

**Thinking styles and doctors' knowledge and behaviours relating to
acute coronary syndromes guidelines**

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Background

There remain clear gaps between the best available scientific evidence and practice in a range of clinical disciplines, including cardiology.¹⁻² Increasingly, strategies to change clinician behaviour are being investigated in an emerging field known as implementation science.³ Most work has used empirical approaches without reference to specific theoretical rationales, and it has been argued that medicine now needs to look to other disciplines for theories relevant to implementation of best practice.⁴⁻⁶ Individual physician factors, such as differences in thinking styles, may be important in understanding the translation of evidence to practice. Psychological theories of decision making may therefore provide one useful framework with which to consider evidence implementation.⁷

Cognitive-Experiential Self Theory (CEST) posits two internal reasoning systems that influence how we relate to the world: experiential and rational.⁸ The experiential is considered to be holistic, unconscious, automatic and effortless; the rational is thought to be analytic, conscious, intentional and effortful. The two systems work in parallel, with their joint operation assumed to determine behaviour. One theoretical implication is that there are believed to be relatively stable differences in how people think. These thinking styles have been called “need for cognition” (the tendency to engage in and enjoy thinking) and “faith in intuition” (the tendency to engage in and enjoy experiential processing).⁹ Receptivity to different messages differs according to these thinking styles.¹⁰ Probability of innovation adoption has been linked to differing individual levels of need for cognition in consumer marketing psychology,¹¹ and matching messages to individual need for cognition styles has resulted in greater mammography utilization in consumer health research.¹² As the presentation of clinical guidelines is a specific example of a communication strategy, we speculated that awareness and use of guidelines may vary according to doctors’ thinking styles.⁷

Since studies of acute coronary syndromes have consistently documented guideline discordant practice,¹³⁻¹⁶ the current study investigated the relationship between thinking dispositions and the knowledge and clinical practices of doctors directly involved in the management of acute coronary syndromes. We predicted that higher need for cognition and/or lower faith in intuition would be associated with (1) awareness of the recently published guidelines; (2) knowing the topics included in the guidelines; (3) correctly answering questions about topics covered in the guidelines; and (4) higher need for cognition and/or lower faith in intuition would be associated with an overall higher self-reported estimate of guideline-concordant clinical practice. We also wished to investigate whether (5) doctors with higher faith in intuition and/or lower need for cognition would be more likely to estimate guideline-discordant clinical practice overall and (6) across eight specific clinical scenarios.

Methods

Setting

An independent study of doctors' knowledge and behaviour in relation to the new National Heart Foundation of Australia/Cardiac Society of Australia and New Zealand Guidelines for the Management of Acute Coronary Syndromes 2006 (referred to as the Physician Guidelines Study),¹⁷ conducted as an adjunct to the Australian Collaborative Acute Coronary Syndromes Prospective Audit (ACACIA),¹⁸ provided a timely opportunity to concurrently measure thinking styles.

Participants

Any doctor approached for the Physician Guidelines Study was eligible to participate in our study, resulting in a sample of 84 consultant general physicians, consultant cardiologists, registrars, residents, interns and private cardiac specialists with an active clinical role caring for patients with acute coronary syndromes. Only eight females responded, while two

respondents did not indicate gender. For homogeneity, the final sample was restricted to the 74 male respondents, who had a mean age of 42.8 years (SD = 10.7).

Design

The study was approved by the Flinders Clinical Research Ethics Committee. A questionnaire measuring thinking styles was included in the Physician Guidelines Study. Surveys were first mailed on 12th July 2006, with two follow-up contacts approximately 3 and 6 weeks later.

Measures

The *Rational Experiential Inventory (REI)*⁹ reliably measures an individual's preference for two styles of thinking: need for cognition (rationality) and faith in intuition (experientiality). Each construct has its own subscales relating to self-stated ability to think in each style (ability) and reliance and enjoyment on each type of thinking (favourability). The REI comprises 40 questions with 5-point response scales (20 each for need for cognition and faith in intuition, with 10 items each for the subscales of ability and favourability). All scores are averaged to provide variables ranging from 1 to 5, with a higher score reflecting a greater tendency to endorse the construct measured. The current sample provided internal reliabilities (Cronbach's α) of 0.84 (total need for cognition), 0.76 (need for cognition: ability), 0.74 (need for cognition: favourability), 0.91 (total faith in intuition), 0.84 (faith in intuition: ability), 0.87 (faith in intuition: favourability).

