TITLE: A taxonomy of explanations in a general practitioner clinic for patients with persistent "medically unexplained" physical symptoms

RUNNING HEAD: Explanations for persistent physical symptoms

LaKrista Morton [a], l.morton@abdn.ac.uk;

Alison Elliott [a], a.m.elliott@abdn.ac.uk;

Jennifer Cleland [b], jen.cleland@abdn.ac.uk;

Vincent Deary [c], vincent.deary@northumbria.ac.uk;

Christopher Burton [a]*, c.burton@abdn.ac.uk

[a] Institute of Applied Health Sciences, University of Aberdeen, Aberdeen AB25 2ZD, UK

[b] Division of Medical and Dental Education, University of Aberdeen, Aberdeen AB25 2ZD, UK
[c] Department of Psychology, Northumbria University, Newcastle-upon-Tyne NE1 8ST, UK

*Corresponding Author: Dr Christopher Burton, Polwarth Building, University of Aberdeen, Aberdeen AB25 2ZD, UK. Phone: +441224437256. Fax: +441224437285

Communication Studies

Abstract

Objective

To develop a taxonomy of explanations for patients with persistent physical symptoms.

Methods

We analysed doctors' explanations from two studies of a moderately-intensive consultation intervention for patients with multiple, often "medically-unexplained," physical symptoms. We used a constant comparative method to develop a taxonomy which was then applied to all verbatim explanations.

Results

We analysed 138 explanations provided by five general practitioners to 38 patients. The taxonomy comprised explanation *types* and explanation *components*. Three explanation types described the overall structure of the explanations: Rational Adaptive, Automatic Adaptive, and Complex. These differed in terms of who or what was given agency within the explanation. Three explanation components described the content of the explanation: Facts – generic statements about normal or dysfunctional processes; Causes – person-specific statements about proximal or distal causes for symptoms; Mechanisms –processes by which symptoms arise or persist in the individual. Most explanations conformed to one *type* and contained several *components*.

Conclusions

This novel taxonomy for classifying clinical explanations permits detailed classification of explanation types and content. Explanation types appear to carry different implications of agency.

Practice Implications

The taxonomy is suitable for examining explanations and developing prototype explanatory scripts in both training and research settings.

Keywords

1. Background

Physical symptoms which cannot be explained by organic disease are present in 40% of patients consulting GPs[1], are the reason for consultation in 20% [2-4] and account for up to 65% of referrals to specialists[5]. These so-called medically unexplained symptoms (MUS) may occur singly (e.g. dizziness), in syndrome clusters (e.g. fibromyalgia), or in combination [6]. Most symptoms are transient, but approximately 2% of adults experience persistent or recurrent symptoms which are associated with increased primary care consulting and referral to secondary care [7,8].

Despite the term "medically-unexplained", developments in neuroscience and other disciplines mean it is now possible to explain many symptoms using models which integrate biological, psychological and social processes [6,9,10]. These models are increasingly similar to those used to describe chronic pain, with processes such as central sensitization – originally worked out for pain - now being applied to other symptoms [11]. The DSM-5 psychiatric classification [12] now includes Somatic Symptom Disorder which no longer requires that symptoms are medically unexplained, and there is increasing recognition that the dichotomy between "explained" and "unexplained symptoms" is false. [13] Given these developments in models and changes in classifications, there is a strong case for developing explanations which permit the biological and the psycho-social to co-exist in a wide range of symptoms and settings [14].

Despite this increase in knowledge and evolution of classification there is a gap between the expectations of patients with persistent physical symptoms and what they receive from clinicians in terms of explanation [15-17]. Many patients dislike terms such as 'medically unexplained' and 'somatic' and prefer terms such as persistent physical symptoms [18,19]. For some patients the lack of appropriate terminology and clear explanation for their symptoms delegitimises their condition. For others, older models of explanation such as somatisation are rejected as too simplistic [20] or as a threat to their integrity [21].

Patients enter consultations with possible explanations of their own[22], and consultations should involve a process of negotiating explanation and co-constructing meaning. However, doctors struggle to provide explanations for MUS [23] and in practice use a very limited repertoire of explanation with patients [24]. We have recently argued, following Salmon [25], that this does not need to be the case: it is possible to construct and deliver "rational" explanations for symptoms [26]. In order to do so, we need to first understand how such potentially useful explanations for symptoms are constructed.

