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**Consultation and illness behaviour in response to symptoms: a comparison of models
from different disciplinary frameworks and suggestions for future research directions**

Research Highlights

- We compare, systematically, three discipline-specific models of response to symptoms.
- Despite different intellectual origins they are remarkably similar.
- Symptoms, responses and actions are simultaneously evaluated in the light of action.
- Knowledge, access to services, social networks, symptoms and emotions are all important.
- Changes in knowledge, embodied state and emotions can be influential at any point.
- An integrated symptom-response framework will allow better accumulation of knowledge.

Consultation and illness behaviour in response to symptoms: a comparison of models from different disciplinary frameworks and suggestions for future research directions

Abstract

We all get ill and social scientific interest in how we respond – the study of illness behaviour - continues unabated. Existing models are useful, but have been developed and applied within disciplinary silos, resulting in wasted intellectual and empirical effort and an absence of accumulation of knowledge across disciplines. We present a critical review and detailed comparison of three process models of response to symptoms: the Illness Action Model, the Common Sense Model of the Self-Regulation of Health and Illness and the Network Episode Model. We suggest an integrated framework in which symptoms, responses and actions are simultaneously interpreted and evaluated in the light of accumulated knowledge and through interactions. Evaluation may be subconscious and is influenced by the extent to which the symptoms impose themselves, expectations of outcomes, the resources available and understanding of symptoms' salience and possible outcomes. Actions taken are part of a process of problem solving through which both individuals and their immediate social network seek to (re)achieve 'normality'. Response is also influenced by social structure (directly and indirectly), cultural expectations of health, the meaning of symptoms, and access to and understandings of the legitimate use of services. Changes in knowledge, in embodied state and in emotions can all be directly influential at any point. We do not underestimate the difficulty of operationalising an integrated framework at different levels of analysis. Attempts to do so will require us to move easily between disciplinary understandings to conduct prospective,

longitudinal, research that uses novel methodologies to investigate response to symptoms in the context of affective as well as cognitive responses and interactions within social networks.

While challenging such an approach would facilitate accumulation of knowledge across disciplines and enable movement beyond description to change in individual and organisational responses.

Word count: 291 words

Key words: Illness behaviour; consulting behaviour; illness career; access to healthcare; health service utilisation; psychology; sociology; symptoms.

Introduction

In 1962 David Mechanic (Mechanic, 1962) coined the term 'illness behaviour' to encompass, *"the varying ways individuals respond to bodily indications, how they monitor internal states, define and interpret symptoms, make attributions, take remedial actions and utilise various sources of formal and informal care"* (Mechanic, 1995 p1208). Since then, social scientific interest in illness behaviour has continued unabated; social scientists argue that a detailed understanding of the social and cognitive processes involved in responding to symptoms is essential for effective self-management and better health service use.

Most social scientific research has focused on explaining, or attempting to predict, formal help-seeking or use of preventative health services (see e.g. Calnan et al., 2007; Rogers et al., 1999; Uehara, 2001). Dingwall (2001) characterized existing models of help-seeking as 'individualistic' or 'collectivist'. Individualistic models, such as the Health Belief Model (Rosenstock, 1974), focus on explaining behavior with reference to personal characteristics or rational cognitive processes. Collectivist models, such as that described in Zola's classic study 'From person to patient' (Zola, 1973), focus on explaining behavior in relation to factors such as access to services or interactions with others. One influential model, the Behavioral Model (Andersen, 1995), combines aspects of individualistic and collectivist perspectives in recognizing the importance of psycho-social influences (such as attitudes and beliefs) and of enabling resources (such as access to care). A common criticism of all models of healthcare use is that they focus

on explaining a *singular* decision to seek professional help whereas the decision is better represented as a *process*, a series of smaller decisions or actions that are taken and reflected on over time. In addition, the use of survey data to assess the Health Belief and Behavioral Models means that characteristics such as gender or ethnicity are used as proxies to measure social structural factors. Such proxy measures inadequately represent the social context of people's lives and belief systems (Biddle et al., 2007; Pescosolido, 1996) or more performative understandings of gender and ethnicity.

