

A conceptual treadmill: the need for ‘middle ground’ in clinical decision making theory in nursing

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This paper explores the two predominant theoretical approaches to the *process* of nurse decision making prevalent within the nursing research literature: systematic-positivistic approaches as exemplified by information processing theory, and the intuitive-humanistic approach of Patricia Benner. The two approaches’ strengths and weaknesses are explored and as a result a third theoretical stance is proffered: the idea of a cognitive continuum. According to this approach the systematic and intuitive theoretical camps occupy polar positions at either end of a continuum as opposed to separate theoretical planes. The methodological and professional benefits of adopting such a stance are also briefly outlined.

Keywords: clinical decision making, information processing, intuitive knowing, cognitive continuum, theoretical discussion, methodological development, nursing knowledge

INTRODUCTION: THE SEMANTICS OF NURSE DECISION MAKING

In relation to the examination of decision making in nursing a number of expressions are used by authors to describe what is, in essence, the same phenomenon: decisions taken by nurses relating directly to issues of nursing diagnosis or intervention in clinical settings. Clinical decision making is the most common term used (Ford 1979, Field 1987, Luker & Kenrick 1992) but other terms utilized include clinical judgement (Benner & Tanner 1987, Itano 1989), clinical inference (Hammond 1964), clinical reasoning (Grobe *et al.* 1991) and diagnostic reasoning (Carnevali *et al.* 1984, Radwin 1990). To all intents and purposes these terms are interchangeable given they describe a single process, namely, the ‘operationalisation of nursing knowledge’ (Luker & Kenrick 1992 p. 458). The stance that nursing decisions represent the

operational face of nursing knowledge is the one adopted by this paper. However, as will be demonstrated later, the operationalization of knowledge is no monotonic or linear equation along the lines of:

[scientific] knowledge + clinical challenge + registered practitioner = uniformly optimal decision

An alternative way of viewing the subtle differences in descriptions of the same process is to recognize that terms such as clinical diagnosis represent the *process* of decision making and also the *outcome* of this process (Carpenito 1983, Gordon 1987). This paper explores theory on decision making as a *process*. The paper, and the study with which it is associated, do not seek to judge the quality of decisions reached, or whether the decisions are better or worse for different nurses using different decision making models. There are two reasons why deploying such an approach would be methodologically unwise.

First, studies seeking to examine the outcomes of decisions often depend on the implicit assumption that 'good' equals 'accurate' (Tanner *et al.* 1987, Hamers *et al.* 1994). This is problematic for nursing as we do not yet know what constitutes an 'accurate' nursing diagnosis or intervention-decision. For example, would an accurate decision be one which most nurses (however ill-informed) would take? One which is best supported by scientifically rigorous and generalizable research findings? Or one which best balances the needs of the nurse, available resources and the end-user? All of these could be taken legitimately as 'accurate' decisions but each could conceivably be very different both in terms of process and outcome.

This flaw is compounded by the second reason for rejecting a comparative approach, namely, the lack of consensus regarding nursing diagnoses themselves. Nursing lacks an internationally recognized database of nursing diagnoses such as that used in medicine in specialities such as psychiatry. Moreover, little, if anything, is known about the correlation between information, the cues used to guide decisions, and the diagnoses or decisions reached. Clearly then without greater knowledge of the outcomes of decisions and a demonstrable (or at least visible) degree of consensus amongst practitioners regarding nursing diagnoses such an approach would be ill-advised. However, these limitations do not prevent the exploration of the processes involved in decision making.

Despite the lack of linguistic homogeneity, a variety of models of decision making in nursing, both normative and descriptive, have been advanced. These models fall into two discrete theoretical categories: the systematic-positivist and the intuitive-humanist.

THE SYSTEMATIC-POSITIVIST STANCE ON DECISION MAKING

The dominant explanatory stances on nurse decision making until the 1980s were models portraying decision making as a hypothetico-deductive rational process based around theory derived from the field of cognitive psychology. A number of influential studies took the issue of nurse decision making and explicitly or implicitly sought to examine it from the perspective of what will be termed the Information Processing Model (Cianfrani 1984).

