

- Scottish University of the Year 2017



School of Medicine
University of Dundee

Clinical Reasoning: the nuts and bolts

Prof Maggie Bartlett

- 3rd CReME Conference , York 2019

Biases are Heuristics

- Representativeness
- Confirmatory bias
- Availability bias
- Anchoring

Premature closure

Metacognition

“The process by which we reflect upon, and have the option of regulating, what we are thinking”

The Cognitive Imperative: Thinking about How We Think

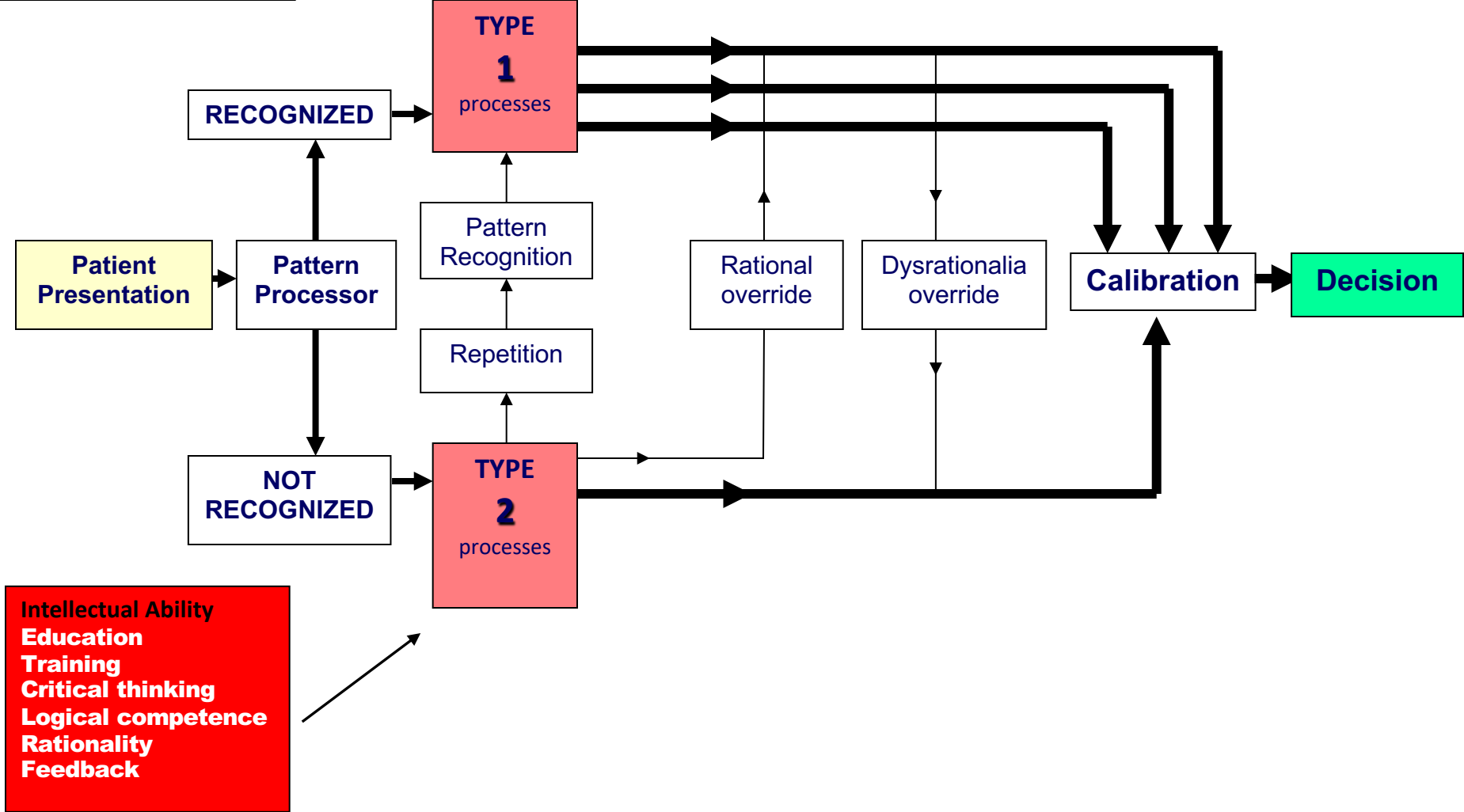
Croskerry 2000 Academic Emergency Medicine