More dynamic models recognize help-seeking as part of a broader, socially embedded, 'illness career', comprising the complex processes, multiple 'small' decisions and 'recipes' of action (Robinson, 1971) that take place as symptoms are experienced, evaluated and managed. In these understandings, as Biddle et al (2007) point out, "*Illness behaviour is not a simple decision about professional help-seeking but a multi-faceted, protracted career composed of a plurality of strategies [...invoked] during the process of coping with symptoms*" (p984). 'Illness career' approaches focus on the *process* as well as the *outcome* of decisions, addressing such questions as 'how do people come to feel ill and what do they do about it?' rather than 'who uses formal services?' (Biddle et al., 2007; Calnan et al., 2007; Dingwall, 2001; Rogers et al., 1999). In sociology these models are best represented by the Illness Action Model (Dingwall, 2001), the Network Episode Model (Pescosolido, 1991, 1992) and the multilevel network episode model (Pescosolido, 1996), and in psychology by the Common Sense Model of the Self-Regulation of Health and Illness (H. Leventhal et al., 1998), hereafter called the Common Sense Model.

These models characterize response to symptoms as an iterative process. The Common Sense Model has been particularly influential although all have informed subsequent research to some degree (see e.g. Locker (1981), Calnan et al (2007) and Biddle et al (2007) for research that references the Illness Action Model; Hagger & Orbell (2003) for a review of the application of the Common Sense Model, and Weardon & Peters (2008) for an overview of interventions designed on the Common Sense Model; and Pescosolido & Boyer (1999) and Pescosolido, Garder & Lubell (1998) for applications of the Network Episode Model in mental health services).

However, researchers who apply these models have largely operated in disciplinary silos, with little cross-referencing, and little recognition of the existence of alternative formulations of the same problem. Surprisingly, to our knowledge, there has only been one previous attempt to integrate sociological and psychological understandings of responses to symptoms (Dracup et al., 1995), but this model only focussed on individual responses, and has not been widely applied in subsequent research. In short, neither sociologists nor psychologists have recognized, acknowledged or built on relevant research in other disciplines, resulting in wasted intellectual and empirical effort, an absence of accumulation across disciplines and an unhelpful entrenchment of the disciplinary divide between psychology and sociology.

In this paper we attempt to bridge this divide to describe and critically compare the Illness Action Model, the Common Sense Model and the Network Episode Model as part of an iterative process to develop an integrated interdisciplinary framework to understand, and influence, response to symptoms. First, we describe each of the three models in detail, drawing out key differences and similarities between them. We go on to describe how an integrated framework for understanding response to symptoms can focus at the same time on interpretation, action and evaluation influenced by knowledge, by embodied experience of symptoms and by resources one has available. With reference to some other literatures, we suggest that this process, in turn, needs to be understood in the context of social networks, culturally influenced expectations of illness and services, and social structure. We suggest that changes in knowledge, or symptoms, or resources can precipitate a re-evaluation of the most appropriate responses to underlying bodily states. Finally, we identify a challenging agenda to further develop an integrated symptom-response framework that has the potential to inform more effective policies.

Three iterative models of response to symptoms

The Illness Action Model

The intellectual origins of the 'Illness Action Model' (Dingwall, 2001) lay in the sociology of deviance. Dingwall argued that illness can be seen as a failure of everyday life, that "*being ordinary was something we had to work at. We had to know what it would take to 'be ordinary'*"

and we had to be able to command the skills and resources, including our own bodies, to do this.” (Dingwall, 2001, ppix).

In developing the model, Dingwall placed importance on interactions between human actors and their bodies, drawing on Schutz’s ‘systems of relevance’ (Schutz & Luckman, 1973). The model starts from the position that in everyday life our bodies are taken for granted, not consciously questioned yet monitored. If we gain new external knowledge (e.g. about rising prevalence of an illness) there is a shift in interpretational relevances; we interpret our bodies differently on the basis of that new information. If changes take place in our biological or physiological functioning (e.g. infection or trauma) there is a shift in imposed relevances and these require a response. Finally, Dingwall argues that a vast range of concerns compete for our attention; which we select to ‘manage’ depends on current interests and projects, and so motivational relevances come into play. Choices of what to focus on are constrained; physiological trauma, unfamiliar situations, others’ views and actions can all limit the possibilities for action, but there is always an element of competition between the range of possibilities that we could deal with at any particular time.

Underlying Dingwall’s approach is the idea that, on experiencing a change in what is taken for granted about the body (a ‘disturbance of equilibrium’ or ‘problematic experience’), we seek to reconcile it so that we can continue to present ourselves, to ourselves and others, as essentially

normal or 'ordinary', and sufficiently reliable to act as a 'competent partner' in social interaction. Responses can include evaluation of the problematic experience in the light of knowledge about ourselves, the world and possible courses of action using a 'stock of knowledge' drawn both from personal experience and what is culturally available. The essential focus is interpretation through which the experience is evaluated, labelled (or not) and explained (or not). The interpretation can be immediate or delayed and is followed by action, which is itself monitored and evaluated. Actions in response to the problematic experience can include dismissal (it's not important), 'wait and see' (I'll see how it goes on), self-treatment and consultation with formal health services or others considered knowledgeable. The outcome of the enacted response is continually evaluated and appraised in attempts to achieve a restored sense of familiarity in the relationship between the person and their body.