The information processing model

The central assumption behind the model is that the human decision system can be separated into two components: short- and long-term memory. Short-term memory houses the stimuli information required to 'unlock' factual (semantic) and experimental (episodic) knowledge stored in long-term memory (Carnevali *et al.* 1984, Hamers *et al.* 1994). The interface between these two cognitive

databases is represented by a four-stage process (Radwin 1990, Hamers *et al.* 1994).

First, the clinician takes part in a patient encounter and gathers preliminary clinical information about the patient (also called the cue acquisition stage). This information can also be gathered prior to patient encounter.

Following this the clinician generates initial, tentative, hypotheses. These are related to gathered data and short-term memory-based cues. The number of hypotheses generated is generally estimated as being limited to between four and six.

The third stage (interpretation) involves the clinician interpreting the cues gathered during the acquisition stage and classifying them as either confirming, refuting or not contributing to the initial hypotheses generated.

Using this classification, the final evaluatory stage involves the clinician weighing up the pros and cons of each decision alternative and choosing the one favoured by the preponderance of the evidence.

This basic sequential hypothetico-deductive model has been used as the basis for more elaborate schemata; but despite increasing complexity the basic stages remain. For example, Carnevali (1984) describes a seven-stage process of diagnostic reasoning in nursing which simply breaks down the basic four-stage model described thus far:

- 1 Exposure to pre encounter data.
- 2 Entry to the data search field and shaping the direction of data gathering.
- 3 Coalescing of cues into clusters or 'chunks'.
- 4 Activating possible diagnostic explanations (hypotheses).
- 5 Hypothesis and data directed search of the data field.
- 6 Testing diagnostic hypothesis for goodness of fit.
- 7 Diagnosis.

A number of studies have attempted to go beyond the somewhat vague assertion that nurses simply weigh up the 'pros and cons' of decision alternatives and have tested the hypothesis that nurses draw on formal or informal (i.e. known or estimated) probability estimates of 'diagnostic fit' as well as contextual data in making clinical decisions. Specifically, a number of authors have utilized Bayesian and/or probability theory to examine the clinical decision making of nurses (Hammond *et al.* 1967, Aspinall 1979, Panniers & Kellogg-Walker 1994).

Bayesian logic in nurses' decision making?

Bayes' theorem, expressed mathematically, argues that:

$$\text{Prob}(H/E) = \text{Prob}(H) \times \text{Prob}(E/H) / \text{Prob}(E)$$

The significance of Bayes' theorem to a discussion of clinical decision making comes when this equation is unpacked. Simply stated, Bayes' theorem argues that people hold degrees of belief in relation to scientific

theories or outcomes (or indeed any phenomenon). Moreover, these degrees of belief will be adjusted in response to the presentation of new probability-evidence (Papineau 1996), to the extent that the practitioner considers E likely given H, but unlikely otherwise. For example, suppose that H is the hypothesis held by the practitioner and E is some new evidence relating to the hypothesis then the theorem dictates that upon discovering the evidence the practitioner will adjust their degree of belief in the hypothesis in line with the right hand side of the equation.

Expressed alternatively, if the evidence (E) is very surprising or enlightening (for example, that the use of compression bandaging significantly decreases healing time for venous leg ulcers) but is in line with the theory adopted (H — that compression bandaging appears to be beneficial in the patients that you treat for leg ulceration) then it should make you increase your belief in (H). The corollary being that if the evidence is no more likely given H than it would be according to any other theory then the presence of E provides no more support for H and beliefs should be adjusted accordingly (Papineau 1996 pp. 295–296). The currency of Bayes' theorem therefore is probability relating to nursing evidence and hypotheses.

Hammond *et al.* (1967), in what was probably the first significant strand of nurse decision making research, examined the ways in which six nurses revised their diagnoses of patients' conditions as new data were gathered and presented. These revised hypotheses and diagnoses were then compared with calculated probabilities of the conditions. Whilst consistently reviewing their hypotheses, nurses tended to be 'cognitively cautious' in their revisions. That is, they were not as revisionist as the Bayesian model of decision making would suggest.