The relevant data used from the Physician Guidelines Study comprised six questions (Appendix A) that evaluated knowledge, attitudes and clinical behaviours in relation to the recently published National Heart Foundation of Australia/Cardiac Society of Australia and New Zealand Guidelines for the Management of Acute Coronary Syndromes 2006 (the guidelines). These were publicly available three months prior to the survey (17th April 2006).¹⁷ Participants were asked to identify the correct publication date of the guidelines

(Question 1 - Awareness), and to indicate which of three topics were covered (Question 2 – General Knowledge). Detailed knowledge of topics covered in the guidelines was assessed using ten specific questions (Question 3 – Topic Knowledge). Correct answers were tallied to provide a maximum score of 10. Respondents were then asked to assess, using 5-point Likert scales, how often they based their practice on clinical guidelines (Question 4 – Concordant Behaviour), and did not give their patients guideline-recommended care because it differed from what they had always done (Question 5 – Discordant Behaviour). Finally, participants assessed the percentage of their patients who were given guideline-concordant treatment for eight specific clinical scenarios (use of aspirin, clopidogrel, beta blockers, calcium channel blockers, ACE inhibitors, statin therapy, early invasive strategy in high risk NSTEMI-ACS and reperfusion therapy). Responses were averaged to give a mean percentage score, the inverse of which represented discordant practice (Question 6 – Discordant Practice Rate).

Statistical Analysis

De-identified Physician Guidelines Study data were matched with responses to the REI. Analyses were conducted using SPSS Version 14.0 for Windows using Pearson's point-biserial correlation coefficients and Pearson's Product Moment correlation coefficients as appropriate, with statistical significance for all analyses set at $p < 0.05$ (1-tailed). The effect of age was partialled out of all analyses given its negative association with faith in intuition among doctors in an as yet unpublished study.

Results

Descriptive data are summarised in Table 1. The majority of respondents were aware that the guidelines were published in 2006, and that the three topics of unstable angina, NSTEMI and STEMI were covered. Only a small number of doctors achieved a maximum score of 10/10 to

knowledge based questions, although most agreed or strongly agreed that they often based their practice on clinical guidelines (68/74, 91.9%). Approximately half (38/74, 51.4%) also indicated that there are times when they do not give guideline-suggested care because it differs from their usual practice. Doctors' overall mean discordant practice rate was 27.40% (SD = 8.3%).

Table 2 presents correlation coefficients between the variables of interest. Neither need for cognition nor faith in intuition scores were significantly related to correctly knowing the date of guideline publication or scores relating to specific topic content knowledge of the guidelines. Correctly knowing the topics covered in the guidelines was unrelated to need for cognition scores. However knowledge of topic coverage was associated with lower faith in intuition scores. Higher scores on need for cognition (total and favourability subscale) were significantly associated with greater agreement with the statement "I often base my practice on clinical guidelines"

Higher scores on faith in intuition (all scales) were significantly related to higher levels of agreement with the statement "There are times when I do not give my patients guideline suggested care as the guidelines differ from what I have always done previously". Higher faith in intuition scores (all scales) was also associated with a higher average self-stated guideline discordant practice across eight different clinical scenarios concerning the use of: aspirin, clopidogrel, beta blockers, calcium channel blockers, ACE inhibitors, statin therapy, early invasive strategy in high risk NSTEMI, and reperfusion therapy.

Discussion

Doctors with a higher preference for need for cognition identified their practice as more guideline-concordant. A higher preference for faith in intuition was associated with guideline-discordant behaviours. However a higher preference for a rational mode of reasoning was not

significantly related to awareness or detailed knowledge of the guidelines. Only lower faith in intuition was associated with correctly knowing the topic coverage.

The key finding is the demonstrated positive relationship between faith in intuition and self-reported guideline-discordant behaviours. Admittedly the effect sizes are small (r^2 range 6.25% to 7.84%), but if a preference for the experiential/automatic mode of reasoning does predict guideline-discordant practice behaviour, this might inform guideline implementation strategies. While guidelines may communicate the necessary evidence, other strategies might be required to selectively target actual practice. Consistent with CEST, the rational mode of reasoning can be used to ‘correct’ the more automatic functions of the experiential mode. In this case, it could be used to modify clinicians’ perceptions of their own practice in relation to guidelines. Individualised audit and feedback of guideline concordance/discordance is one specific strategy which is conceptually consistent with this view. If discordant behaviour is associated with the experiential mode of reasoning, then further research should test such a strategy within this context.