Another essential feature of the Illness Action Model is interaction with others. Other people may: notice a problem one had disregarded; help interpret the problem if asked, bringing to bear their own knowledge and experience; and, actively engage in practical help such as buying treatments or making a medical appointment. In addition, the model is essentially iterative. Actions are monitored as an on-going process in the context of everything else happening in one's life and the effects of actions or inactions are monitored until equilibrium is restored. Through this process, one's equilibrium may shift, and what is accepted as 'normal' may be different to the 'normality' of the past.

Six essential features of the illness action model can be distinguished: action is driven by the desire to be 'ordinary' when one's equilibrium is disturbed; a 'stock of knowledge' is both general (shared, culturally available, common-sense) and personal (based on one's own experience of one's body and interactions with health services); and is used to evaluate, label and explain experiences from which; a range of actions is considered; the impact of these actions is evaluated and reassessed; and interactions with other people, including health professionals, directly impact on evaluations and actions.

The Common Sense Model of the Self-Regulation of Health and Illness

The intellectual origins of the Common Sense Model are in the self-regulation models developed by psychologists in the 1960s and 1970s (H. Leventhal et al., 1984; L. Leventhal et al., 2003). In generic self-regulatory systems, which can be physical as well as biological, a simple feedback loop operates to govern actions summarised by the acronym TOTE (test, operate, test, exit). In the Common Sense Model, problem solving is the means through which the self is managed; solutions to perceived problems are tried and tested until goals are achieved. In relation to health, the goals for self-regulation are, "*the concrete, perceptual experiences, the physical sensation and symptoms, moods and emotions, and feelings of vigour and competence generated by the biological and psychological self*" (L. Leventhal et al., 2003, pp44).

Leventhal and colleagues developed the model through a series of experiments on the communication of health-related fear. The original work was undertaken on the 'parallel processing' model in which action depends on both cognitions (the perceived reality of the health threat) and associated emotional responses (such as fear, anxiety or worry) (H. Leventhal, 1970; H. Leventhal et al., 1998). The cognitive elements of the model are by far the best developed. Assumptions underlying the cognitive model are that: 1) people are active problem solvers, attempting to achieve meaning for their symptoms (through seeking information and testing hypotheses); 2) they use a cognitive construct to represent illness that is then used to guide coping and to appraise the outcomes of actions; 3) illness representations are individualised because of one's personal experiences and culturally available knowledge.

According to Leventhal and colleagues, individuals carry with them 'schematic structures' based on prior health and illness experiences or those derived from general knowledge. These are known as 'illness prototypes', schemata of what particular conditions might entail, against which external stimuli (such as new knowledge about a health scare) or internal stimuli (such as perceptions of somatic changes) are compared in order to construct an illness representation. Qualitative studies suggested that this matching process (evaluation of one's own experiences against prototypes) is elaborated in five areas, or 'illness representations'. The evaluation can be considered as seeking answers to a series of questions:

1. What is the problem (identity)? Answers can include a disease label;

2. What is the expected duration (timeline)? Answers help interpret the experience according to expectations;
3. What causes the problem (cause)? Answers can provide further definition of the symptoms and possible courses of action;
4. Is it controllable (control)? Whether the symptom is likely to respond to intervention further defines its common-sense meaning;
5. What are the likely consequences (consequences)? This includes disruption of activity and anticipated long-term consequences of the problem.

The cognitive illness representations are used to shape the selection and realisation of appropriate coping strategies, which are themselves subsequently appraised in an iterative process over time.

The importance of the social context is recognised in later presentations of the model. It is argued that it is a mistake to think of people as '*isolated problem-solving machines*' and that '*self-regulation is dependent on the input and expertise of others*' (L. Leventhal et al., 2003, pp 54). Others' importance is operationalised at the cognitive level, in that others are thought to influence the five domains of illness representation rather than influencing behaviour more directly.

The Network Episode Model

Working in the intellectual traditions of North American sociology and seeking to integrate structural with individual influences on health and health behaviour, Bernice Pescosolido developed the Network Episode Model (Pescosolido, 1991) and, subsequently, the Social Organisation Strategy (Pescosolido, 1992) as a framework through which to understand access to health services. Pescosolido (1991, 1992) argues that all actions - including illness behaviour - are social actions and that social networks and social support mediate micro- (individual) and macro- (social structural) level sociological systems (Young, 2004). The central tenet of the Network Episode Model is that social networks are essential to the recognition of and response to health problems. Through a detailed critique of the dominant, individually focused, 'revised rational choice model' used in much American sociology (which Pescosolido sees as overly cognitive and inherently individualistic), Pescosolido provided a "*network- and event-centred counterpart*" (Pescosolido, 2006, pp196).