Aspinall (1979) took this approach further and found that a structured decision modelling tool (a decision tree) based on calculated probabilities helped nurses to reach 'correct' diagnostic decisions. Panniers and Kellogg-Walker (1994), however, using a similar approach (though different research methods) found that nurses' intuitive decisions and those promoted by a tool based on calculated probabilities were significantly different. Specifically, in relation to wound dressings there was only a 35% level of agreement between qualitative judgement and quantitative evidence-led prescriptions (Panniers & Kellogg-Walker 1994), although it is worth noting that in the absence of treatment outcome data (and associated probabilities) the quantitatively 'correct' decisions in this study were not necessarily the optimal ones in terms of clinical effectiveness. Instead, the work focused on the probabilities of variables such as nurses' knowledge of the product, patient comfort, risk of adverse effects and costs.

It is clear that the Bayesian annex of the systematic-positivist strand of decision making is more prescriptive than descriptive. Bayesian models and studies examining their utility offer the potential for improving decision

making rather than describing the reality of clinical practice. This is a criticism which is levelled at the information processing model generally; namely, that the linear sequential implications of the model are not observed in practice. Nurses frequently overlap stages in the process and change their order (Lauri 1982, Jenkins 1985, Corcoran 1986.). Fischhoff and Beyth-Marom (1983) present a useful overview of the theory of Bayesian logic in relation to systematic perspectives on cognition and also point out the limitations of the theory in the 'real world' of clinical practice. This lack of descriptive 'fit' is the basis for the competing, intuitive-humanist, alternative model of clinical decision making.

THE INTUITIVE-HUMANIST STANCE ON DECISION MAKING

Just as there is a lack of consensus over the terms used to describe decision making, the lack of consensus surrounding descriptions of the role of intuition in clinical decision making mitigates against an easy summary of the relevant literature in this area. The various approaches to defining intuition include:

- 'Understanding without a rationale' (Benner & Tanner 1987 p. 23).
- 'A perception of possibilities, meanings and relationships by way of insight' (Gerrity 1987 p. 63).
- 'Knowledge of a fact or truth, as a whole; immediate possession of knowledge; and knowledge independent of the linear reasoning process' (Rew & Barron 1987 p. 60).
- 'Immediate knowing of something without the conscious use of reason' (Schrader & Fischer 1987 p. 45).
- '[A] ... process whereby the nurse knows something about a patient that cannot be verbalized, that is verbalized with difficulty or for which the source of knowledge cannot be determined. (Young 1987 p. 52).

The author most attributed with developing the intuitive model and the distinction between theoretical knowledge and experiential knowledge is Patricia Benner (1984). Her work has been hugely influential in the preparation of trainee nurses (Luker & Kenrick 1992) and offers a useful theoretical counter to the empiricism associated with the information processing model. The basic thrust of all intuitive-humanist models is that intuitive judgement distinguishes the expert from the novice, with the expert no longer relying on analytical principles to connect their understanding of the situation to appropriate action. Nursing appears intuitive to the outside observer and feels internalized within the practitioner; clinical decisions are the result of an almost unconscious level of cognition (Hamers *et al.* 1994).

In common with others, McKenna makes the analytical distinction between 'know how' and 'know that'

knowledge. 'Know how' knowledge is that which is skills based, rooted in intuition and often relates to the 'art' of nursing. 'Know that' knowledge, on the other hand, is grounded in theory and empirical research and often classified as responsible for the 'science' of nursing (McKenna 1997). For McKenna, Benner's work contributes firmly to the 'know how' knowledge base of nursing or nursing as art. For Benner herself, however, such a classification is unforthcoming, as for her nursing constitutes a practice rather than an art (Bishop & Scudder 1997).

The primary distinction between systematic-rational and intuitive approaches lies in their respective motivational loci. In the systematic approach of the information processing model the prime motivators in any decision are its related task-features: the number of cues, the task complexity, etc. In the intuitive approach of Benner and Dreyfus and Dreyfus (1986) — on which Benner's work is based — the shaping force in any decision is the individual making it. Good decisions are those made intuitively by professionals with expertise, such expertise representing the end-point of a five-stage sequential transformation from novice to expert:

- 1 Novice: those with no experience of situations in which they are expected to perform and who find themselves governed by context-free rules as guides to action.
- 2 Advanced beginners: those who demonstrate marginally acceptable performance and have amassed enough experience to recognize recurring meaning in the situations they are involved in.
- 3 Competent: those who see their actions as part of a longer-term plan which helps achieve efficiency and organization in work.
- 4 Proficient: the practitioner begins to perceive things as a whole with speedy alterations to the long-term plans when expected normal patterns of care do not present themselves.
- 5 Expert: one who has no reliance on guiding rules or maxims and who has an intuitive grasp of situations; only falling back on hypothetico-deductive logic when a new or unexpected challenge arises.