Here we report an analysis of data combined from two studies of the Symptoms Clinic Intervention (SCI), a moderately-intensive, primary care based consultation intervention, comprising one long- and three moderate-length consultations, for patients with multiple, largely "medically unexplained", physical symptoms which aimed to provide explanations for symptoms as a means of validating patients' experience and as a link to advice about self-management [27,28]. In this analysis we aimed to rigorously develop a taxonomy for the explanations for "medically unexplained" symptoms by doctors which would be generalisable beyond the current studies. Development and use of a taxonomy allows exemplars of behaviour and communication to be identified which in turn permits their evaluation [29,30]. We required that the taxonomy be inclusive, flexible and suitable for use in both describing and developing explanations for different clinical settings.

2. Methods

2.1 Study design, setting & participants

We conducted an in-depth secondary analysis of the content of UK general practitioners' (GPs') explanations for patients' persistent physical symptom(s). The data for this analysis came from two developmental studies of the SCI. [27,28]

The first study of the SCI, Multiple Symptoms Study 1 (MSS1), was a pilot randomised controlled trial of the SCI versus usual care conducted with a single GP, who was the developer of the SCI [27]. Its primary aim was to test the acceptability and feasibility of the SCI and of trial procedures such as recruitment and randomisation. The second study, Multiple Symptoms Study 2 (MSS2), was an observational study to examine delivery of the SCI by four GPs, to patients in their own practice, after participating in a two-day training programme [28]. All consultations from both studies were recorded and transcribed: those transcriptions provided the research material for this analysis.

Detailed methods of both studies have been described elsewhere [27,28]. Here, we provide a brief summary.

For both studies, potential patients were identified using a two-stage procedure of clinical database search for diagnostic codes and referrals, followed by a mailed questionnaire. This included the Patient Health Questionnaire-15 (PHQ-15) which measures the impact of symptoms which are commonly medically unexplained (e.g. nausea/gas/indigestion, pain in arms/legs/joints). Eligible patients had one or more diagnostic codes indicative of MUS (e.g. irritable bowel syndrome,

fibromyalgia), referrals to specialists within the preceding three years, and a PHQ-15 score of ≥10.
2.2.

Symptoms Clinic Intervention

The SCI consists of a series of three or four extended consultations. It comprises four key components of *Recognition, Explanation, Action,* and *Learning.* The first consultation lasts approximately 50 minutes and centres on *Recognition -* active listening and acknowledgement of the patient's account of illness and its impact on daily living. *Explanation*s for patients' symptoms are proposed in the first or in subsequent follow-up consultations (which last approximately 20 minutes each) and involve making constructive sense of a patient's reported symptoms in terms of physiological, and/or psychosocial mechanisms. GPs and patients then negotiate *Action:* symptom management strategies that are concordant with the explanations previously discussed. Throughout the consultations, GPs and patients *Learn* what does or does not make sense or work for the patient and their understanding and management of their symptoms.

2.3 Data collection

One hundred and twelve consultations (43 MSS1, 69 MSS2) with 39 patients were audio-recorded and transcribed verbatim for subsequent analysis.

2.4 Ethical approval

Both studies had appropriate ethical approval: Lothian Research Ethics Committee (reference 09/S1102/34) & North East Scotland Research Ethics Committee (reference 14/NS/1014).

2.5 *Data analysis*

2.5.1 *Extraction of Explanations*

As the aim of the current study was to develop a taxonomy of physicians' explanations explanation for symptoms, it was important that the analysis focus on explanation as the primary unit of inquiry; previous work has illustrated that analysis at this level can provide insights about the development and delivery of explanation [21,31]. We defined explanations within the consultation transcripts as a sequence of utterances by the doctor (with or without input from the patient) which began at the point the GP introduced an explanation of how the patient's symptoms might be understood and ended when the conversation moved to another aspect of the consultation (e.g. *Action*). We extracted all these instances of explanations from the full transcripts for detailed analysis.

2.5.2 Classification of whole explanations

We initially attempted to develop a classification <u>at the level of each explanation (using the definition in section 2.5.1)</u> by summarising each verbatim section from MSS1, where possible retaining the natural language of the GP. One researcher (LM) then analysed these summaries thematically to identify potential categories to describe the content of the explanations. The research team (CB, VD, AE, JC) then conducted a group sort analysis of the explanations, which involved discussing the core features and themes of each explanation and classifying them based on similarities and differences to other explanations. During this sorting process it became apparent that most explanations had multiple components, that common components could be recognised across otherwise different explanations, and that many explanations could belong to more than one category.