The Network Episode Model focuses on understanding individuals' entry into and out of the health system as an 'episode' that can be investigated through patterned sets of social interactions within and between social systems. Pescosolido (1992) recognises the importance of individual actions, but seeks to understand them in the context of the social networks with which individuals interact:

“....Individuals are neither puppets of some abstract culture nor calculating individualists; people both shape and are shaped by social networks. ...[A]ffect and rationality drive in tandem” (p 1109)

Pescosolido emphasises that network structure (the size and strength of bonds) interacts with its cultural content (prevailing beliefs and the nature of experiences within social networks). She suggests that understanding the structure of social networks (e.g. number, density and type of ties) helps identify which individuals are likely to be influenced by others, whereas understanding the content of social networks (e.g. what is actually discussed) helps to reveal the role of prevailing cultural beliefs about health, illness and the health service. So, she argues, it is important to investigate who (network structure) says what (network content) and how this influences response to symptoms.

The Multilevel Network Model (Pescosolido, 1996) takes these ideas further, towards an understanding of response to symptoms within and between three social systems: the ‘lay’ community (personal social networks); treatment organisations (such as general practices or hospitals); and health care delivery systems (such as health maintenance organisations, or the UK National Health Service). Each of these social systems is seen to influence response to symptoms, and this response can be modelled at three levels:

- individual (influenced by prior experience, the illness itself, perceptions and actual access to care);
- personal social network (interactions within which provide information, advice, expressive or emotional support dependent on the network's structure and content);
- a treatment network (providing access to treatment, advice, information, and support, depending on the strength of the ties within the treatment organisation and between it and its users).

Similarities and differences between the models

Despite a notable lack of cross-referencing between these three models, a detailed examination of how they conceptualise response to symptoms demonstrates remarkable similarities and complementarities between them. The models' features are summarised in table 1, juxtaposing the way each deals with important domains (e.g. the role of knowledge; actions/coping). Here we summarise the main similarities and differences.

Table 1 about here

Intellectual basis and methodological approach

The intellectual bases of the models are clearly different and are summarised in table 1. Associated methodological approaches have also differed. Although researchers used qualitative methods to develop all three models, the Common Sense and Network Episode Model have also been investigated using quantitative or mixed methods. For example, the

Illness Perception Questionnaire (Moss-Morris et al., 2002; Weinman et al., 1996) which was developed to measure illness representations (which are integral to the Common Sense Model) has been widely used. Mixed methods were used by Pescosolido et al (1998) in a study which used the Network Episode Model to understand how people came to use mental health services. First, qualitative methods were used to distinguish general approaches to first-time use of mental health services (characterised as choice, coercion or muddling through) and then quantitative methods were used to investigate associations between approach to service use and network type.

The nature of the problem and purpose of illness behaviour

Although different language and labels are used, the nature of the problem that symptoms pose and the purpose of illness behaviour are strikingly similar in the Illness Action and Common Sense Models. Each suggests that symptoms are perceived as a result of changes in knowledge (external stimuli) or in pathophysiological processes (internal stimuli). Similarly, both suggest that actions are taken in order to (re)achieve normality in physical and social functioning. The nature of the problem is not considered in any detail in the Network Episode Model (Pescosolido, 1991, 1992). Rather, the model starts from the presence of noticeable symptoms and interactions about them.

The role of knowledge, interpretations and evaluations

'Knowledge' is central to all three models. Each suggests that knowledge is gained through prior personal experience (of symptoms, of previous or others' approaches to managing them, and of health services) although the Network Episode Model places particular emphasis on experience of past interactions with health services and how this affects current response. All models also emphasise the importance of 'culturally available' knowledge in the form of social norms and expectations of health and illness which in turn shape what is considered to be or available appropriate responses. The Network Episode Model further suggests that access to, and use of, knowledge is likely to be socially structured (by highlighting the importance of both the structure and content of networks). However, unlike the other two models it does not deal in detail with the cognitive evaluation, of symptoms. As we have seen this is emphasised in the Illness Action and Common Sense Models although both also recognise that potential responses to symptoms can be unconscious; explicit cognitive evaluation may only be necessary as somatic sensations become increasingly bothersome or when others prompt a discussion.

