# Influence of perceived difficulty of cases on student osteopaths' diagnostic reasoning: a cross sectional study.

Aurelien L. Noyer, Jorge E. Esteves & Oliver P. Thomson.

University College of Osteopathy

# Background

- Despite the implications for patient safety, professional standing & education, there is little research on osteopathic diagnostic reasoning (DR) (Edwards et al., 2004, Thomson et al., 2014, Grace et al., 2016) .
- Osteopathic DR resembles that of medicine and physiotherapy, providing an opportunity to apply recommendations from their extensive literature (Noll et al., 2011, Doody & McAteer, 2002, Thomson et al., 2014).
- Build upon/corroborate the findings of previous research & potential to guide future studies exploring metacognition and expertise (Thomson et al., 2014).
- Need for ecological designs and a focus on the moderators of DR such as context complexity and expertise (Mamede et al., 2008, Rajkomar & Dhaliwal, 2011, Norman et al., 2013).

**Aim:** investigate the influence of perceived task complexity on the DR of student osteopaths

**Hypothesis:** Increased reliance on System 2 vs System 1 when manipulated into a complex scenario.

# Methodology

***Diagnostic task***
- 2 complex cases
- 4 min per case
- 'Best fitting diagnosis'

→

***Decision task***
- 8 literal, 16 filler & 24 inferred concepts
- Speed and accuracy

→

***Outcome measures***
1. Response time (RT) (ms)
2. Error rate (ER) (%)

## ***How it works?***

- Concepts act as surrogate markers of reasoning mode:
  - System 1 = Literal concepts
  - System 2 = Inferred concepts

- Decision task performance can be used to infer DR approach during the diagnostic task:
  - ↓ ER & RT = high recruitment
  - ↑ ER & RT = low recruitment

All materials and procedures obtained from Esteves (2011) & Mamede et al., (2008)