THE STRENGTHS AND LIMITATIONS OF THEORETICAL DECISION MAKING MODELS

Both the systematic-positivist and the intuitive-humanist stance have a number of strengths and limitations. These can be separated into four themes: communicability; simplification; context specificity; and applicability.

Communicability

Knowing can only become shared knowledge when it is communicated to others (McKenna 1997) and herein lies the problem for intuitive models: it is almost impossible to

communicate something which is intangible and which the practitioner is unable to express. Given that the intuitive model exemplified by Benner and her acolytes relies on experiential knowledge as the basis for 'knowing' as opposed to the science of communicable research findings, it is difficult to imagine a scenario where nursing's knowledge base becomes a shared resource available to all practitioners equally. One could argue that the intangible 'character' of nursing is often passed from expert to novice through observation and a form of physical apprenticeship, but this still begs the question, how does the novice know whether their interpretation of the intangible is an appropriate one? This is particularly so when one considers that certain kinds of clinical experience and the decisions that accompany them are something of a 'scarce resource' for students, with all the accompanying limitations on opportunities for knowledge reinforcement that follow.

Systematic-rational, hypothetico-deductive, models are not without their problems in this regard, however. Whilst undoubtedly promoting communicability (through transparency) in the decision making process, the use of knowledge, and the reproduction of that knowledge, the process itself may not be that relevant if, as appears to be the case, it does not 'fit' with the reality of clinical practice. Lauri and Salanterä (1995), using a factor-analytical approach, found evidence that both Benner's intuitive model and the hypothetico-deductive approach of information processing had a degree of analytical utility in explaining the decision making of nurses. The implication was that both have something to offer and that neither one offers a unitary solution to explaining decision making in the complex arena of practice. The importance of this pluralistic explanation is highlighted later in the paper when the idea of a cognitive continuum is introduced.

Simplification

Linked to this realization is the problem of simplification or reductionism. If the information processing model is failing to capture all the variables involved in decision making and clinical diagnosis (McGuire 1985) and at the same time communicating this 'incomplete' picture to other practitioners in the form of scientific 'evidence' then nursing's knowledge base will continue to develop in an *ad hoc* manner with significant gaps in the total picture. The intuitive model of expertise and decision making at least allows for the complexity of decisions allied to health care provision and recognizes that health is more than the sum of its constituent parts. More importantly intuitive expertise-based approaches recognize that nursing as a verb is more than the sum of a series of physical, social and spiritual interventions carried out on the patient. However, if the profession relies on holistic

'intuitive' forms of knowing in its practitioners as the basis for practice then, whilst undoubtedly allowing for the complexity of the work, nursing decisions will remain an opaque activity unable to be influenced by anyone other than nurses, thereby representing perhaps the ultimate form of occupational closure!

Context specificity

Crow and colleagues (1995) point to the importance of practice context to decision making — although they prefer the more formal term domain-specific knowledge structures. For Crow, contexts such as occupation and clinical specialty are seen as significant determinants of decision making. These domain [context] specific knowledge structures:

... specify what action to take and can be best described as ways of thinking about problems met in everyday practice. For example, nurses experienced in looking after patients with diabetes may judge whether the patient's condition is stable very differently from nurses experienced in looking after patients with a myocardial infarction.

(Crow *et al.* 1995 p. 208)

Crow points to three studies (Prescott *et al.* 1989, Marks *et al.* 1991, Javacone & Dostal 1992) as evidence of the importance of such domains to the decisions made by nurses. The importance of domain or context, however, is not treated equally by the two camps of clinical decision making theory. The systematic-positivist approach to decision making can be criticized because it includes an implicit assumption that judgement is the result of a unitary generic process used by all clinicians at all times (Berner 1984). The intuitive-humanist approach can be criticized for the opposite reason; namely, because of its axiom that each clinical challenge is unique, and the processes and inputs used subjective, then it is almost entirely context-specific and transferability of 'intuition' between different practitioners becomes impossible (Radwin 1990).