Cognitive de-biasing

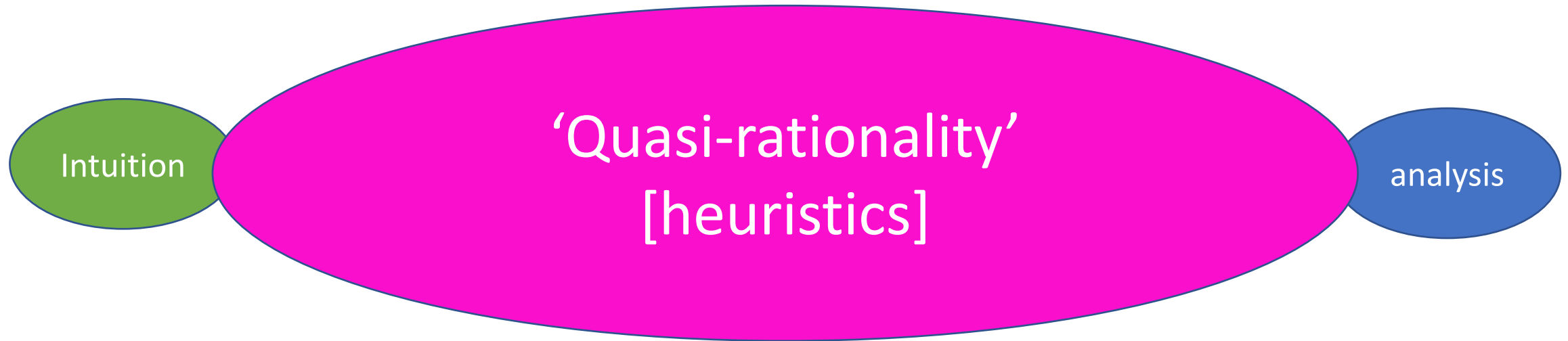
- Using metacognition effectively

A theory of decision making: The Dual Process Diagram

Context
Ambient conditions
Task difficulty
Task ambiguity
Mood and physical state



Cognitive Continuum Theory...



- Hammond KR Psychol Inq. 2010.21:327-337
- Custers EJFM Acad Med.2013;88:1074-1080

What is clinical reasoning?

The GMC

(Clinical reasoning is) the cognitive process that is necessary to evaluate and manage a patient's medical problem.

Durning et al

Clinical reasoning includes gathering, interpreting, and synthesizing information, generating hypotheses and diagnoses, developing management and treatment plans, avoiding cognitive errors, and ensuring patient safety.

What do we need to be able to make clinical decisions?

The Building Blocks – knowledge and experience

Expert



Exemplars

Illness Scripts

Novice

Basic Mechanisms of Disease

Knowledge : Managing Information

Half of what you'll learn in medical school will be shown to be either dead wrong or out of date within five years of your graduation; the trouble is that nobody can tell you which half...

David Sackett 'the father of evidence based medicine'.

806,000 medical papers are published each year

<https://www.quora.com/How-many-medical-papers-are-published-each-year#>

Many people seek to make money from those who don't understand science. Doctors should call out bollocksology when they see it.

Margaret McCartney

<https://www.bmj.com/content/bmj/362/bmj.k3745.full.pdf>

How do you make diagnoses?

Patient factors
Context
Prior Information

Idiosyncratic
aspects

Opening statement

Pre-diagnostic interpretation
(is it acute/chronic/emergency, what system is it ?)

Further questions with reference back to pre-diagnostic interpretation leading to new information

Diagnostic Hypothesis
Murtagh's Diagnostic Strategy:
What is the most likely diagnosis *for this patient* ?
What can be excluded ?
What MUST be excluded even its not very likely ?

Search for specific features (more history, examination, investigations)



DIAGNOSIS

Context , prior information

Male aged 56. Smoker. Infrequent attender. Married.

Opening statement

I've had a cough for a few weeks

Pre-diagnostic interpretation

May be serious. Likely to be respiratory system. Could be cancer, could be infection.

