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Learning about health

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This paper examines the extent of patients' health-related learning from a range of sources and aims to identify psycho-cognitive variables that predict learning. Using a survey design, we found that people higher in perceived health competence were lower in anxiety and took a more logical approach to decision making. Low perceived health competence was associated with avoidant decision making. Levels of learning were predicted by perceived health competence, decision-making orientations and anxiety. Perceived health competence was a significant positive predictor of both learning from health professionals and of learning from other sources, such as the internet. Rational decision-making orientation and anxiety, however, were not associated with learning from medical professionals but were predictive of levels of learning from other sources. Highly dependent decision makers reported learning more from their medical professionals. The implications for theory and practice are explored.

Keywords: learning, health competence, anxiety, decision making

Introduction

Patients need to understand their health conditions in order to make good choices. We examine the extent to which patients of general practitioners learn about their health from different sources and we identify important psycho-cognitive variables that predict learning. Our study contributes to a greater understanding of adult patient behaviour and underlines yet again the importance of developing positive orientations to learning in our adult population.

In this paper, we establish the importance of patients' understanding of their health conditions. We review the literature on predictors of information seeking and learning, considering in turn perceived health competence, decision-making orientations and anxiety.

Over the past decades, the model of medical decision making has shifted from one where doctors took decisions on behalf of their patients to a more egalitarian model where patients are expected to participate actively in decisions regarding their health care (Kaba & Sooriakumaran 2007). This shift is now enshrined in regulatory guidelines, patient rights declarations, health policy and law (Patak et al. 2009; Waterworth & Luker 1990). The move towards patient-centred care and shared decision making is recognised not only as appropriate in societal terms but also as having a positive impact on health (Mead & Bower 2000). Patients who know more about their health and participate in decision making stay safe (Davis, Jacklin, Sevdalis & Vincent 2007) and maintain better health (Kickbusch 2001).

Recently health literacy or health competence has emerged as a concept both within health care and within adult education. It has been defined as 'The degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate health decisions' by the US Department of Health and Human Services (2010: 1). Efforts have been made

to measure health literacy in the form of a series of competencies (Steckelberg, Hülfenhaus, Kasper, Rost & Mühlhauser 2007). The results of these studies suggest that a high proportion of the general population does not have the competencies to understand adequately and manage their own health (Barber et al. 2009). At present we do not know why some patients are well-informed and actively involved in their own health-related learning and others are not. Educational level and socio-economic status have been identified as predictors of health literacy (Barber et al. 2009; Paasche-Orlow 2005), demand for information (Ayers 2007; Dutta-Bergman 2003) and participation in decisions (Kaplan, Gandek, Greenfield, Rogers & Ware 1995; Murray, Pollackb, Whitec & Lo 2007). To date research has not clearly identified the underlying psycho-cognitive differences by which these simple demographics affect health-related behaviours. In the section below we identify three psycho-cognitive orientations which are potential predictors of individual differences in levels of health-related learning. They are perceived health competence, decision-making orientation and anxiety. We examine these three variables to ask:

> Research question: What is the relationship between perceived health competence, decision making and anxiety?

Perceived health competence, also known as health self-efficacy, is reported to predict whether patients will try to change their health behaviour, how much energy they will invest, and how persistent they will be (Schwarzer 2008). Health-based self-efficacy has been related to satisfaction with information (Stewart, Abbey, Shnek, Irvine & Grace 2004) and with the selection of information sources (Pálsdóttir 2008). Similarly, it has also been proposed that self-efficacy leads to greater health-related information seeking and, in turn, learning (Johnson & Meischke 1993; Wilson 1997).These findings are consistent with social cognitive theory (Bandura 1986) and other models of behaviour, for example the theory of planned behaviour (Ajzen 1991). Therefore, we expect that perceived health

competence will be positively associated with reported levels of learning.

> Hypothesis 1: Patients high in perceived health competence will report more learning than patients low on perceived health competence.