Possibly most doctors were aware the new guidelines existed because of the timing of the survey three months post publication. Also, detailed knowledge of the evidence in the specific recommendations in the guidelines may have been widely known prior to publication of the guidelines. Knowing the recommendations is not necessarily a result of being familiar with the guidelines.

We note that the link between self-report and actual behaviour remains to be investigated.

Without objective data about an individual doctor’s clinical practice, it is difficult to confirm whether their responses in this study reflect perceived, or real behaviour. Self-report is noted to be a particular methodological challenge for implementation research.¹⁹ This highlights the

need for future research into thinking dispositions to be related to real-life individual clinical behaviours, observed and measured through processes other than self-report.

Conclusions

This study investigated thinking styles and awareness, knowledge and behaviours of male doctors in relation to newly published acute coronary syndrome guidelines. Higher preference for an experiential/automatic mode of reasoning predicted self-reported guideline discordant clinical practice. Higher preference for a rational mode of reasoning predicted self-reported guideline use in relation to practice overall. Findings support that guidelines may be necessary to communicate evidence, but other strategies should be used to target discordant behaviours. Individualised audit and feedback against specific guideline recommendation is one recognised strategy which could correct clinicians' perceptions of reality, and therefore influence appropriate practice changes. Future research should test such interventions in guideline design and implementation.

Competing Interests

The authors declare they have no competing interests.

Authors Contributions

RS, PP and MB conceived and designed this study, with contributions from LH and DC. RS and LH undertook all data acquisition. RS and MB undertook the primary data analysis and interpretation. RS drafted the paper with substantial contributions from MB, and all authors were involved in its revision and final approval for publication.

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Appendix A. Questions used from the Physician Guidelines Study

Question 1. Current Guidelines for the Management of Acute Coronary Syndrome were most recently published in:

1999

2000

2001

2002

2003

2004

2005

2006

Due 2007

[Correct response is 2006]

Question 2. Current guidelines for the management of Acute Coronary Syndromes published by the National Heart Foundation and the Cardiac Society of Australia and New Zealand cover (please tick all boxes that apply):

Unstable Angina

NSTEMI

STEMI

[Correct response is to tick all three topics]

Question 3. Please consider the following statements and mark only those with which you **strongly** agree.

An elevated cardiac troponin (I or T) is diagnostic of cardiac chest pain

An elevated CK-MK is diagnostic of cardiac chest pain

With the advent of cardiac troponins, CK levels do not need to be measured

An elevated cardiac troponin is a useful discriminator for risk of further events in patients presenting with suspected unstable angina*

The ECG is the sole test required to select patients for emergency reperfusion (thrombolytic therapy or direct PCI)*

Exercise treadmill testing for unstable angina patients judged to have intermediate risk should be delayed until the result of cardiac troponin taken 8 hours following initial chest pain*

All patients presenting with chest discomfort should have an ECG completed within five minutes of arrival at a medical facility*

Intermediate risk patients need to be treated with heparin unless reclassified into a low risk group

Streptokinase is the reperfusion modality of choice in Aboriginal patients

In patients with unstable angina and NSTEMI, randomized studies have shown no definite reduction in mortality with the use of beta blockers*.

[Indicates correct responses]*

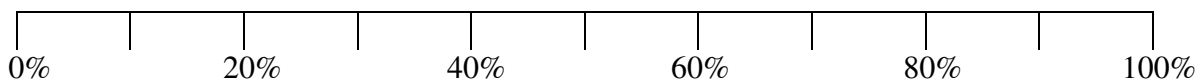
Question 4. I often base my practice on clinical guidelines.

Strongly agree Agree Neutral Disagree Strongly agree

Question 5. There are times when I do not give my patients guideline suggested care as the guidelines differ from what I have always done previously.

Strongly agree Agree Neutral Disagree Strongly agree

Question 6. The following rating scale was provided for the 8 parts of question 6.
[100% represents maximal guideline concordance].



Question 6.1 (Aspirin)

For patients under my care, the percentage with an acute coronary syndrome *who have no contraindications and are discharged on aspirin* is approximately ...

Question 6.2 (Clopidogrel)

For patients under my care, the percentage with an acute coronary syndrome *who have no contraindications and are discharged on clopidogrel* is approximately ...

Question 6.3 (Beta Blockers)

For patients under my care, the percentage with an acute coronary syndrome *who have no contraindications and are discharged on beta blockers* is approximately ...