Further questions

Started 6 weeks ago. Dry at start but now yellowish phlegm, occasional flecks of red blood. Short of breath. Weight loss half a stone, poor appetite, gone off cigarettes (not smoked any for a fortnight). Previously 15 a day for 40 years.

Diagnostic hypothesis (what is most likely for this patient, what can safely be excluded, what must be excluded?)

Most likely diagnosis: lung cancer
must exclude: infection (TB?)

Search for specific features (more history, examination, investigations)

Examination : apyrexial. No focal signs in chest.
Investigations : Chest Xray, mass in left lung, bronchoscopy/biopsy confirmed cancer. Full blood count: white cell count normal.

Diagnosis

Lung Cancer

Hypothesis driven examination

- Patient's narrative – forming diagnostic hypotheses
- Open and closed questions – testing hypotheses
- Search for physical findings – 'focused' or selective examination driven by diagnostic hypotheses
- Knowledge of probability (likelihood ratios)

Learning and teaching Clinical Reasoning

Ericsson 1990

- 10,000 hours to become an expert
- Sustained deliberate practice
- 'Perfectly accurate feedback'

Deliberate practice ...with feedback

Ericsson 1990

Reflection:

- Self explanation using causal pathophysiology
- Free – no input from tutor
- Cued – some guidance from tutor
- Modelled – case ‘worked out’ with commentary from an expert

