

When Reading More Doesn't Work: Identifying and Remediating Deficient Diagnostic Reasoning

John Gazewood, MD, MSPH, University of Virginia
Kristina Johnson, MD, University of Virginia



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Objectives

- Describe dual-process theory of clinical decision-making
- Describe and identify common type 1 and type 2 diagnostic reasoning errors
- Describe remediation strategies for common type 1 and type 2 diagnostic reasoning errors

Solve this problem as quickly as you can:

- A bat and ball together cost \$1.10
- The bat costs \$1.00 more than the ball
- **How much does the ball cost?**



5 Cents?
10 Cents?

Poll Question

Type 2 thinking is less prone to error than type 1 thinking

- True
- False

Dual Process Theory

Cognitive Style	Type 1 – Intuitive	Type 2 - Analytical
Responsiveness	Passive	Active
Automaticity	High	Low
Reliability/Rigor	Low	High
Cognitive awareness	Low	High
Errors	Relatively common	Less common
Effort	Low	High
Capacity	High	Low

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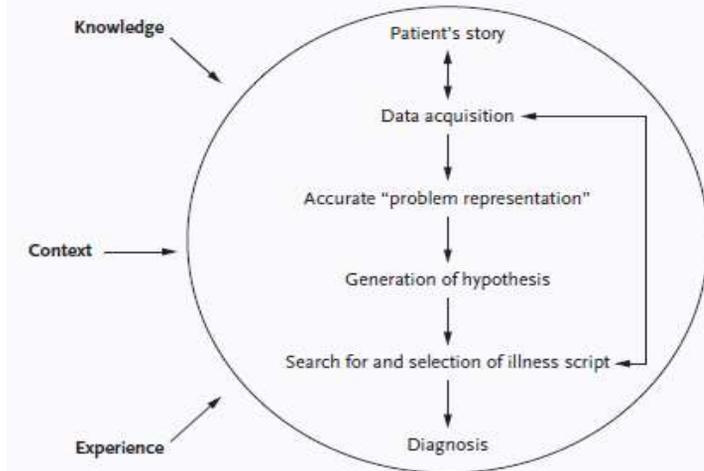
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Type 2 Thinking



Bowen, N Engl J Med 355;21, 2006

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Problem Presentation

- A synthesis of data, using an accurate and cohesive abstraction, which succinctly represents the overall clinical picture

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Illness Script

- Mental representations of a medical condition
 - Enabling conditions or predisposing epidemiologic features
 - Relevant pathophysiologic process
 - Clinical features and sequelae

Patient's Story

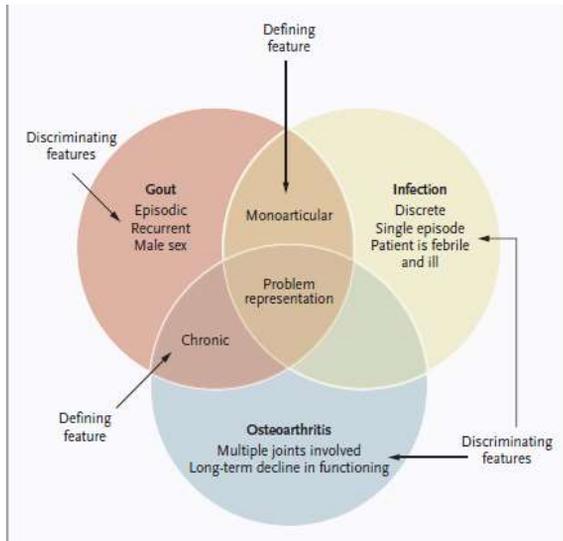
54 y/o man – “my knee hurt me so much last night, I woke up from sleep. It was fine when I went to bed. Now it's swollen. It's the worst pain I've ever had. This has happened before, in the same knee – first time 2 years ago, and then ago 9 months ago. Doesn't bother me between times”

Problem Presentation

- 54 y/o man with acute onset of mono-articular arthritis, with a history of recurrent episodes of arthritis affecting the same knee, who is asymptomatic between episodes.

