulations*. Washington, DC: American Psychiatric Press, 1992.
- Royal Australian and New Zealand College of Psychiatrists. Exemption Candidate Examination, Formulation Guidelines for Candidates. Available at: http://www.ranzcp.org/images/stories/ranzcp-attachments/PreFellowship/Examinations/ECE/ece_formulationguidelines.pdf.
- Anderson L, Krathwohl D. *A taxonomy for learning, teaching and assessing: a revision of Bloom's taxonomy of educational objectives*. New York: Longman, 2001.
- Peltz WL. A triad of conceptual models for formulating and teaching psychodynamics. *American Journal of Psychiatry* 1967; 123: 1087–1093.
- McDermott J, Jr, Streltzer J, Lum K, Nordquist C, Danko G. Pilot study of explicit grading criteria in the American Board of Psychiatry and Neurology. Part II. Examination. *American Journal of Psychiatry* 1996; 153: 1097–1099.
- Mellsop GW, Banzato CEM. A concise conceptualization of formulation. *Academic Psychiatry* 2006; 30: 424–425.
- Royal Australian and New Zealand College of Psychiatrists. Exams Archive, Examination Reports. Available at: <http://www.ranzcp.org/prefellowship/exams-archive.html>.
- Kohut H. *The analysis of the self: a systematic approach to the psychoanalytic treatment of narcissistic personality disorders*. Chicago, IL: University Of Chicago Press, 2009.
- Fairbairn WRD. *Psychoanalytic studies of the personality*. London: Routledge & Kegan Paul, 1952.
- Ogden TH. The concept of internal object relations. *International Journal of Psychoanalysis* 1983; 64: 227–241.
- Schafer R. *Aspects of internalization*. New York: International Universities Press, 1968.
- Freud S. *The ego and the id. The standard edition of the complete psychological works of Sigmund Freud*, Vol. 19. Translated and edited by Strachey J. London: Hogarth Press, 1961.
- Bowlby J. *Attachment and loss, Vol. 1: Attachment*. London: Hogarth Press, 1969.
- Bowlby J. *Attachment and loss, Vol. 2: Separation: Anxiety and anger*. London: Hogarth Press, 1973.
- Bowlby J. *Attachment and loss, Vol. 3: Loss: Sadness and depression*. London: Hogarth Press, 1980.
- Erikson, EH. *Childhood and society*. New York: Norton, 1963.

29. Young JE . *Cognitive therapy for personality disorders: a schema-focused approach*. Sarasota, FL: Professional Resource Exchange, 1999.
30. Beck AT, Rush AJ, Shaw BF, Emery G. *Cognitive therapy of depression*. New York: Guilford Press, 1979.
31. Weissman MM, Markowitz JC, Klerman GL. *Comprehensive guide to interpersonal psychotherapy*. New York: Basic Books, 2000.
32. Linehan MM. *Skills training manual for treating borderline personality disorder*. New York: The Guilford Press, 1993.
33. Minuchin S. *Families & family therapy*. Cambridge, MA: Harvard University Press, 1974.
34. Oberg K. Culture shock: adjustment to new cultural environments. *Practical Anthropology* 1960; 7: 177–182.
35. Coderre S, Mandin H, Harasym PH, Fick GH. Diagnostic reasoning strategies and diagnostic success. *Medical Education* 2003; 37: 695–703.
36. Schmidt HG, Norman GR, Boshuizen HPA. cognitive perspective on medical expertise: theory and implications. *Academic Medicine* 1990; 65: 611–621.
37. Brooks LR, Norman GR, Allen SW. Role of specific similarity in a medical diagnostic task. *Journal of Experimental Psychology* 1991; 120: 278–287.
38. Laupacis A, Sekar N, Stiell IG. Clinical prediction rules: a review and suggested modifications of methodological standards. *The Journal of the American Medical Association* 1997; 277: 488–494.
39. Wasson HS, Sox HC, Neff RK, Goldman L. Clinical prediction rules. Applications and methodological standards. *New England Journal of Medicine* 1985; 313: 793–799.
40. Falk G, Fahey T. Clinical prediction rules. *British Medical Journal* 2009; 339: b2899.
41. Stiell IG, Greenberg GH, McKnight RD, et al. A study to develop clinical decision rules for the use of radiography in acute ankle injuries. *Annals of Emergency Medicine* 1992; 21: 384–390.
42. Stiell IG, Wells GA, Vandemheen KL, et al. The Canadian C-Spine rule for radiography in alert and stable trauma patients. *The Journal of the American Medical Association* 2001; 286: 1841–1848.
43. Roberts DD. *Existential graphs of Charles S. Pierce*. Chicago, IL: University of Illinois, 1963.
44. Collins AM, Quillian MR. Retrieval time from semantic memory. *Journal of Verbal Learning and Behaviour* 1969; 8: 240–247.
45. Kingdon DG, Turkington D. *The case study guide to cognitive behaviour therapy of psychosis*. New York: Wiley, 2002.
46. IHMC. Cmap Tools. Available at: <http://cmap.ihmc.us>.