Cognitive Load Theory

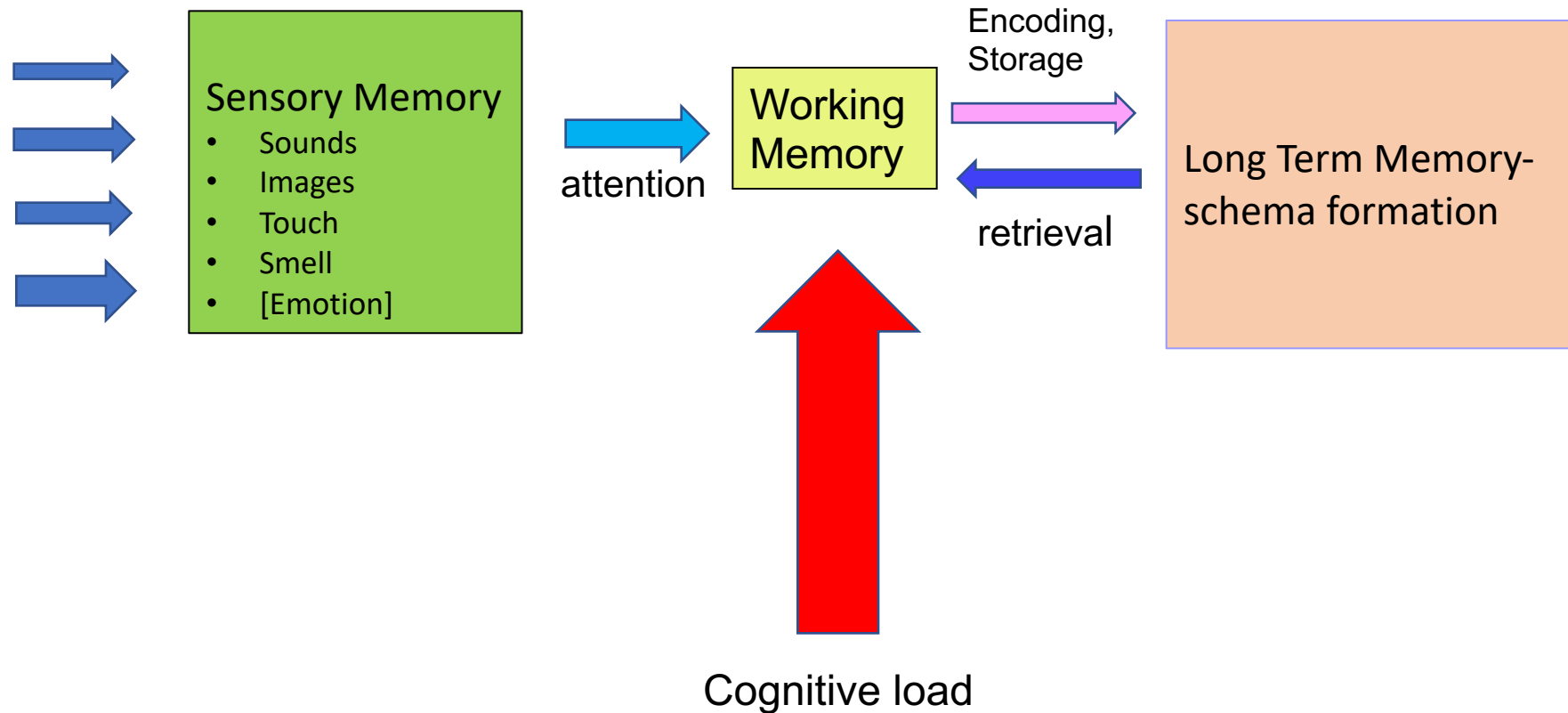
Sweller 1998

Schema and illness scripts

MYOCARDIAL INFARCTION

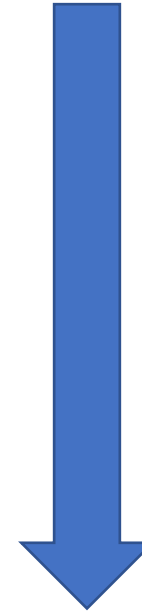
- Chest pain
- Central
- Exertional
- Crushing
- Left arm and jaw
- Sweaty
- Breathless
- Nausea
- Low blood pressure

Three stage model of human memory (Atkinson-Shriffin)