Applicability

Whilst both the systematic-positivist model of information processing and the intuitive-humanist approach are presented in the literature as descriptive models (i.e. they describe how decisions are made rather than how decisions ought to be made) there appears little to convince the author that either offers a unitary solution to the problems of researching clinical decision making in nursing. A number of commentators highlight the fact that most studies are characterized by decision making models which represent a 'middle way' — combinations of intuition, explicit data gathering, and tangible explanation and intangible 'knowing'. For example, Philips and

Rempushki (1985) found that whilst decision making was grounded in the acquisition of data it was far from the linear progression assumed by the hypothetico-deductive model generally. Smith (1988) found that intuition or 'gut instinct' was often combined with 'objective' data as well as subjective variables such as nurse experience and familiarity with the patient.

A DECISION MAKING CONTINUUM?

There is little to convince this researcher that either the humanistic-intuitive approach or the systematic-rational approach offers a solely convincing basis for explaining decision making and by implication the information used as the basis for nursing decisions. A more appropriate stance might be to recognize that each has something to offer and that in their theoretically 'pure' states they represent ideal-typical frameworks for analysis. Certainly, White *et al.* (1992) found in their study that whilst hypothetico-deductive models were applied the end-result was a decision making model which possessed the characteristics of both models:

[The study findings] ... indicate that the hypothetico-deductive process of clinical decision making was applied... the difference... in the time spent working through the simulations and in the amount of subjective data acquired also is consistent with evolving cognitive models which indicate that efficiency in clustering information develops with experience in a given setting or with specific presentations. This supports the findings of Benner that expert nurses... move ahead more quickly and on the basis of less subjective data than novice nurses.

(White *et al.* 1992 p. 157)

Similarly, in their work on learning to use scientific knowledge in education and practice settings (in a British context) Eraut and colleagues (1995) argue that systematic-rational approaches alone fail to explain advanced levels of clinical performance. However, they add the caveat that the intuitive models of Benner and the Dreyfusses are often idealized rather than researched and that professional deliberations are usually mixtures of intuitive and analytical processes.

With these points in mind it is appropriate to view both models as ideal typical end-points on a continuum of clinical decision making, particularly as there is so little empirical material to draw on, and that which is presented throws up contradictory themes and mixed messages. This view of a 'cognitive continuum' in relation to clinical decision making is supported by Hamm (1988). His analysis is based firmly in medicine, but the key points apply equally to an analysis of nursing practice. For Hamm, practitioner cognition is neither purely intuitive nor purely analytical, rather it is commonly located at some point in between (Hamm 1988 p. 82). For example, the expert community practitioner will, in the delivery of care:

- Exhibit elegant and logical use of diagnostic and decision making skills and expected probabilities in selecting products for use on a patients with wounds (rational-analytic thought).
- Know intuitively when to refer a patient to another member of the multidisciplinary health care team after just a few introductory questions and an assessment when faced with a patient with a leg ulcer (intuitive cognition).
- In the course of teaching juniors, steer them in the assessment of the presenting features of a given patient using their own judgements and perceptions as a framework (a combination of both — quasi rational cognition).

According to the cognitive continuum theory the major determinants of whether a practitioner utilizes a rational or intuitive approach to decision making are primarily determined by the position of the task on a continuum which has three dimensions (Hamm 1988 p. 83):

- 1 Complexity of task structure.
 - 1.1 Number of cues — when presented with lots of information a practitioner will probably utilize an intuitive approach.
 - 1.2 Redundancy of cues — the more cues help in the prediction of the presence of other cues then the more likely that intuitive cognition will be used.
 - 1.3 The nature of an organizing principle — if a simple 'averaging' approach to combining information is known to be more accurate then intuitive thought is likely to be a feature. If it is known that a complicated approach to combining evidence produces more accurate answers then this will induce an analytical approach.
- 2 Ambiguity of the task
 - 2.1 Whether an organizing principle exists — if an organizing principle exists then the practitioner is more likely to be analytical.
 - 2.2 Familiarity of the task — unfamiliarity induces an intuitive approach as the practitioner has not had time to develop more complicated ways of dealing with cue information.
 - 2.3 The potential for accuracy — if a particular approach to assessment is known to be accurate (even if only perceived as such) then it is more likely to be used as the basis for analysis. For example, universal assessment scales for pressure sore assessment.
- 3 Nature of the presentation of the task
 - 3.1 Task decomposition — if the task leads to the need to address related sub-tasks then analytic modes of thought will be used.
 - 3.2 The ways in which information is presented — if visual information is used then intuition is induced. If the information is presented as