Several workers take an information-processing approach in an effort to explain active information and learning behaviours (Ellis 1989; Kuhlthau 1991) and propose stages and meta-cognitive monitoring processes (Johnson & Meischke 1993; Wilson 1997). Implicit in these models is a view of the learner as cognitive, rational (albeit flawed) and engaged. Information seeking is seen as a means to an end, with the end being problem resolution or sense making and an associated uncertainty reduction (Wilson 1997). Much of this work derives from library and information scientists who study information seekers in situations that may be less time pressured and emotionally charged than some patients' experience (Johnson 2009).

Not everyone makes decisions in the same way and, while the rational decision maker is both implicitly and explicitly thought of as the ideal, a number of other orientations to decision making have been described (Gambetti 2008; McRoberts, Hall, Madden & Hughes 2011). Rational decision makers are logical, in that they systematically seek information and apply reason to their decisions. On the other hand, a decision maker may tend to be dependent, that is, they may rely on others to take their decisions or they may be avoidant, that is, they tend to defer decision making (Thunholm 2008).

To the extent that health-related information seeking and learning reflects an effort to inform and engage in problem solving, then rational problem-solving strategies should positively predict information seeking and learning. Conversely an avoidant approach should be associated with reduced information seeking and learning.

Hypothesis 2: Patients high on rational decision-making orientation will report more learning than patients low on rational decision-making orientation.

Hypothesis 3: Patients high on avoidant decision-making orientation will report less learning than patients low on avoidant decision making.

Dervin developed her sense making theory to explain real world behaviour (Dervin 1983). It is based on the notion that in a situation that is uncertain, sense making takes place in an effort to achieve a desired outcome. She proposes that individuals are constantly theorising within their small world contexts. Their resultant mental models are robust, believed and familiar (Westbrook 2006). The pre-conditions that determine information seeking and acquisition are based on the division of people into 'insiders' and 'outsiders', with insiders' information carrying more weight than outsiders' information. These models can go some way to explaining why patients sometimes reject valid information and make seemingly irrational decisions (Case, Johnson & Allard 2005).

Both sense making approaches (Dervin 1993) and goal-oriented, problem-solving approaches (Wilson 1997) draw attention to the importance of affect and feelings of uncertainty. Uncertainty reduction theory proposes we have a drive to reduce uncertainty and its associated anxiety or discomfort and there is ample evidence that levels of uncertainty positively predict information-seeking efforts (Guo 2011).As a general rule, the more information we access, the more we reduce uncertainty (Case et al. 2005). A model emphasising uncertainty as a learning motivator does not need to posit any problem-solving ambitions: people seek information, but may make no use of any knowledge gained; it simply serves to reduce uncertainty and the anxiety or discomfort associated with not knowing.

However, information does not always lead to uncertainty reduction (Eastin & Guinsler 2006) and health anxious people may indulge in extensive information seeking, reassurance and service use (Salkovskis & Warwick 1986). Paradoxically, it seems that highly anxious people may search for information more but feel they learn less. Bensi and Giusbertia (2007) suggest that anxiety may provoke less rather than more information seeking, and demonstrate that individuals high on trait anxiety use fewer points of evidence prior to making a decision. They interpret the findings as reflecting that their heightened sense of uncertainty leads anxious people to jump to decisions, even at the expense of decisional accuracy. Additionally, uncertainty management theory (Ford, Barrow & Stohl 1996) suggests that uncertainty does not always drive information seeking, and that sometimes uncertainty will be deliberately maintained.

Thus there is research that suggests that when anxiety and uncertainty are high, information seeking may be either increased or decreased. This seems intuitively reasonable, that in an effort to avoid anxiety we might both seek and avoid information (Maslow 1963). Wilson's (1997) model of information seeking has anxiety as an initial activating mechanism determining whether information will be sought. The model can therefore accommodate both increased and decreased information seeking as consequences of anxiety. Johnson and Meischke's (1993) and Johnson, Donohue, Atkin and Johnson's (1995) model of information seeking proposes that demographics, experience and relevance are antecedents to information seeking. Experience includes both prior knowledge of health conditions and understanding of where and how to gain more information. Personal relevance includes salience and beliefs relating to efficacy. Personal relevance, rather than uncertainty reduction, is the key motivator within this model. Further, within the model, anxiety would be expected to increase the salience of information and so stimulate information seeking.