2.5.3 Classification of explanation features

Following the difficulty in allocating whole explanations to single categories within the thematic and group sort analyses, we developed a new classification of explanation features. These explanation features existed on two levels: the overall explanation type, and phrases or sequences of phrases which represented identifiable components of the explanation. In developing this classification we used a constant comparative method [32]. Firstly, two researchers (LM, CB) coded the explanation summaries' type and components based on the themes identified during the previous group sort and thematic analyses . From this we further developed and defined the codes for explanation types and components. Next we applied a cyclical process of coding verbatim explanations from MSS2 (coded as transcripts were received from the study) against the set of codes, followed by discussion between researchers; the codes were further developed and refined when necessary. Initial coding was conducted by LM and a random sample of 12 (16%) explanations from different doctors in MSS2 were independently coded by CB; difficulties in coding and disagreements were resolved by discussion between LM and CB.

The coding structure was continuously developed until the components could be clearly described with definitions for each explanation component. At that point we finalised the taxonomy and applied it afresh to all verbatim explanations from both MSS1 and MSS2.

2.5.4 Relationship of doctors' explanations to patient's explanations and dialogue

All of the doctors' explanations which we analysed occurred within larger dialogues between doctor and patient. They represented either 1) hypotheses based on the preceding dialogue or 2) performative speech acts [14] whereby an explanation was presented as declaration. We have conducted a separate analysis of the dialogue in relation to explanations (den Boeft, submitted for

publication) including the ways they are negotiated within consultations and the ways that patients respond to them and these are not reported here.

3. Results

The final taxonomy was derived from 138 explanations from 38 patients receiving the SCI (63 explanations from MSS1 and 75 from MSS2); one patient in MSS2 experienced a change in clinical condition which led to withdrawal from the study before receiving any explanations. Explanations were presented for symptoms of musculoskeletal pain, fibromyalgia, headaches, fatigue, gastrointestinal issues, breathlessness, chest tightness/palpitations, insomnia, environmental sensitivities, and tinnitus. GPs provided a median of 3 (range 1 to 9) explanations per patient over the course of the SCI.. The taxonomy comprised explanation *types* (codes relating to the explanation structure) and *components* (codes relating to individual phrases or sequences of phrases within the explanation)*. These are described below and summarised in Table 1.

3.1 Explanation Types

Explanation *types* summarise the overall emphasis of the symptom explanation and in particular they relate to the location of responsibility for, or agency over, the symptom. We consider them as a discursive structure which holds the more detailed mechanistic components. We identified three different explanation types termed Rational Adaptive, Automatic Adaptive, and Complex which are described below. Most 102 (73.9%) explanation sequences could be allocated to a single explanation type. Twenty (14.5%) explanations did not fit any of these three types and 16 (11.6%) included elements of two types. Only one patient with explanations had none which could be allocated to an explanation type. The following examples of explanations reflect either direct quotations from the GP or sections of dialogue between GP and patient in which the explanation was proposed.

'Rational Adaptive' explanations were present in 31 (22.5%) explanations and used with 18 (50%) patients. They described patients' symptoms in terms of biological or psychosocial processes which were understandable but also served to cause and/or perpetuate symptoms. These explanations were similar to those commonly used in cognitive therapies: the symptom was real and understandable, but ultimately maladaptive. In rational adaptive explanations, agency – the responsibility for the symptom and for action – resides with the individual. In the following example of consultation dialogue, the GP uses a rational adaptive explanation around "boom-or-bust" energy balance.

> *GP: So thinking about energy levels ... people with fibromyalgia are commonly*
> *describing where they have good days and get lots done, … they see that the pains*
> *aren't too bad and they try and rush and get everything done.*
>
> *F: Yeah, because you're feeling okay,-ish.*
>
> *GP: Yeah, and then alternately you'll have bad days, where the pains, where the*
> *pains are bad, and you can't really get, get very much done.*
>
> *F: Yeah, definitely.*
>
> *GP: And I think that, that cycle, um, where you have these alternations, and the*
> *subsequent varying in your levels of activity, although it's very, very understandable,*
> *it's probably one of the things that's working … to keep your energy levels a little bit*
> *lower than they need to be.*
>
> *(MSS2, GP C)*

Here the mechanism of an individual's (rational) response to a short-lived respite from symptoms is taken over by processes that ultimately serve to perpetuate symptoms. The implication is that these processes (activity avoidance and exhaustion), over which the patient has agency, are the main perpetuating factors.