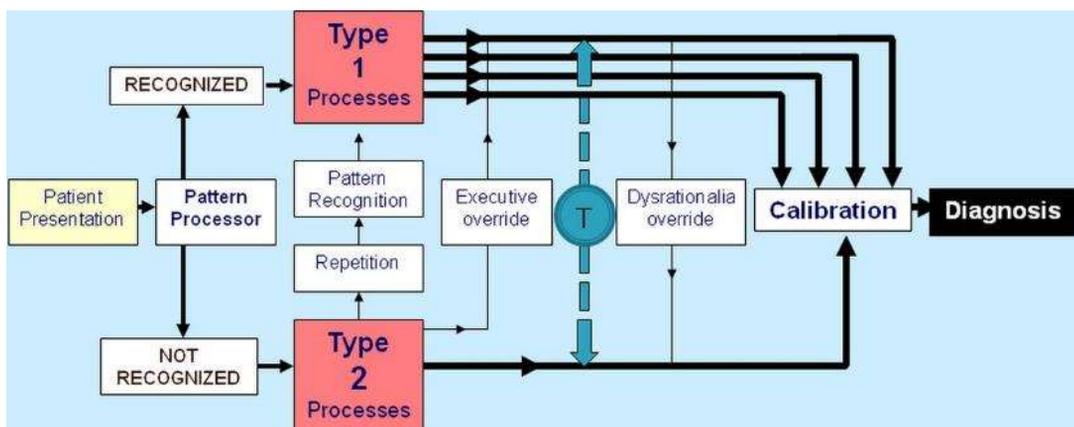
Illness Script

Gout – increased risks in obesity, htn, diabetes; with high purine diets, etoh. Results in elevated uric acid levels in blood and tissue; crystal deposition causes acute episodes of joint inflammation, usually MTP joint. Responds to colchicine and other anti-inflammatories.



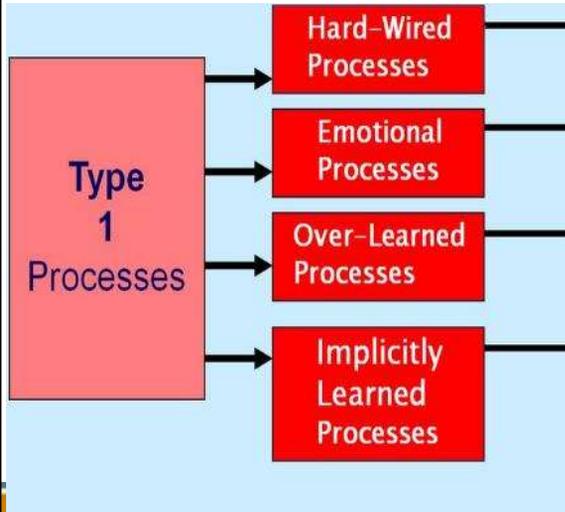
Semantic Modifiers

Dual Process Model



Pat Croskerry et al. BMJ Qual Saf 2012

Type 1 Errors



- Cognitive biases or cognitive dispositions to respond (CDR)
- Lead to diagnostic errors in type 1 thinking

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Poll question

Resident presents patient with h/o DM and peripheral neuropathy. Patient has had worsening right foot pain for 3 months, worse with activity, unresponsive to increasing doses of gabapentin. The residents wants to prescribe Lyrica for worsening neuropathy.

What type of type 1 error is this?

- A. Premature Closure
- B. Confirmation bias
- C. Fundamental attribution error
- D. Anchoring

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Common Type 1 Errors

CDR	Characteristic
Premature closure	Tendency to close decision-making prematurely in dx process
Confirmation bias	Tendency to look for evidence to support a dx, rather than evidence that might refute dx
Fundamental attribution error	Tendency to be judgmental and blame patients for problems
Anchoring	Tendency to lock onto salient features too early, and failing to take into account contradictory information

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Cognitive Dispositions to Respond

- Can occur in combination and self-reinforce
- Increased risk when:
 - Fatigue
 - Emotional Distress
 - Cognitive Overload



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Premature closure

- Young man with “mold exposure” in basement, later develops fever, productive cough and dyspnea
- On exam, febrile, appears ill, with focal lung findings
- Resident Dx: Hypersensitivity pneumonitis
- Final Dx: Pneumonia

Poll Question

What clues to premature closure might be observable while observing or precepting a resident?