Much of the work on information avoidance is derived from work with patients who are facing very serious diagnoses and radical treatments (Cassileth, Volckmar & Goodman 1980). It is possible that the relationship between anxiety and information seeking is curvilinear, with low levels of anxiety stimulating information seeking but extreme anxiety being associated with avoidance. In our sample of predominantly healthy, general practice patients, it is unlikely that anxiety levels would be excessive and so anxiety is likely to elevate uncertainty, make it more salient and so drive increased information seeking and learning. Our hypothesis therefore is that:

> Hypothesis 4: Patients higher on health anxiety will report more learning than patients lower on health anxiety.

To summarise, models of health information seeking and acquisition enabled us to propose that perceived health competence, the need to make decisions and solve problems, and the need to reduce uncertainty and associated anxiety are likely motivators or enablers that stimulate learning. In the section below, we consider how these factors might differentially apply when information is derived from health care professionals and when information is informally accessed by patients from other sources such as family and friends or the internet.

Kickbuech (2008) notes that in general people have a high interest in learning about their health and seek information from a host of sources including: the internet, TV, radio, newspapers, friends, family, government institutions, health care providers and insurers. Accessing such information can be active or passive; that is, it might require effort and intent or it might be 'incidental' (Williamson 1998), 'serendipitous' (Foster & Ford 2003) or 'encountered' (Erdelez 1997). In this study, we examine the extent of self-reported learning from the media, health professionals, the internet and family and friends, all of which are likely to both provide information unasked and to provide

additional information if they are engaged with actively (although, perhaps, to varying degrees and of widely ranging quality).

The most obvious source of health-related information is members of the medical profession. Health care providers have responsibilities for providing information, have access to quality information and are trained in communicating with patients. Members of the medical profession represent important authority figures with high credibility and it would be expected that patients who depend on others in making decisions would favour doctors as a source of information over alternative sources.

> Hypothesis 5: Patients high on dependent decision-making orientation will report learning more from their doctors than will patients low on dependent decision-making orientation.

In an ideal consultation, the doctor might listen to the patient, provide information and discuss treatment options – highlighting the strengths and drawbacks of each, answer questions, check understanding and then support the patient in making choices. The doctor might also provide leaflets and written guidance to supplement the information given in the consulting room. However, communication within the consulting room is not always as effective as it could be and both health care providers and patients may encounter difficulties. Philips and Zorn (1994) found that more than two thirds of patients viewed access to information in their community hospital as a problem (but less than half the physicians agreed). Time constraints may not always allow for a full exchange of information or allow time for and tailoring of communications to match patients' levels of health literacy (Adams et al. 2009). Kelly and Haidet (2007) report that doctors overestimate patients' ability to understand both written and verbal communications, and Miller et al. (2007) suggest that this is particularly true for older patients.

There are therefore many reasons why patients may seek additional information from channels other than health professionals. Johnson's

(1995) model of information seeking claims that alternative sources of information are accessed according to their perceived utility, which includes usefulness, ease of access and credibility. Other workers identify completeness (Eysenbach & Kohler 2002), reliability and authority (Wathen & Burkell 2002) and relevance (Marton 2003) as important features of information content, particularly in relation to electronic formats.