Actions, coping, evaluation and feedback

Action, or coping, with symptoms is also central to all models; actions include 'ignore' and 'wait and see' as well as more active responses such as self-treatment or consultation with a health professional. The Network Episode Model highlights the importance of expectations of health services (shaped by past experiences), and of actual availability of services, in shaping response. All three models also emphasise the on-going, iterative, evaluation of the result of actions in

relation to whether they have restored health ('equilibrium') or allowed a redefinition of normality. The Common Sense Model suggests that this as a cognitive process in which techniques such as 'if-then' plans can be used (e.g. if this headache persists for 3 days and is not responsive to over the counter painkillers then I will see a doctor). The Network Episode Model emphasises the social processes that shape evaluation of actions (further discussed below).

The role of emotions

The only model which seriously considers the role of emotions in response to illness is the Common Sense Model, although even here 'emotions' are often inadequately operationalised as 'anxiety', worry about, or 'fear' of (the meaning of) symptoms. Although the Network Episode Model recognises the role of 'affect', and that social support and interaction with health professionals can be effective because they offer the emotional or expressive support in times of uncertainty, the role of emotions is neither discussed explicitly nor operationalised in empirical research.

The role of others and of the treatment system

The role of others is seen as important in all models although it is conceptualised differently. The Illness Action and Common Sense models conceptualise members of a social network influencing response through their effect on individual cognitions and behaviour. That is, interactions are understood to impact on individuals' interpretations and the focus of analysis

continues to be the individual. The Network Episode Model, on the other hand, sees the social network as the fundamental unit of analysis, i.e. it drives individual response through both its structure and its content. The idea of a social network as the fundamental unit of analysis is attractive, but is easier to articulate than to operationalise. The best worked example of the application of the Network Episode Model we have found (Pescosolido et al., 1998) focuses analysis at the individual level.

Similarly, the only model to seriously consider the health care system is the Network Episode Model, which characterizes it as part of an individual's network which provides information, advice and support, dependent on its size, strength and accessibility and on the availability of effective treatments and resources. However, again, the Network Episode Model has not been operationalised at this level.

The development of an integrated symptom-response framework

As we have seen, there are many similarities but some differences between the models. Given the similarities and evidence complementarities we suggest bringing them together in an integrated symptom-response framework that will better enable an accumulation of knowledge across disciplines. An integrated symptoms-response framework would include the iterative processes of recognising, interpreting and responding to illness at an individual level (emphasised in the Illness Action and Common Sense Model), the focus on emotional response

(emphasised, but not operationalised, in the Common Sense Model) and interactions within social and treatment networks which are themselves both culturally and socially structured (emphasised in the Network Episode Model). Although we do not imply a linear process, in expressing how an integrated symptom-response framework could account for the process of responding to symptoms we use a series of bullet points.

- Symptoms or signs are noticed as physiological, embodied changes and are interpreted in the light of (new) knowledge gained through interactions;
- Knowledge and understandings of symptoms, of what they represent, how they can be interpreted, and of what has happened following past responses to similar experiences is critical;
- Knowledge is accumulated over time by all actors. It can be one's own or others' or drawn from wider culturally available understandings of both interpretation and culturally acceptable response. It is fundamentally influenced by interactions at all levels in the social world; it may be socially structured and influenced by culturally available explanations;
- The interpretations and the evaluations of possible actions are influenced by the extent to which the symptoms impose themselves. This includes how annoying, painful or frightening they are; the extent to which they impact on the conduct of everyday life (i.e. interfere with activities), the broader life context itself (what else is happening in one's life at the time and one's on-going emotional responses to that) and by

expectations of outcomes (what is likely to happen to the symptoms with or without intervention) and in interactions with services (since this is how past experiences of service use can so fundamentally influence subsequent use);

- Interpretations and responses are also influenced by the resources one has available. Resources need to be interpreted broadly to include good access to treatment systems which are, in turn, dependent on within-country health care systems; good access to social support; and, through health literacy, to understanding of the salience of symptoms and possible outcomes;
- Actions taken depend on all of these and are part of a process of problem solving through which both individuals and those in their immediate social network seek to achieve 'normality' or equilibrium;
- Actions, including consultation with health professionals, are assessed, again through social interactions, and alternatives tried until the situation is resolved or changes.

This process of responding to symptoms described above is represented in Figures 1 which, rather than presenting response to symptoms as a linear process, attempts to illustrate that the many-levels of influence at play as 'circles of influence' on the response to symptoms.