- A. Resident seeks only confirming data
- B. Learner fails to notice other data
- C. Scarce elaboration of alternative hypotheses
- D. Absence of pertinent negatives
- E. All of the above

Strategies for addressing Type 1 errors

- “Meta-cognition”
 - Could you explain how you came to this diagnosis/hypothesis?
 - What are other alternative/plausible diagnoses?
 - What data did you look for to confirm or exclude these diagnoses?
 - Ask learner to reflect on why other diagnoses were not considered
- Ask learner to consider the base rate
- Use clinical prediction rules
- Consider use of a symptom-based diagnostic checklist

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Checklist: Cough

Viral URI
Post-nasal drip
Postinfectious, postviral cough
Bronchitis
Asthma
COPD
GERD
*Drugs (ACE-I; beta-blockers, amiodarone)
♣*Pneumonia
External or middle ear disease
Aspiration, recurrent
♣*Pulmonary embolus
♣Pertussis
Psychogenic
♣* Heart Failure

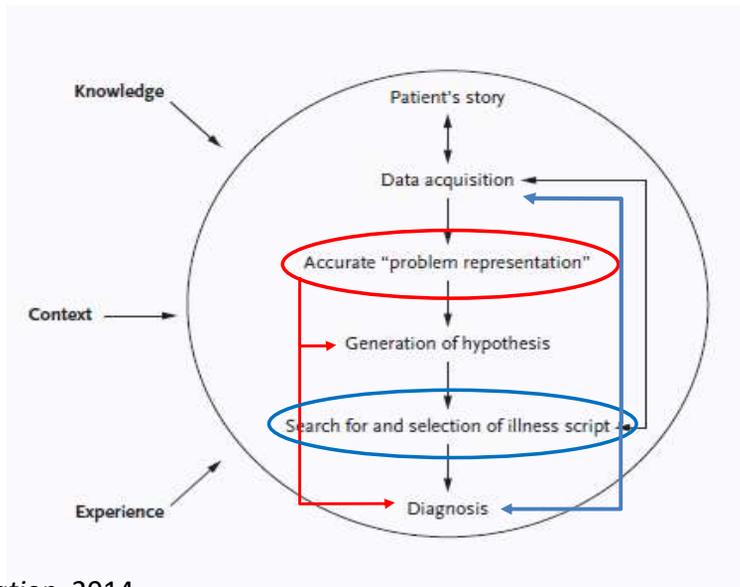
♣“Can’t miss” DX
* Often-missed DX

Ely, JW et al; Acad Med 2010

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Type 2 Errors



N Engl J Med 355;21; 2006
Remediation in Medical Education, 2014

- Video

Poll question

In the resident's presentation, which feature suggests a deficit in clinical reasoning?

- A. Poorly organized history
- B. Lack of an assessment
- C. There is a differential for each symptom

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Difficulty with problem presentation

- Limit or eliminate assessment or commitment to a DX
- The “SOP” or “SOSOP” presentation
 - Subjective, Objective, Plan
- The “SILOed” differential
 - Differential for each symptom

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Remediation Strategies

- Reverse presentation
 - ASOAP
- Practice with semantic qualifier “Buy a qualifier”
- Structured precepting model
 - SNAPPS

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SNAPPS

- Summarize presentation
- Present a limited differential
- Analyze differential
- Probe preceptor about uncertainties
- Plan mgmt
- Select issue for self-directed study

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Problem with Illness Script

- Unable to test diagnostic hypothesis in real-time
 - Interviews overly exhaustive; non-organized
 - Miss relevant data on hx, PE
 - “comfort zone” presentation
 - The “data dump” presentation
- Frozen differential – ignores relevant data
- Zebra differential