objective and quantitative then analysis is commonly a feature.

- 3.3 Time available — the shorter the available time the more likely that intuitive approaches will be adopted.

However, where the cognitive continuum theory departs from the 'cold' rationality of the information processing model is in its encompassing of the variables of power, social structure and individual knowledge (Hamm 1988 p. 84). As a framework for researching nurse decision making the theory allows for the realization that multidisciplinary team members will accept analytical thinking from people who are broadly perceived as competent, able to eliminate uncertainty, and familiar: often those 'experts' in senior clinical positions. Similarly practitioners may reject intuitive solutions from 'junior' colleagues where analytical reasoning cannot be demonstrated. Clearly, this suggests that variables such as an individual's position in the structures and hierarchies in a work environment will exert some sway on the organizing cognitive principles available for them to deploy.

Similarly, the relationship between individual knowledge and cognitive modes is significant; as Hamm points out, 'the ability of a task thinker to induce a mode of cognition depends [also] on what the thinker knows' (Hamm 1988 p. 84). For example, if a practitioner does not know that there are sound scientific principles behind the selection of wound care products, then a wound-based 'task feature' will not encourage analytical cognition in dealing with wound data.

The fact that issues of social structure and levels of knowledge variation amongst practitioners can be incorporated into any analysis is an attractive aspect of the theory. From a researcher's perspective this allows nurse decision making to be brought into analytical and methodological frameworks which view nursing as a form of social action, with the attendant emphasis on questions of culture, values, interests and power that accompany such perspectives.

CONCLUSION

The nursing literature commonly separates decision making into one of two theoretical camps: the systematic-positivist approach (as typified by information processing theory), and the intuitive-humanist stance of Benner and the Dreyfusses. However, neither of these two positions offer a unitary theory able to reconcile the apparently different worlds of normative theory and clinical reality. An alternative approach is to accept that, whilst conceptually distinctive, the two approaches occupy the same theoretical plane. Specifically, the systematic-positivistic stance of the information

processing-based approaches and the intuitive-humanistic stance of Benner represent poles at either end of a cognitive continuum.

The promotion of the two approaches as poles on a continuum rather than diametrically opposed entities is not simply some theoretical 'opt out' or a simple methodological 'middle-way'. It is a solution which recognizes the diversity of individual cognitive strategy and, more importantly, lends itself to the theoretical development and empirical testing of decision support systems which assist the clinician in reaching decisions able to cope with the plurality of modern clinical practice. This is an important point as, in respect of the Benner/Dreyfus models, such supporting empirical enquiry is not a dominant feature of the literature. Such quantitative evidence of the explanatory as well as normative power of the humanistic-intuitive approach to decision making for nursing would greatly add to the utility of the theory for the profession.

Whilst not wishing to introduce the quantitative/qualitative evidence debate into the paper at such a late stage, it is worth noting that the decisions nurses make, the processes behind them and the outcomes they produce are intricately linked to nursing's professionalization 'project' — i.e. the broader struggle to be seen as a professional occupational group. Good quality, generalizable and analytically transparent evidence of the applicability of Benner's ideas to nursing practice would do much to convince those concerned with nurses' decision making of the value of this vital member of the health care team, particularly as the qualitative studies often used as a means of 'demonstrating' the theory can be criticized for further mystifying professional practice and ultimately serving as literary tools supporting attempts at occupational closure. By acknowledging that unitary decision theories are limited in their methodological usefulness to the researcher of nursing practice and decisions, then more elegant — and more importantly, transparent — research solutions can be advanced. This has to be to the benefit of all and not just those who are intuitively 'in the know'.

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