



RESEARCH REPORT

Intuition, analysis and reflection: An experimental study into the decision-making processes and thinking dispositions of osteopathy students



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Abstract *Background:* Decision-making and reflective thinking are fundamental aspects of clinical reasoning. How osteopathy students think and make decisions will therefore have far-reaching implications throughout their professional lives. Models of decision-making are firmly established in cognitive science literature and their application is universal, yet the decision-making processes and thinking dispositions of osteopathy students remain relatively unexplored.

Objectives and method: Using the Cognitive Reflection Test (CRT) to measure decision-making preferences and the 41-item Actively Open-minded Thinking disposition scale (AOT), this study set out to explore how osteopathy students at the start (novice; $n = 44$) and end (intermediate; $n = 32$) of their pre-professional training make decisions and how reflectively they think.

Results: Intermediate level practitioners demonstrate significantly more analytical decision-making than their novice peers ($p = 0.007$; effect size = 0.31); however, reflective thinking dispositions do not change as participants progress through their training ($p = 0.07$). No significant association was found between analytical decision-making and reflective thinking ($p = 0.85$).

Conclusions: The trend for intermediate level practitioners to demonstrate more analytical decision-making than novices, without significant differences in reflective thinking processes, supports other research that suggests osteopathic

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education promotes deductive over inductive reasoning in its graduates and that reasoning and thinking dispositions may develop independently of each other, given the skills and knowledge-based requirements of osteopathic education.
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Implications for practice

- Graduating students display significantly more analytical decision-making than their novice peers; however, reflective thinking dispositions do not change with increased exposure to osteopathic education.
- Analytical reasoning does not predict reflective thinking preferences in osteopathy students.
- The emphasis on 'technical rationality' in osteopathic education might prevent students from developing reflective thinking styles, which are central role to the development of metacognitive proficiency, a critical component of an osteopath's clinical competence profile.

Introduction

Clinical reasoning is the thinking and decision-making process that informs and underpins autonomous clinical practice, involving the interrogation and application of both declarative and procedural knowledge, reflection, and evaluation.¹ Clinical reasoning in autonomous health professions such as osteopathy is likely to make use of higher-order cognitive processes associated with, for example, reasoning, problem-solving and decision-making. Thinking and decision-making remain, however, an under-researched topic in osteopathy. This is despite independent and responsible decision-making being the hallmarks of an autonomous profession.² The literature in the field of cognitive science is awash with concepts and models of decision-making and during the last two decades, the dual process theory has become widely accepted and established as a model of human reasoning and decision-making.³ Dual process theorists propose that everyday's decision making is underpinned by two distinct systems of judgement, which cluster at either end of a continuum of cognitive effort.^{4–6} System 1 is an associative system, which uses basic cognitive processes such as similarity, association, and

memory retrieval; judgements are fast, automatic, intuitive and largely unconscious. In contrast, System 2 is a rule-based system; judgements are slow, deliberative and conscious.^{7,8} The dual process theory illustrates the two main forms of human reasoning: inductive and deductive.⁸ Whereas inductive reasoning is primarily based on the rapid retrieval, and appraisal of world knowledge, i.e., System 1; deductive reasoning depends on rule-based, formal procedures, i.e., System 2.

It has been claimed that osteopathy is distinguished from other health care professions by the fact that it is practised according to an articulated philosophy.⁹ However, it can be argued that the decision-making processes and thinking dispositions of osteopathic practitioners are universal. Although firmly established as a model of reasoning and decision-making in the field of cognitive science, the application of the dual process theory to medicine remains uncommon¹⁰ and only limited attempts have been made to explore it in the context of osteopathy.^{11,12} In the UK, as primary contact practitioners, osteopaths have a statutory obligation to demonstrate appropriate thinking skills in order to justify their clinical decision-making, but also to regularly engage in reflective thinking to ensure their knowledge remains relevant.¹³ The present study is especially timely as osteopathy's inclusion in national guidelines for the management of non-specific low back pain¹⁴ must make it more available for scrutiny in the context of changing health care purchasing and provision.¹⁵

As a general psychological construct, System 1 processes can be adaptive and useful strategies to reach reasonable, if not always considered, conclusions.¹⁶ Although there may have been certain evolutionary advantages to fast intuitive thinking, it continues to exert considerable control over human decision-making today.³ Frederick¹⁷ illustrates this well in his extensive research involving over 3000 subjects across 35 separate studies. Despite some methodological flaws, Frederick demonstrated an overwhelming tendency for subjects to resort to System 1 processes to answer a simple three-item 'Cognitive Reflection Test' (CRT). Frederick¹⁷ argued that the items on the test are easily understood when the solutions are

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