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Building Illness Scripts



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Horizontal Reading

Postnasal Drip / Allergic rhinitis	
Pathophysiology	Type 1 hypersensitivity response (IgE and mast cell mediated) of upper respiratory tract to aeroallergens
Epidemiology	<ul style="list-style-type: none"> - Varied prevalence worldwide (2.2% in Iran and 24.2% in Taiwan) - Atopy associated with increased risk for asthma, allergic rhinitis, and eczema
Time Course	Biphasic – 15-30 minutes of exposure release of mediators from mast cells, 4-8 hrs release of cytokines and leukotrienes
Salient Symptoms and Signs	<ul style="list-style-type: none"> - Environmental/seasonal pattern; chronicity; coexisting conditions - Nasal polyps, cobblestoning, pale or bluish boggy nasal mucosa, transverse nasal crease, tonsillar hypertrophy - Eyes (pruritic, tearing, swelling), ears (fullness, popping), nose (sneezing, pruritic, discharge), throat (pruritic, scratchiness, soreness) - Fever usually not a finding
Diagnostics	<ul style="list-style-type: none"> - Usually clinical diagnosis - Allergic testing (skin testing vs. specific IgE testing) to help guide management - Occasionally, testing to evaluate for immune deficiency (e.g. cystic fibrosis)
Treatment	<ul style="list-style-type: none"> - Allergen avoidance - Intranasal corticosteroids – best evidence, most effective - Intranasal antihistamines at least as good as 2nd generation PO H₂ blockers - Anticholinergic may reduce rhinorrhea, but don't really help other symptoms - Immunotherapy

Script sorting exercise

Potential Diagnoses	Discriminating Features				
	EKG changes (rest or with stress test)	Prodrome	Neurologic Findings	Cardiac Exam findings	Post-ictal state
Seizure	-	+	+	-	+
Cardiac arrhythmia	++	+	-	+	-
Vasovagal syncope	-	+	-	-	-
Stroke	-	-	++	-	- (though can have post-CVA deficits)

Persuade the MD

- Use a patient presentation
- Ask learner to “persuade” you that they have an illness (relevant to differential) in 30 seconds or less
- Have learner compare and contrast their presentation to patient’s history

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Tools for a Remediation Plan

- Observation of patient encounters
- Chart-stimulated recall
- On-line cases
- SNAPPS during precepting
- Coaching

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On-line cases

New England Journal of Medicine Case Exercises

Go to: <http://www.nejm.org/multimedia/interactive-medical-case>

Make an account (Free)

Complete 1 case (at least 1) each week

At the first page (history of present illness), STOP and write down 3 diagnoses, including a 'can't' miss condition, with 2 or 3 "discriminating" features of the presentation that support or don't support the diagnosis –try to use a semantic qualifier if you can, eg "acute", "mild", "intermittent"

1. Cardiac Arrhythmia (less likely given age, hypertrophic cardiomyopathy induced arrest would not result in spontaneous recovery; but did have prodrome of lightheadedness)
2. Vasovagal syncope c/b dehydration – lightheadedness, fairly complete recovery argue for this
3. Seizure (generalized given LOC) – no incontinence, no convulsive activity, and no significant post-ictal state would argue against this

Case Discussion

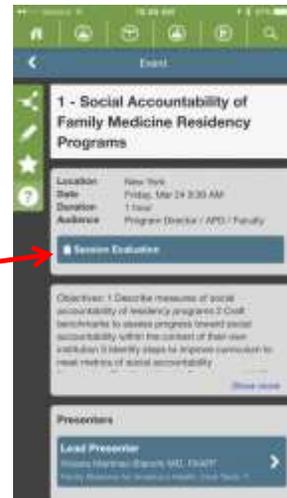
Poll Question:

Enter your email address to be included in any follow-up communication from the presenter(s).



Social Q & A

Please...
Complete the
session evaluation.
Thank you.



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