Figure 1 about here

Central to the integrated symptom-response framework is the iterative process of interpretation, action and evaluation that happens when one is faced with symptoms or signs

of illness. We have seen that all three models emphasize the central importance of 'knowledge' to how people respond to symptoms and this is illustrated in figure 1 labelled 'knowledge' by the through-cutting arrow. We have also seen that such 'knowledge' may be based on personal experience or on the experience of others and includes the importance of both expectations and experience of using health services in the past, which, in turn can shape current experience. That disease perceptions, preferences for and use of health services is a product of past interactions with services is eloquently illustrated by a number of authors in disparate areas including Lawton et al (2005) in relation to diagnoses of diabetes, Gately et al (2007) in relation to interactions with a self-management programme designed to influence use of services, and France et al (2011) in relation to decisions about antenatal testing for genetic abnormalities. Also influential, and represented by through-cutting arrows are the resources one has at one's disposal, including resources such as access to services and to social support, and embodied experience of symptoms, that is the varying pain or discomfort they bring, often interpreted in relation to how much they impose on everyday life.

Figure 1 also attempts to illustrate that changes in any of these influences can immediately influence the continuous cycle of interpretation, action and evaluation. For example, new knowledge could result from discussing one's cough with someone outside of one's family. If they had had a similar cough, which had led to a diagnosis of lung disease, this could lead to a different interpretation of one's own cough and set of actions. Similarly, a change in embodied state or sensory experiences, such as pain increasing or becoming unmanageable, may lead to

immediate consultation. To continue with the example of a lung problem, such a change might be severe pain on coughing or coughing up blood which again would lead to different actions, often without even thinking of the implications beyond ‘this is serious’. Changes in embodied state could also include changes in emotional response to symptoms. If the friend’s lung disease discussed above as new knowledge was actually a lung cancer one could easily become more frightened about the possible consequences which could in turn lead to a difference in response. Finally, a change in the resources one has available, in terms of access to treatment (a ride to the doctor’s surgery, or a windfall to pay for consultation) could also influence how one thinks of the symptoms and actions one takes at any point.

Social structure can influence response to symptoms both directly (through for example, access to care and health services, to the resources for easy travel or the ability to take time off work or childcare) or indirectly (through social networks’ access to resources such as understanding and knowledge and associated health literacy (Nutbeam, 2008)). It can also influence response through shared views and attitudes about such factors as the ‘right’ to use services. Dixon-Woods et al (2006) concept of ‘candidacy’ is useful to help explain differential patterns of access to and use of health services by people in different social circumstances. Mackenzie et al (2012, 1), drawing on Dixon-Woods et al, describe the concept of candidacy as: *an individual’s identification of his or her ‘candidacy’ for health services is structurally, culturally, organizationally and professionally constructed, and helps to explain why those in deprived circumstances make less use of services than the more affluent “.*

This definition emphasises important links between social structure and shared, cultural, expectations of health and the meaning of symptoms, which Figure 1 suggests is also important to understanding response to symptoms. Arthur Kleinman (1981) described culturally-determined explanatory models of illness which, he argues, can partly explain differences in response to episodes of illness. Kleinman argues that explanatory models are quite distinct from general beliefs about sickness and health care which can exist independent of episodes of illness or symptoms. He suggests that explanatory models are held by both patients and therapists/healers in all health systems and offer explanations of particular episodes of sickness and treatment which guide choices of response. Explanatory models rarely have single reference points but instead can be seen as semantic networks that loosely link a variety of concepts and experiences. They are rarely explicit but influential; understanding them can cast personal and social meaning on the experience of illness. Kleinman (1981) argues that it is possible to distinguish five major questions that each explanatory model seeks to explain for a particular illness episode. The five questions bear remarkable similarity to the questions asked to understand the representations of illness described in the Common Sense Model (H. Leventhal et al., 1998). They include understandings of aetiology of the illness (similar to the Common Sense Model's questions on 'causation'), assessment of their timing and mode of onset (similar to the Common Sense Model's questions on 'timeline'), how they are thought to operate on the body (similar to the Common Sense Model's 'identity'), the expected course of sickness (similar to the Common Sense Model's 'control') and expected treatment (similar to

the Common Sense Model's 'consequences'). These similarities further emphasise the importance of cultural influences on individual and network based reasoning in relation to illness. Both Uehara (2001) and Zola (1973) also emphasise the importance not only of shared explanations for symptoms and illness but also cultural expectations of services in shaping response.

Finally, the innermost circle of figure 1 illustrates the continuous importance of social interaction in understanding response to symptoms. In some cases this can lead directly to service use (by family members making appointments) or to delay in service use (when, through discussion, other interpretations are privileged or actions taken (Smith et al., 2005)). The social interaction and internal processes of interpretation, evaluation and action take place simultaneously and often subconsciously unless, as the Illness Action and Network Episode Model suggests, conscious cognitive processing is required.