# Results

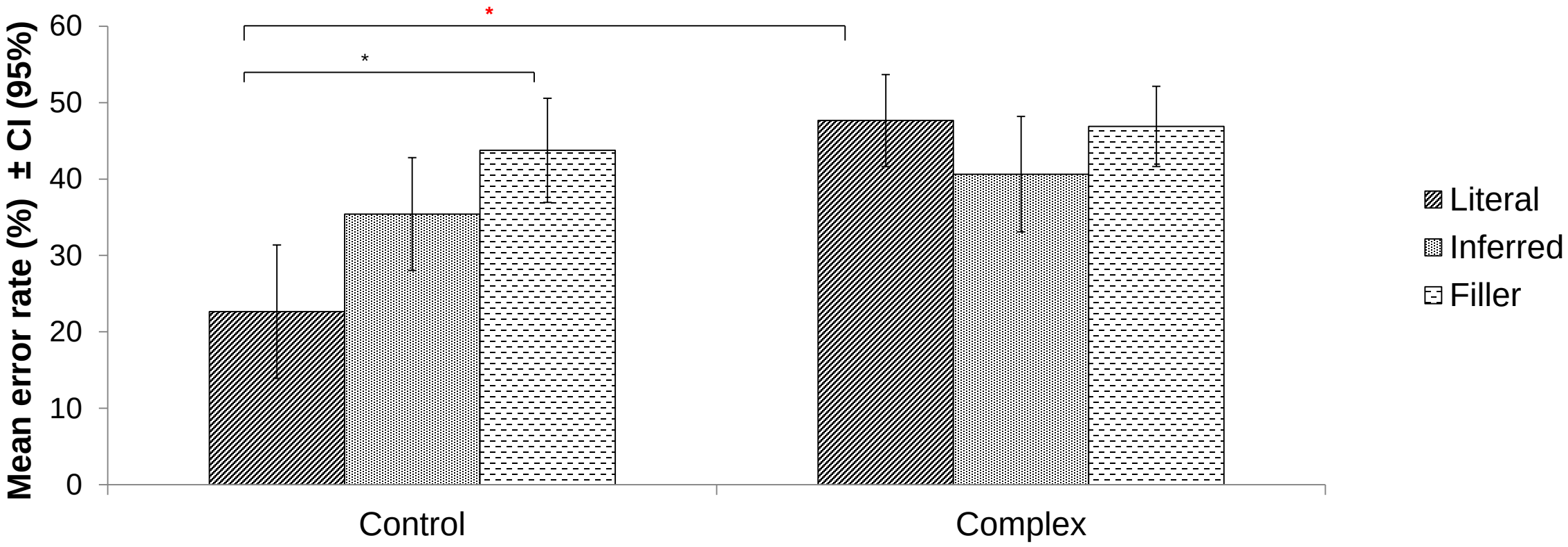



**Figure 1.** *Mean error rates as a function of concept type and context. (* = p ≤ 0 .0055)*

50% increase in ER for literal concepts in the complex context

# Results

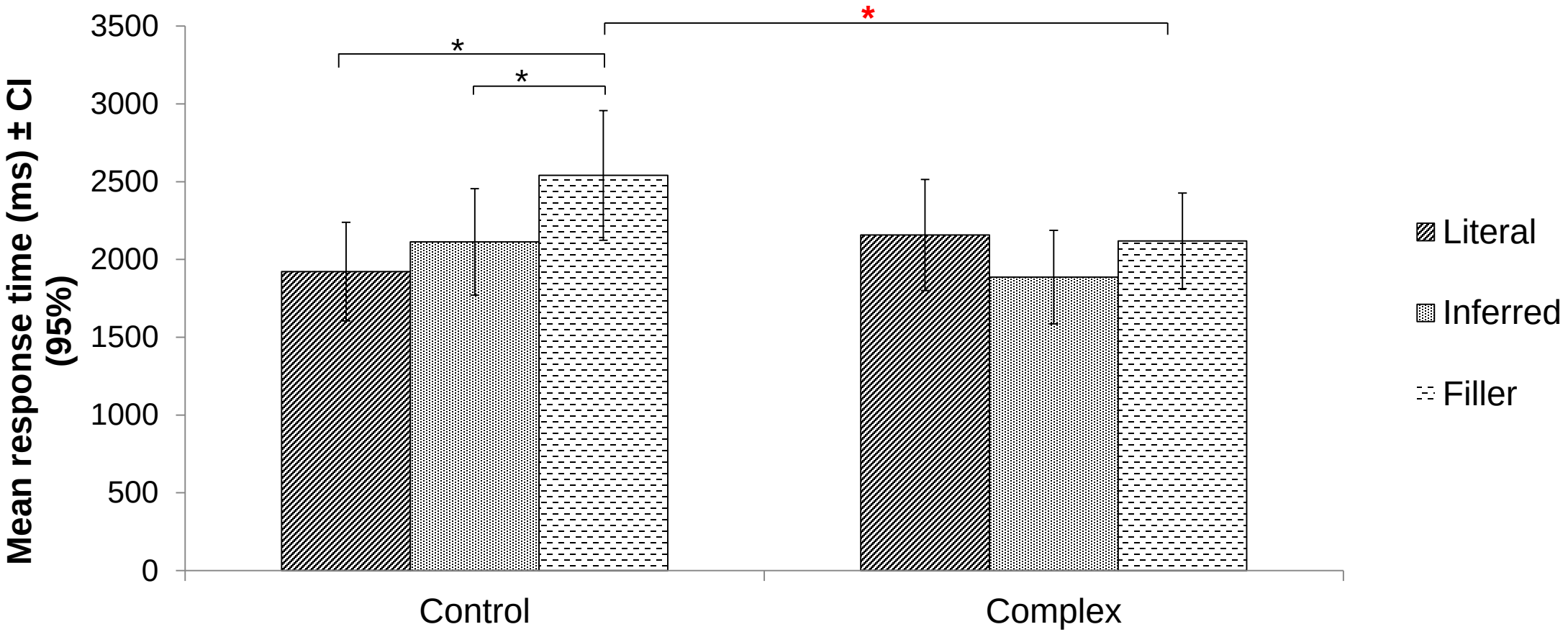



**Figure 2.** *Mean response time ± CI (95%) as a function of concept type and context. (* = p ≤ 0.0055)*

Reduction in RT for filler concepts in the complex context

# Discussion

- Initial prediction not met → absence of reasoning shift or reduced sensitivity to manipulation?

- Impairment in the judgement of literal concept suggestive of increased System 2 recruitment (Croskerry, 2009a).

- Consistent with previous literature on DR/expertise in osteopathy (Thomson et al., 2014), medicine (Mamede et al. 2008) & physiotherapy (Jones, 1992, Noll et al., 2001, Doody & McAteer, 2002).

***Implications:***

- Promote the development of intuitive & metacognitive capabilities → reduce cognitive load? (Croskerry, 2009b, Petty et al., 2011, Trowbridge et al., 2013, Thomson et al., 2014)

- Mentorship opportunities for recent graduates & experienced osteopaths? (Petty & Morley, 2009)

# Limitations

- No think aloud protocol → alternative hypotheses for observed changes?
- No concurrent change in ER & RT → weaker inferences.
- No objective measure to confirm manipulation effect.
- Small sample & artificial set up → generalizability?
- Future directions?

# References


Croskerry, P. (2009a). A universal model of diagnostic reasoning. *Academic medicine : journal of the Association of American Medical Colleges*. 84(8), pp. 1022–1028.

Croskerry, P. (2009b). Clinical cognition and diagnostic error: applications of a dual process model of reasoning. *Advances in Health Science Education.* 14(1), pp. 27-35.

Doody, C. & McAteer, M. (2002). Clinical Reasoning of Expert and Novice Physiotherapists in an outpatient Orthopaedic Setting. *Physiotherapy*. 88(5), pp. 258-68.

Edwards, I., Jones, M., Carr, J., Braunack-Mayer, A. & Jensen, G.M. (2004). Clinical reasoning strategies in physical therapy. *Phys Ther*. 84(4), pp. 312-30.