'Automatic Adaptive' explanations were found in 51 (37.0%) explanations and used with 24 (66.6%) patients. They were similar to 'Rational Adaptive' explanations in that there was a clear link between a stimulus (process) and its consequence (symptoms). However, these explanations made sense of patients' symptoms in terms of involuntary processes, typically described in bodily (physiological) terms rather than mental (psychological) terms. These processes were described as normally adaptive, automatic mechanisms that were now acting maladaptively to generate and/or perpetuate symptoms. Within these explanations, agency was given to the body or brain.

> *…fatigue is another of these symptoms that is great in the early stages if you have an*
> *illness or an injury…it's your body's way of saying you need to rest because you need*
> *to convert all your energy into healing, fighting this infection or whatever, really*
> *useful when something's gone wrong…but again it's outlived its use in people with,*
> *you know, got chronic fatigue really and it's striking that balance between what its*
> *original message is 'rest, don't do anything' and how helpful that is when it's become*
> *pervasive symptoms?... (MSS2, GP A)*

Here the mechanism of recuperative fatigue, and its maladaptive persistence, is located in the body. The automatic adaptive explanation type places the causal responsibility away from the person. Instead it has the potential to recreate the distance between patient and problematic body which is typical of a conventional biomedical clinical interaction. Thus while the patient is not directly responsible, there is the opportunity for therapeutic action, either by patient, clinician or both, to regain control over symptoms.

'Complex' explanations were present in 52 (37.7%) explanations and used with 24 (66.6%) patients. They differed from the previous two types in that there was no clear link between a stimulus and its consequence, i.e. a process or symptom could spontaneously occur without any original apparent adaptive purpose or rationale. These explanations located symptom generation within the intricate functioning and/or interplay of different bodily systems (such as the immune system or hypothalamus pituitary adrenal axis). These explanations gave agency to systems which were complex and therefore, to an extent, unknowable; GPs often described "vicious circles" where systems, symptoms and their consequences fed into one another within an autopoeitic cycle.

> *GP …one of the things that, sort of, drives this symptom approach is the view that symptoms and the processes that cause them can, kind of, have a life of their own separately from a direct cause.*
>
> *Patient Cause, yes.*
>
> *GP   So a pattern of immune system behaviour can set up, that it no longer needs a full-blown fight with a flu virus to, kind of, set the thing up. It's like it's happened so often or been so strongly imprinted that it just... once it starts, it just needs to be tipped off and it just...*
>
> *Patient It goes again.*
>
> *GP   Begins, or pain and all that, kind of, pain cluster of stuff, and it, kind of, seems that there's a few, kind of, key events that leave their mark in your body and not literally but leave their mark in terms of the way systems work, and the way your memory works, and the way your body, kind of, goes, oh, I've seen that before, I know what happens next, uh-oh. (MSS1 GP1)*

Complex explanations described processes which were automatic, occurring at the level of unfathomable system behaviour and were essentially non-adaptive and without purpose. They just happened. These explanations mirrored the chaotic narratives [33] which patients with MUS

commonly describe [34]. While other explanation types, particularly the rational adaptive, could be seen as a challenge to the individual's integrity [21], complex explanations avoid this and thus may be more acceptable to patients for whom other explanations are unsatisfactory. However the implicit lack of agency in these accounts limits therapeutic options – although acceptance or mindfulness based approaches could still be compatible with complex explanations.

Explanations which did not fit a type tended to describe a simple relationship between cause(s) and the resulting symptom(s); symptoms were not situated within larger physiological or psychological processes. In MSS1 they mostly represent brief reprises of ideas discussed in more detail earlier, however in MSS2 they sometimes appeared with little surrounding context.

> *And I think, you know, it certainly wouldn't be causing it, but getting wound up about it won't help because of course when you get tense about things it drives the adrenalin system and that makes you sweat more. (MSS2, GP A)*

3.2 Explanation Components
We identified three different categories of explanation components: Facts, Mechanisms and Causes. The components made up the content of the explanations and we coded them on a line-by-line basis, as opposed to the explanation types which were typically coded at the level of the explanation. A summary of each component is provided in Table 2.