There are a number of barriers to accessing information from sources other than health care providers: social and technological barriers may need to be overcome, validity of the information cannot be assumed, and information may not be neatly packaged nor necessarily of relevance. On the other hand, a number of barriers to accessing information that exist in the doctor's consulting room are removed or reduced: there are fewer constraints on time and topic, and learners are relatively free to learn as little or as much as they wish. It is likely that patients who are more health competent will learn more from these informal sources than will those who are less competent because they will be more persistent. This effect may not be so apparent when encounters with health professionals are concerned, since this is usually a time-limited situation where persistence may have no benefit. Additionally, it seems reasonable to predict that the motivating effects of anxiety and health competence described above are of more importance in the unstructured contexts of accessing information sources other than medical professionals than they are in the more structured and constrained context of learning from medical professionals. Put simply, anxiety and health competence may drive people to overcome barriers to access and to learn more and for longer.

> Hypothesis 6: The effect of perceived health competence on learning will be a stronger predictor of learning from sources other than medical professionals than learning from medical professionals.

Hypothesis 7: The effect of anxiety on learning will be a stronger predictor of learning from sources other than medical professionals than learning from medical professionals.

Method

Procedure

An on-line questionnaire was constructed and linked to the newsletter of [blank for anonymity]. The questionnaire was anonymous, and potential participants had a choice to complete the questionnaire and enter a prize draw to win an ipod Nano. To be eligible to answer the questionnaire, participants had to be aged 16 years and over and they had to have visited a general practitioner in the past 12 months. Responses were collected and exported to SPSS for analysis.

The sample

The sample consisted of 196 adults (85% female and 15% male) who responded to an invitation in an electronic newsletter sent to a list of 6,000. Fourteen percent were under 40 years of age, 22% were 41 to 50, 28% were 51 to 60, 24% were 61 to 70 and 12% were 71 or more. Seventy-two percent of the sample was educated to degree level and the remainder mostly had qualified for university entrance or had trade or professional qualifications; only three in the sample of 196 reported having no academic qualifications.

Eighty percent of the sample reported that they were quite or very healthy. A further 14% said they were okay and only 6% reported being quite or very poorly. Respondents were asked how many times they had been to the doctor in the last 12 months, either for themselves or with a relative or friend. Forty-eight percent had been three times or less, 31% had been four to five times and 21% had been five times or more.

Measures

Levels of learning were assessed as follows: participants were asked how much they learnt from five sources and asked to rate their learning on a five-point scale ranging from *Not at all* to *A great deal*. The sources were: media (TV, newspapers, books), health professionals, internet, friends and family, and other. The named sources selected were the ones identified in the literature as being the most used by patients in information seeking and acquisition (Pálsdóttir 2008).

Decision-making orientation was measured using nine items from the General Decision Making Style Inventory (Scott & Bruce 1995) to assess rational, dependent and avoidant approaches to decision making. The selected items included, for example: '*I double check my information sources to be sure I have the right facts before making a decision'* (rational), '*I like to have someone steer me in the right direction when I am faced with important decisions'* (dependent) and *'I put off making decisions because thinking about them makes me uneasy'* (avoidant). Respondents rated each item on a seven-point scale ranging from *Completely disagree* to *Completely agree*.

Health efficacy was assessed using eight items from the Perceived Health Competence Scale (Smith, Wallston & Smith 1995) and included items such as: '*I am able to do things for my health as well as most other people*'. Half the items were negatively framed and half were positively framed. Responses were recorded on a five-item scale ranging from *Strongly disagree* to *Strongly agree*. It is important to note that none of the items ask for ratings on either learning or decision-making capacity.

Heath anxiety was assessed using four items adopted from (Wells 1997). The item assesses how distressing or disabling health anxiety was over a fixed period and included: *'How often have you been distressed by health worries'*. Thinking of the last 12 months, participants rated items on a five-point scale ranging from *Not at all* to *All the time*.

Results

The frequency distributions depicting levels of learning from alternative information sources are shown in Figure 1. Very few patients reported accessing information sources other than those listed and therefore these are not included in the analyses below.