Esteves, J. (2011). *Diagnostic Palpation in Osteopathic Medicine : A Putative Neurocognitive Model of Expertise.* PhD thesis. Oxford Brookes University.

Grace, S., Orrock, P., Vaughan, B., Blaich, R. & Coutts, R. (2016). Understanding clinical reasoning in osteopathy: a qualitative research approach. *Chiropractic & Manual Therapies*. 24(6), **doi:** 10.1186/s12998-016-0087-x.

Jones, M.A. (1992). Clinical reasoning in manual therapy. *Physical therapy*. 72(12), pp. 875–84.

Mamede, S., Schmidt, H.G., Rikers, R.M.J.P., Penaforte, J.C. & Coelho-Filho, J.M. (2008). Influence of perceived difficulty of cases on physicians' diagnostic reasoning. *Acad Med.* 83(12), pp. 1210–16.

Noll, E., Key, A. & Jensen, G. (2001). Clinical reasoning of an experienced physiotherapist: insight into clinician decision-making regarding low back pain. *Physiother Res Int.* 6(1), pp. 40-51.

Norman, G., Monteiro, S. & Sherbino, J. (2013). Is clinical cognition binary or continuous? *Academic medicine : journal of the Association of American Medical Colleges*. 88(8), pp. 1058–60.

Petty, N.J. & Morley, M. (2009). Clinical expertise: Learning together through observed practice. *Man Ther.* 14(5),pp. 461-2.

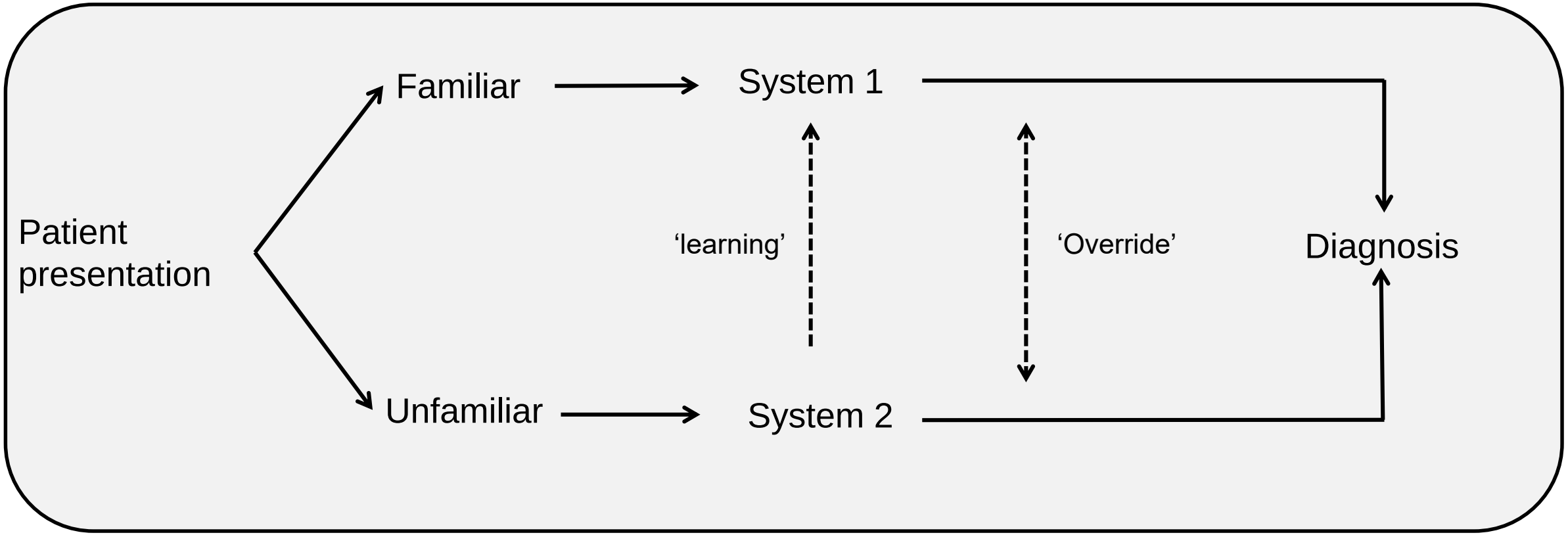
Petty, N.J., Scholes, J. & Ellis, L. (2011). The impact of a musculoskeletal masters course: developing clinical expertise. *Man Ther*., 16(6), pp. 590-5.

Rajkomar, A. & Dhaliwal, G. (2011). Improving diagnostic reasoning to improve patient safety. *Perm J.* 15(3), pp. 68–73.

Thomson, O.P., Petty, N.J. & Moore, A.P. (2014). Diagnostic reasoning in osteopathy – A qualitative study. *International Journal of Osteopathic Medicine*. 17(2), pp. 83–93.

Trowbridge, R.L., Dhaliwal, G. & Cosby, K.S. (2013). Educational agenda for diagnostic error reduction. *BMJ quality & safety*. 22(sup2), pp. ii28–ii32.


University College of Osteopathy




Adapted from Croskerry (2009a)