Question 6.4 (Calcium Channel Blockers)

For patients under my care, the percentage with an acute coronary syndrome *who have no contraindications and are discharged on calcium channel blockers* is approximately ...

Question 6.5 (Angiotensin Converting Enzyme (ACE) Inhibitors)

For patients under my care, the percentage with an acute coronary syndrome *who have no contraindications and are discharged on an ACE Inhibitor* is approximately ...

Question 6.6 (Statin Therapy)

For patients under my care, the percentage with an acute coronary syndrome *who have no contraindications and are discharged on statin therapy* is approximately ...

Question 6.7 (Early Invasive Strategy in High Risk NSTEMI)

For patients under my care, the percentage who present with high risk NSTEMI and who are provided with early (within 48 hours) invasive management is approximately ...

Question 6.8 (Reperfusion Therapy)

For patients under my care, the percentage with STEMI (who present within 12 hours and have no contraindications) and are given reperfusion therapy is approximately ...

Table 1. Descriptive data for key study variables.

Rational-Experiential Inventory (Mean, SD)	
Need for cognition (total score)	3.93 (0.37)
Need for cognition (ability)	4.04 (0.34)
Need for cognition (favourability)	3.82 (0.48)
Faith in intuition (total score)	3.05 (0.53)
Faith in intuition (ability)	3.27 (0.51)
Faith in intuition (favourability)	2.83 (0.64)
Acute Coronary Syndromes Knowledge and Behaviours	
Q1. Awareness (n/N, % correct answers) <i>Correctly knows year of publication</i>	50/74 (67.6)
Q2. General Knowledge (n/N, % correct answers) <i>Correctly knows topic coverage</i>	59/74 (79.7)
Q3. Topic Knowledge (Mean, SD) <i>Number of correct responses (max. 10)</i>	7.08 (1.35)
Q4. Concordant Behaviour (Mean, SD) <i>I often base my practice on clinical guidelines</i>	4.24 (0.64)
Q5. Discordant Behaviour (Mean, SD) <i>There are times when I do not give my patients guideline suggested care as the guidelines differ from what I have always done previously</i>	2.77 (0.94)
Q6. Discordant Practice Rate (Mean, SD) For patients under my care, the percentage with an acute coronary syndrome <i>who have no contraindications and are discharged on [treatment]</i> is approximately ...	27.40 (8.25)

Table 2. Summary of Correlations* relating to Study Hypotheses

ACS Knowledge and Behaviours	Faith in Intuition			Need For Cognition		
	Ability	Favourability	Total	Ability	Favourability	Total
Q1. Awareness <i>Correctly knows year of publication</i>	.04 <i>p = .373</i>	-.02 <i>p = .445</i>	.01 <i>p = .470</i>	.05 <i>p = .341</i>	.05 <i>p = .337</i>	.06 <i>p = .323</i>
Q2. General Knowledge <i>Correctly knows topic coverage</i>	-.18 <i>p = .057</i>	-.20 <i>p = .047</i>	-.21 <i>p = .041</i>	.13 <i>p = .143</i>	.11 <i>p = .135</i>	.14 <i>p = .117</i>
Q3. Topic Knowledge <i>Number of correct responses (max. 10)</i>	-.09 <i>p = .233</i>	-.08 <i>p = .245</i>	-.09 <i>p = .222</i>	.13 <i>p = .143</i>	.13 <i>p = .138</i>	.14 <i>p = .117</i>
Q4. Concordant Behaviour <i>I often base my practice on clinical guidelines</i>	.02 <i>p = .447</i>	.03 <i>p = .389</i>	.02 <i>p = .407</i>	.28 <i>p = .009</i>	.19 <i>p = .058</i>	.25 <i>p = .008</i>
Q5. Discordant Behaviour <i>There are times when I do not give my patients guideline suggested care as the guidelines differ from what I have always done previously</i>	.20 <i>p = .050</i>	.29 <i>p = .007</i>	.27 <i>p = .012</i>	-.16 <i>p = .092</i>	-.10 <i>p = .208</i>	-.14 <i>p = .129</i>
Q6. Discordant Practice Rate <i>For patients under my care, the percentage with an acute coronary syndrome who have no contraindications and are discharged on [treatment] is approximately ...</i>	-.27 <i>p = .011</i>	-.25 <i>p = .020</i>	-.28 <i>p = .009</i>	-.04 <i>p = .373</i>	-.08 <i>p = .268</i>	-.07 <i>p = .293</i>

* All probabilities are 1-tailed