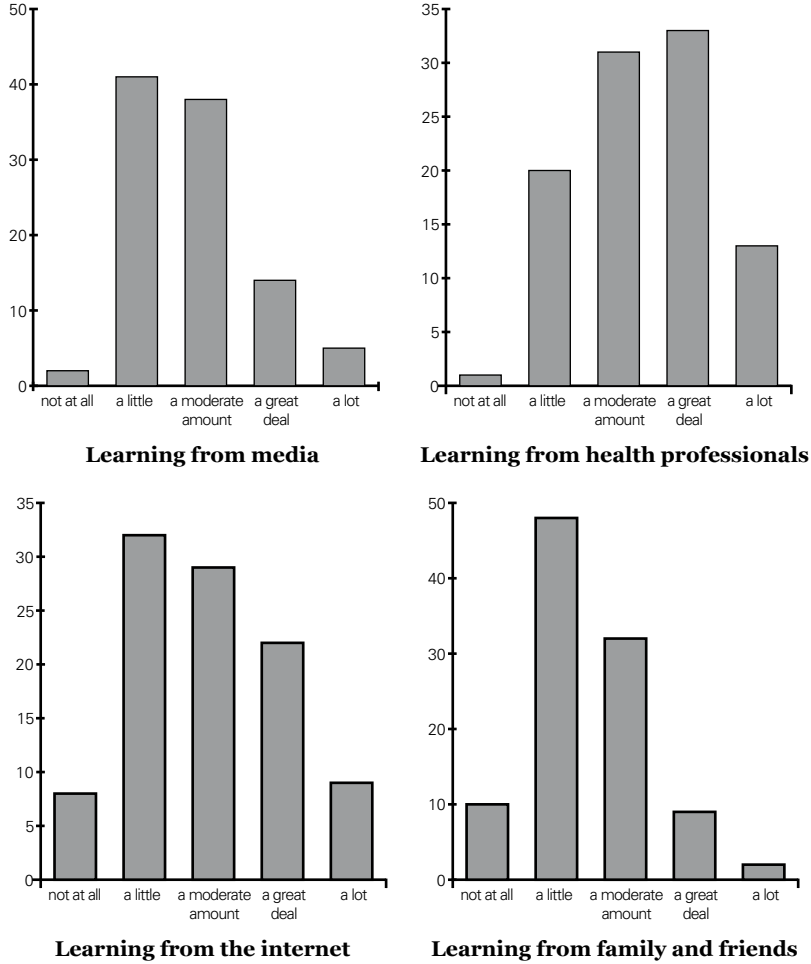

Figure 1: Levels of learning from alternative sources

Participants report learning most from health professionals (mean = 3.40). This is followed by the internet (mean = 2.90) and the media (mean = 2.79). Finally, family and friends were rated as the source of least learning (mean = 2.44).

A mean learning score was compiled by summing the learning scores for the four different sources: media, medical professionals, internet, and friends and family.

The correlation matrix shown in Table 1 reveals moderate, significant and positive correlations between the dependent variables and the independent variables. These relationships are examined in more depth below. Perceived health competence correlates negatively with anxiety (r=-.31, $\alpha < .01$), positively with rational decision making (r=.15, $\alpha < .05$) and negatively with avoidant decision making (r = -.34, $\alpha < .01$). Anxiety correlates positively with dependent decision making (r=.22, $\alpha < .01$).

Table 1: Correlations between learning levels and predictor variables—rational decision making, dependent decision making, health efficacy and anxiety

	Mean values	Learning from health professionals	Learning from other sources	Learning from all sources	Perceived health competence	Anxiety	Decision making—rational	Decision making—dependent	Decision making—avoidant
Learning from health professionals	3.40	n/a							
Learning from other sources	2.71	.177*	(.46)						
Learning from all sources	2.88	.566**	.912**	(.45)					
Health competence	3.75	.248**	.118	.203**	(.87)				
Anxiety	2.62	.116	.250**	.258**	-.313**	(.65)			
Decision making - rational	3.29	.168*	.255**	.284**	.148*	.131	(.64)		
Decision making -dependent	3.29	.173*	.100	.156*	-.050	.219**	.101	(.71)	
Decision making - avoidant	2.36	-.102	-.052	-.086	-.342**	-.012	-.206**	.267**	(.82)