Figure 1 about here

Challenges for developing and applying an integrated framework

In this paper we have compared three, dynamic, models of response to symptoms; two from sociology (the Illness Action and Network Episode Model) and one from psychology (the Common Sense Model). We have shown that despite origins in completely different

intellectual disciplines, and positions within disciplines, they have some remarkable similarities.

In particular that: the purpose of illness behaviour is to (re)achieve normality in physical or social functioning; interaction with others is centrally important to understanding response; past experience of symptoms and of treatment systems is a form of knowledge that fundamentally influences what is currently seen as a possible response; knowledge is also culturally available in the form of social norms or expectations of treatments and access to knowledge can also be socially structured; that actions taken are heterogeneous and continually evaluated in the light of changes in knowledge, resources or embodied experience. The Common Sense Model emphasises the importance of emotional response to symptoms (though it is poorly operationalised) while the Network Episode Model emphasises the importance of social networks in linking social structure to individual action. Methodologically the Illness Action Model and Common Sense Model focus on the individual's cognitive and behavioural response whereas the Network Episode Model recognises the importance of focusing analysis at the level of the social network (although this level of analysis is hard to operationalise).

We have suggested that bringing these models together in an integrated symptom-response framework can incorporate the best features of each and thus enable the accumulation of knowledge across disciplines that have not been previously possible. The integrated model places the iterative processes of interpreting, taking action and evaluating response at the heart of process (emphasised in the Illness Action and Common Sense Model) while allowing

the cross-cutting influence of (new) knowledge, embodied experience (including emotional responses) and resources and the influence of social interactions which in turn are influenced by both culturally available understandings and by social structure.

We recognise that it is, of course, easier to make the case for an integrated symptom-response framework than to operationalise the framework in applied research. Testing whether the integrated framework offers better understanding of the multifaceted influences on illness behaviour will be very difficult.

The methodologies currently available to, and used by, social scientists are part of the problem; we have identified four main challenges. First, resource constraints, convention and difficulties in sampling mean that we usually limit investigations to individual level, cross-sectional, qualitative interviews or questionnaire surveys with easily available populations who already have a diagnosis. These require retrospective accounts of, and justifications for, response to symptoms from respondents which inevitably miss the complex, often unconscious and embodied, processes and impose a greater degree of linearity on people's accounts than may have been experienced in practice.

Second, as a research community, we access the role of others through asking for individuals' perceptions of their role, or by measuring the structure of social networks. We are not well

able to access the *content* of networks (in particular the knowledge they bring) or their dynamic role over time. Pescosolido and Wright (2004, 1796) argue that by representing social networks through individual interviews we get *“dynamic and emotion-charged issues potentially fraught with errors from simple recall bias to complex psychological perceptions.”* Third, we are rarely able to compare responses between people and their social networks in different social structural positions, or with differential access to resources, nor responses in different treatment systems, nor responses at different levels of analysis, as suggested by Young (2004). Fourth, because scholarly research has emphasised language as a medium for accessing experience we have neglected aspects of embodied experiences, such as emotional responses or sensory experiences, which cannot be fully represented in language (Kontos & Naglie, 2007; Pratt & Johnston, 2007).

To operationalise the framework into a testable model will require sociologists, psychologists, anthropologists, and other applied health researchers to pool their intellectual and methodological strengths in larger scale, collaborative, mixed methods studies, operating at different levels. It will require funders to support well-designed, comparative case study, longitudinal, designs which offer most promise to investigate the iterative process of responding to symptoms over time. The longitudinal design would allow at least some access to understanding concurrent responses to symptoms and how they change over time within single episodes.

The comparative case study approach would also allow analysis at both individual and network level. Some promising developments are being published from an on-going study of entry into the illness trajectory of people with Alzheimer's disease, as understood from the perspective of caregivers (Carpentier et al., 2010). The study follows caregivers over time to understand the mutual influence of family history, linked lives, human agency and organisational factors such as the healthcare environment. It draws on relational sociology and uses mixed methods to represent network structure and how this changes over time in the context of narratives of care which can be seen as social representations of barriers and facilitators of seeking help (Carpentier, 2011). Ideally, these approaches would be supplemented by data collection from multiple members of social networks as undertaken by Pescosolido and Wright (2004).