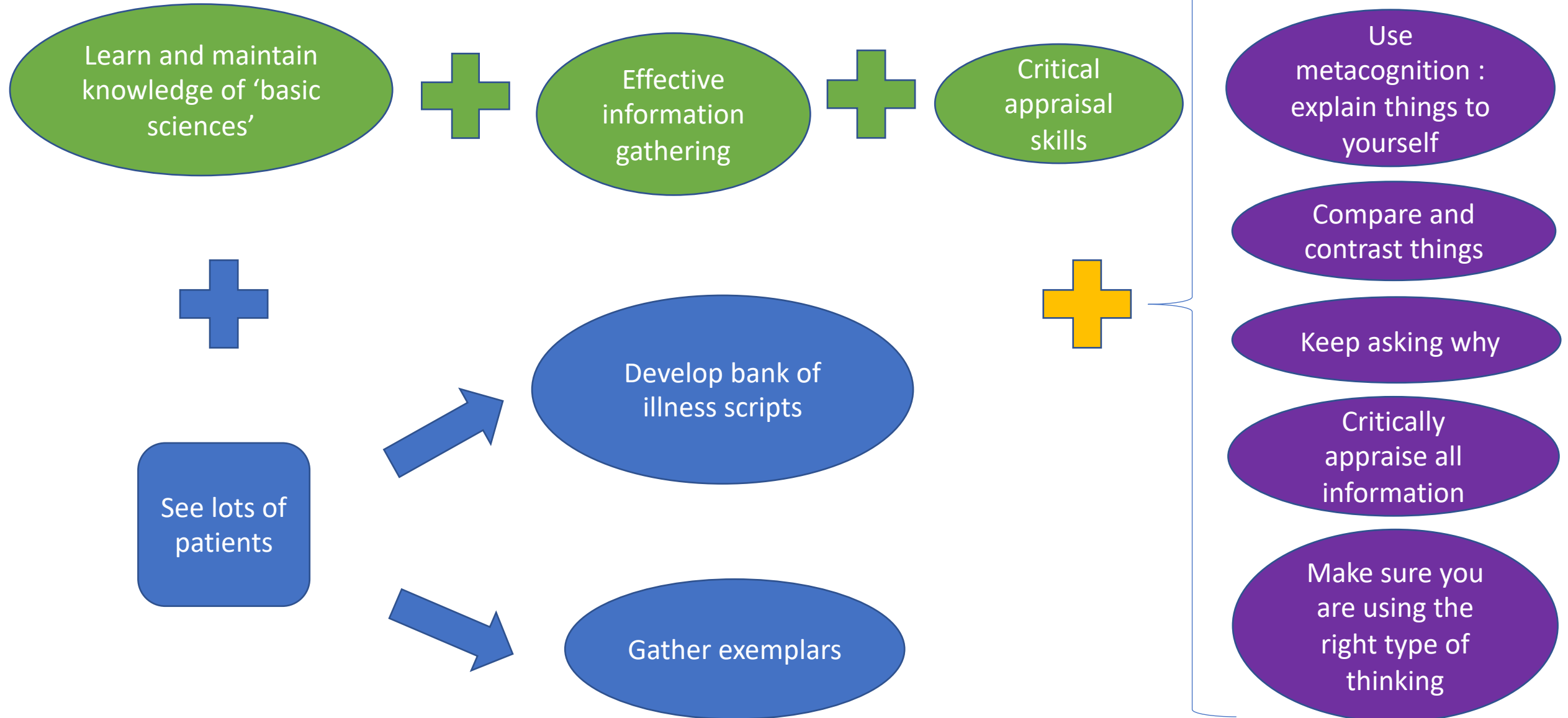


Graded approach

- Acquire relevant knowledge
- Use self-explanation
- Develop illness scripts
- Compare and contrast 'adjacent conditions'
- Use whole cases with novices
- Use serial cueing with more experienced learners

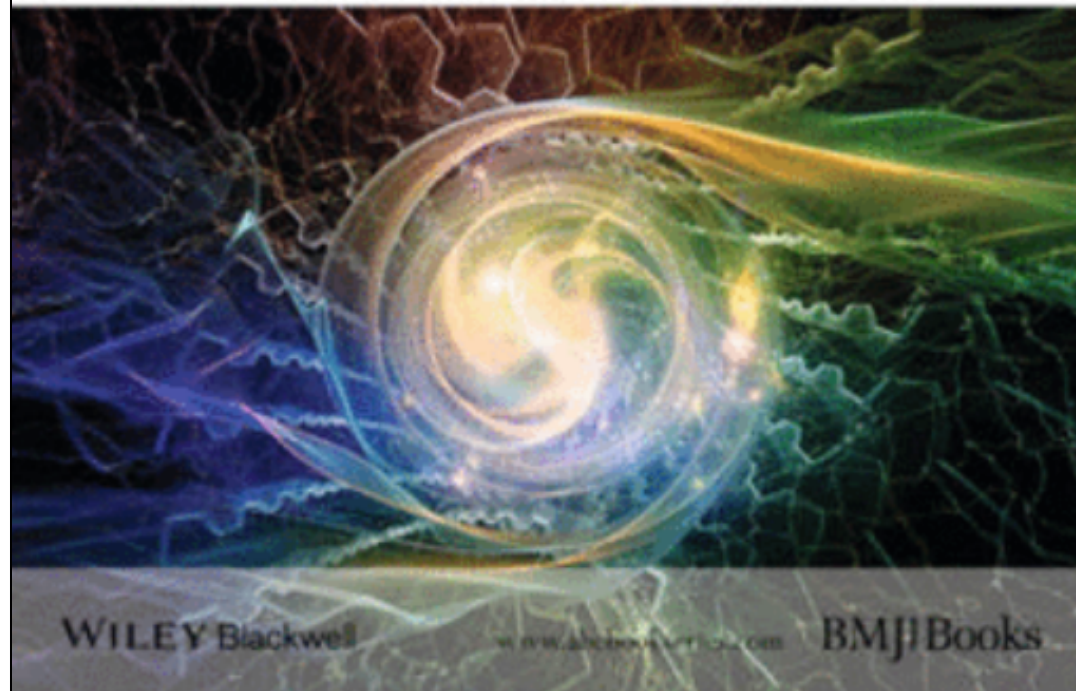


How to learn clinical reasoning...



ABC of Clinical Reasoning

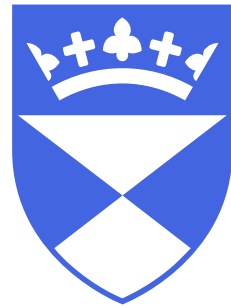
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**University
of Dundee**

m.bartlett@dundee.ac.uk