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Table 2: Regression analyses with levels of learning from medical professionals and from other sources as dependent variables and perceived health competence, decision making orientations and anxiety as dependent variables

	Medical professionals	**Sources other than medical professionals**	**All sources**
Step 1:			
Gender	-.05	.10	.06
Age	.11	-.17*	-.10
Education	.14	.06	.11
GP gender	.00	-.08	-.07
GP visits	.08	.10	.12
R^2	*.04*	*.05*	*.04*
Step 2:			
Health competence	.31***	.22**	.31***
Rational decision making	.07	.21**	.21**
Dependent decision making	.16*	-.02	.05
Avoidant decision making	-.01	.06	.05
Health anxiety	.15	.29***	.30***
Change R^2	*.13***	*.14***	*.20***

* Significant at the 0.05 level
** Significant at the 0.01 level
*** Significant at the 0.001 level

Regression analyses were conducted to assess the extent to which respondents' learning scores could be predicted from perceived health competence, decision-making orientation and anxiety. The results are shown in Table 2. In Step 1 of the analyses, the control variables of gender, age, education, GP gender and GP visits were entered. Perceived health competence, rational, dependent and avoidant decision-making styles and anxiety were entered in Step 2. The analysis was repeated for each dependent variable, learning from medical professionals, learning from other sources and a combined score, learning from all sources.

The control variables as a whole do not explain a significant amount of variance (medical professionals R2 = .04; other sources R2 = .05; all sources = .04). Age negatively predicted learning from sources other than medical professionals (β=-.17, α<.05).

Perceived health competence significantly predicted increased levels of learning for all analyses (medical professionals β=.31, α<.001; other sources β=.22, α<.01; all sources β=.31, α<.001). Rational decision-making orientation significantly predicted increased learning from other and all sources (β=.21, α<.01 and β=.21, α<.01 respectively). Rational decision-making orientation was not related to levels of learning from medical professionals (β=.07, α>.05). Dependent decision-making orientation positively predicted learning from medical professionals (β=.16, α<.05) but not from other or all sources (β=.06, α>.05 and β=.05, α>.05 respectively). Health anxiety positively predicted learning from other (β=.29, α<.001) and all sources (β=.30, α<.001) but was not a significant predictor of learning from medical professionals (β=.15, α>.05). These results are explained and related to the hypotheses in the section below.

Discussion

In this section we discuss the descriptive analyses and review findings relating to the research question and each hypothesis. Finally, we describe the limitations of the design and explore implications of the study.

The sample was not representative of the population of New Zealand and was well educated, middle-aged to elderly, largely female and healthy. This was a deliberate choice by the researchers. The health literature abounds with accounts of how, for example, age or gender determines information seeking and decision making about health. We wanted to explore a little further and see what might lie behind the simple analysis by demographics. If we could isolate dispositional predictors of behaviour within this sample, then perhaps we could take a step towards understanding what it is about simple demographic descriptors such as education or gender that is the fundamental influence on behaviour.

In our study, few of the demographic variables predicted learning. This undoubtedly reflects the restricted sample. Age was a significant predictor of learning from sources other than medical professionals, with older people saying they learnt less than younger people. Examination of the raw scores suggests that it largely derives from lower levels of learning from the internet and from friends and family. This is hardly surprising as older people are less likely to have good internet access and more likely to be socially isolated. It is an important finding, however, given as noted above that previous research has found that older people struggle to understand information provided by medical professionals. Our research suggests that older people are further deprived by reduced learning from other sources.

As Figure 1 shows, few people report learning either nothing at all or a great deal from the media. About 10% report learning nothing from

both family and friends. The modal response to all sources except medical professionals was 'a little'. The modal response to medical professionals was 'a lot', with almost half of the respondents saying they learnt a lot or a great deal from their medical professionals. However, it should also be noted that about 30% of respondents learnt 'a lot' or 'a great deal' from the internet. For most patients, it seems that the medical profession remains their primary source of health-related information and that this is supplemented in a variety of ways by the media, the internet and personal contacts.