Through diverse sampling a comparative case study approach would allow comparison of responses from people and networks in different social positions with access to different treatment systems. Ideally, with adequate funding, this would include cross-country and cross-cultural comparison. Understanding the role of shared, cultural, responses to illness would require the mixed methods of ethnography, including some analysis of media and other public representations of symptoms and of people's response to them. Finally, visual research methods may have some potential to develop understandings of the role of emotions in response to symptoms, allowing those who find it hard to express themselves with language to

communicate their views and experiences (Williams & Cameron, 2009). Visual storytelling may offer useful approaches with some groups who could be asked to represent their visceral responses through creative, visual, methods thus allowing access to a broader understanding of response to symptoms than language-based methods allow (Drew et al., 2010).

In conclusion, we do not underestimate the challenge of operationalising a framework that includes cognitions, emotions and actions at individual, social network and organisational levels while simultaneously accounting for the influence of social structure and culture. However, we argue that doing so would give more purchase to applied social scientific research. As first step we encourage mixed groups of social scientists to share their knowledge and expertise openly and to make peace in the unspoken disciplinary wars. To do so would better enable accumulation of knowledge across disciplines and support attempts to move beyond description to change in individual and organisational responses to symptoms.

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Table and Figure Captions

Table 1. Comparison of the Illness Action, Common Sense and Network Episode Models of response to symptoms

Figure 1. 'Concentric circles of influence' representation of the integrated symptom-response framework

Table 1. Comparison of the Illness Action, Common Sense and Network Episode Models of response to symptoms

	Illness action model	Common sense model	Network Episode Model
<i>Intellectual basis</i>	The sociology of deviance	Self-regulation of health and illness	Meso-sociology - social networks link micro social processes to macro social structures.
<i>Methodological approach to empirical studies</i>	Qualitative, individual interviews.	Qualitative interviews to test and develop the model. Subsequently mainly cross-sectional survey methods to illness representations and coping strategies.	Longitudinal, qualitative and quantitative interviews with individuals to chart entry into and out of the formal health system.
<i>The nature of the problem</i>	A disturbance to equilibrium or problematic experience as a consequence of: a) changes in knowledge b) pathophysiological processes.	Changes to perceived threat to health from: a) external stimuli; b) Internal stimuli.	Individuals or other members of the network noticing symptoms, and prompting response.
<i>The purpose of illness behaviour (illness action or response)</i>	To return the individual to a sense of normality, of ordinariness, of equilibrium.	The self-regulation of health and illness. The goal is to manage, or regulate, the perceived threat.	Not discussed.
<i>Role of knowledge</i>	Knowledge gained from personal experience of illness, how symptoms have responded in the past, what has happened when interacting with health services. Knowledge is culturally available, as common-sense knowledge, or through public campaigns and used to evaluate symptoms and likely result of actions.	People act as common-sense scientists to construct representations based on information from personal experience and other sources, e.g. health professionals, public health campaigns. Illness representations stored in memory as illness schema.	Behaviour influenced by one's own and social networks' prior history and experience of illness, of what has worked in the past and prevailing cultural beliefs and attitudes on threat of illness and acceptable responses.
<i>Cognitions/evaluations</i>	Knowledge used to evaluate, label and explain problematic experience; can be reframed and ignored depending on 'motivational relevance'.	Cognitions represent the threat of the illness in relation to its identity (label), timeline (duration), consequences (expected outcomes), cause and controllability. These are used to guide coping strategies to control threats.	Not discussed in detail.
<i>Actions/coping</i>	Depending on result of evaluations, actions might be to ignore the experience, to wait and see, to ask advice from more knowledgeable people (including health professionals)	Guided by cognitions and dependant on explanations. If-then formulations may be used (if this lasts another two days then I will go to the doctor).	Depends on what is actually, or perceived to be, available in local health system and on past experience.
<i>Evaluation and feedback</i>	Actions are evaluated and changed until a new 'sense of equilibrium' is achieved.	If-then questions generate a self-regulation system that refers to self-knowledge and	The problems are dealt with over time through interactions with social and

		social factors. Actions are re-evaluated and representations changed until return to former or new status quo.	treatment networks.
Emotional response	Not dealt with explicitly.	Internal and external stimuli can lead to emotional reactions such as fear and avoidance. Emotional and cognitive representations are interactive.	Not recognised at level of individual but interaction with social and treatment networks can offer expressive or emotional support.
Role of others	Important in recognising, advising, prompting, and interpreting symptoms. Analysis focused on effect on individual.	Important as part of social environment. Analysis focused on effect on individual.	Illness is experienced in social networks including links into treatment systems. Analysis focused on networks and what they offer.
Role of treatment system	Access to formal health system implicit.	Access to formal health system implicit	Fundamental. Seen to directly impact on the illness career through individuals' interactions with it.

Figure 1. 'Concentric circles of influence' representation of the integrated symptom-response framework