The research set out to examine the relationship between perceived health competence and anxiety and decision-making orientation (the research question). The correlation analysis in Table 1 shows interesting relationships between the dispositional variables assessed. High levels of perceived health competence are associated with lower levels of health-related anxiety. Put conversely, higher levels of anxiety are associated with feeling that one is not capable of looking after one's own health. Given that this was a 'snapshot' survey, no inferences can be made about causality. That is, we do not know whether a lack of health competence causes anxiety or whether building perceived health competence would alleviate anxiety.

Perceived health competence is also associated with decision-making orientations. Specifically, perceived health competence is positively associated with rational decision making—the approach that is often regarded as optimal. It could be expected that perceived health competence would be negatively associated with dependent decision making since, if a patient does not feel capable of making good decisions, they may turn to others whom they consider are more able. This was not found to be the case, since perceived health competence was not found to have a relationship with dependent decision making. However, there was a negative association between perceived health competence and avoidant decision making. It seems that, when

people do not feel capable of managing their health, they avoid decisions rather than turning to others to make decisions for them.

Anxiety was not only negatively correlated with perceived competence, but was positively correlated with dependent decision making. That is, patients who are high on anxiety tend to feel less efficacious than other patients and are more inclined to be highly dependent in their decision-making orientation. Equally interestingly, anxiety is not associated with avoidant decision-making orientation. In this sample, at least, anxiety is not associated with a reluctance to engage in decision making as reported elsewhere in the literature (Brashers, Goldsmith & Hsieh 2002). This finding, that a lack of perceived health competence but not high anxiety levels is associated with avoidant decision making, is new and interesting. If it is replicated using other samples then it provides a possible mechanism for understanding 'blunting', the term used for patients who avoid health-related information (Case et al. 2005). It seems such patients may be in a trapped in a cycle of avoiding learning because they feel they do not understand, and not understanding because they avoid learning.

Seven hypotheses were proposed predicting relationships between learning and perceived health competency, decision-making orientation and anxiety. Hypothesis 1 predicted that perceived health competence would be associated with high levels of learning and this was confirmed. Hypothesis 2 predicted that rational decision makers would report more learning. This was confirmed, and supports the notion that people who have a logical and reasoned approach to decision making seek information and learn more than do others. This effect held only for learning from sources other than medical professionals. Perhaps a rational orientation does not lead to greater learning during consultations with professionals because information is neatly packaged and presented; moreover, perhaps there is little opportunity to reason and question in a brief consultation.

Hypothesis 3 predicted that those high on avoidant decision making would learn less than those low on avoidant decision making. This was not demonstrated, even patients who tended to avoid decision making appeared to be learning about their health. Hypothesis 4 predicted that anxiety would drive learning and this was confirmed. However the detail underlying this is interesting and we discuss this further below.

Our fifth hypothesis was that decision makers high on dependency would learn more from the medical profession than would those low on dependency. This was confirmed and implies that high dependency decision makers are learning from the decision maker rather than learning so that they can make a decision.

Hypothesis 6 anticipated that the effect of perceived health competence would be greater for sources of information other than medical professionals, but this was not supported. It seems that perceived health competence is associated with greater levels of learning, both in consultations with medical professionals and in learning from other sources. It is surprising to find in a sample of highly educated that people who are lower on perceived health competence learn less from their doctors than do those who are high on health competence. The effect of efficacy was expected to be greater when behavioural and situational control was greatest and when more skills were needed to overcome barriers and identify, select, interpret and translate information. It seems that, even in a sample of people educated to degree level, high feelings of health competence contribute to learning from health care workers. This is an area that requires more attention, as it suggests that very many patients, not just those who are seriously disadvantaged by lack of education or communications skills, may feel they struggle to learn what it is that our health carers seek to teach.

The effect of anxiety on learning was confirmed for learning from sources other than medical professionals, and only approached

significance for learning from medical professionals. This supports Hypothesis 7 that a difference would be found, and supports theories that propose that patients' efforts to reduce anxiety or uncertainty may motivate information seeking and learning.

We have found that informal health-related learning is predicted by perceived health competence, a rational orientation to problem solving and by anxiety. Thus, we have support for the notion of the patient as striving to reduce uncertainty or anxiety through seeking out knowledge, and for the notion of the patient as an active and rational problem solver who seeks learning to inform decision making. We have evidence that patients who are confident in their ability to self-manage and to take decisions report more learning about their health than do those who perceive themselves as less efficacious. Our study is the first to validate the implicit assumption that information seeking is motivated by decision making or problem solving. It is the first to simultaneously examine health competency and anxiety and to establish that both are associated with increased levels of learning.

From a practice view, the finding that not all of our patients considered that they learnt equally well from health professionals is worrying. One might expect in many educational settings that novices who know least might learn most, but the opposite was found. This implies that the quantity or level of information presented by doctors' challenges even highly educated patients.

The findings that few respondents learnt solely from medical professionals means that not only should quality information be available but, as patients, we need the skills to source information, understand it, evaluate its quality and make informed decisions. There is a clear role for adult educators here.

Limitations

It is not possible to generalise from this study to patients in general. Our sample was, above all else, healthy and highly educated. Patients newly diagnosed with serious health conditions may not behave in the way our sample reports. The Cronbach alphas reported for our measures of learning were low, suggesting that high levels of learning from one source do not necessarily predict high levels of learning from another. We feel it was justified to use what is in effect a total learning score in this instance as that is the limit of our interest.

Further work

Relationships were identified between our independent variables and these relationships are likely to be complex and at least partly reciprocal. For example, increases in health competence are likely to reduce anxiety and reduced anxiety may well, in turn, contribute to elevated feelings of health competence. Similarly, while health competence may increase the likelihood of rational decision making, rational decision making may also lead to elevated health competence. A longitudinal study would enable us to assess these important causal relationships.

Qualitative studies would also add insight into the way information from different sources was accessed and used. Such an approach would enable researchers to investigate the extent to which identified predictors of information seeking and learning were stable or context and state dependent. The importance of state has been long overlooked and yet plays a large part in determining proactive behaviours (Sonnentag, Binnewies & Mojza 2008). State is likely to be highly relevant in the anxiety-provoking and emotional situations that are part and parcel of many patients' experience of serious illness.

Work within the field of patient information seeking and informal learning about health reflects multiple orientations to both

philosophical assumptions and methodology, with the most frequently adopted approaches reflecting constructivist or positivist orientations as adopted in this paper. The theoretical origins of research in this area can be traced to psychology, education, mental health and information sciences, so not surprisingly a good deal of similar work is emerging but is neither fully cross-referenced nor described using common terminology (Barnett-Page & Thomas 2009). To add to the complexity, investigators have examined information need, defined by Case et al. (2005: 5) as 'recognition that your knowledge is inadequate to satisfy a goal you have', information seeking which is accessing information (Wilson 2007) and information-use behaviour which might include learning and decision making (Spink & Cole 2006). There is very little mention of learning in the information science or medical literature and it seems to be an assumed outcome of information seeking. In our study we asked specifically about the extent of learning as this is the outcome of both practical and theoretical significance if information seeking is to inform health-related decision making and self-care. This is a beginning but the area would benefit from increased attention from educational researchers who understand lifelong learning and are accustomed to engaging with cross-disciplinary work.

Conclusions

The study demonstrates that patient psycho-cognitive orientations determine their information-seeking and learning behaviours, not just in terms of quantity but also in terms of source. The study underlines the importance of the efforts of adult educators who seek to develop independent learners able and confident in their ability to seek information and make decisions. From a practical perspective, the importance of having a variety of sources of information available is underlined by this work, as very few participants relied solely on their professional carers for information.

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