Facts represented general statements about physiological or psychological processes/adaptations within an explanation. Fact statements could relate to normal processes or to abnormal or maladaptive ones, but were presented in an authoritative "popular science" way rather than as a specific interpretation of what was occurring within an individual. Facts were often used repeatedly for patients with similar symptoms by the same GP and largely represent scripts which can be reused with little customisation. Facts were identified in 72 (52.2%) explanations.

In contrast, mechanisms were statements which attempted to interpret symptoms within the specific patient. They described processes by which symptoms were effected or perpetuated rather than more fundamental causes. Mechanisms sometimes built on facts but included more specific "when X occurs, then you / your body does Y" statements. We identified seven categories of mechanism in the explanations: somatic, sensitisation, exhaustion, dissociation, alarm, attention and avoidance. These are listed with an example of each in table 2. These mechanism categories draw on understanding from sources ranging from somatic physiology, through neurophysiology to cognitive psychology.

Mechanisms were found in 129 (93.5%) of the physicians' explanations. In 75 (54.3%) instances there was a single mechanism, in 40 (29.0%) there were two and in 14 (10.1%) there were three or more. Physiological and neurophysiological mechanisms occurred most commonly: sensitisation occurred in 56 (40.6%) explanations, somatic mechanisms in 54 (39.1%) and exhaustion in 29 (21.0%). Cognitive mechanisms were less common: attention occurred in 30 (21.7%) explanations and avoidance in 19 (13.8%). Both dissociative and alarm mechanisms occurred infrequently in 7 and 5 explanations respectively.

Like mechanisms, cause components were specific to the individual and their story of illness. We identified three different causes that GPs discussed for patients' symptoms – predispositions (either heritable or trait), trigger events (e.g. viral infection or significant life event), and complex generative (e.g. interaction of factors or "vicious circles"). Causes were identified in 88 (63.8%) physician's explanations. Of these 54 had a single cause and 34 (24.6%) explanations had two or more causes.

Table 3 demonstrates the number of different mechanism and cause categories present in each explanation, broken down by explanation type. This shows that rational adaptive explanations were more likely to have multiple causes and multiple mechanisms while automatic adaptive explanations were less likely to have any cause and usually included just a single mechanism.

The three explanation components are illustrated within a full symptom explanation in Figure 1; in this explanation, the components are situated within an Automatic Adaptive narrative structure.

4. Discussion & Conclusion

4.1 Discussion

4.1.1 Summary of main findings

We developed an original taxonomy of explanations for persistent physical symptoms. This taxonomy extends existing models of clinical explanation [25] by providing a unifying framework of structure and components. The taxonomy provides new insights into the way that different explanation types convey different messages about responsibility and agency in relation to symptoms.

4.1.2 Strengths and limitations

This taxonomy was developed from explanations delivered to patients within a GP-led clinic specifically designed to help patients with persistent symptoms in which all clinical encounters were audio-recorded for detailed analysis. We included doctors with different levels of experience of and

training in delivering explanations and while the training and manual for the second study included examples of explanations, it was compiled before this taxonomy was developed. We used a constant comparative approach to coding explanations and explanation components. Several authors were actively involved in the coding process, through both hands-on coding and regular team meetings.

The number and breadth of symptoms discussed meant we included explanations for a wide range of symptoms. The process of developing the taxonomy in one dataset, revising it in the and second and then re-coding all data could have resulted in a taxonomy which was over-fitted to the data. However, since developing the taxonomy we have carried out two informal validation steps. The first was to develop a range of explanations, using the types and components, for syndromes which did not feature in the clinics (such as non-cardiac chest pain and dysphonia) and check that these were also possible. For the second, two authors (VD & CB) have included elements of the taxonomy in teaching healthcare professionals and have found them to be well received.

We recognise that this analysis has examined explanations in isolation from their context, the dialogue between patient and doctor and the various explanations and concerns that the patient brought to the encounter. The analysis of dialogue is reported elsewhere (den Boeft, submitted for publication) and both explanatory content and dialogue should be considered together in understanding the clinical usefulness of explanations.

4.1.3 Comparison with existing research

We considered using a number of existing consultation coding schemes [35-37] but these largely focus on the structure of the consultation and communication within it rather than the detailed content of explanations. We found descriptive reports of explanation types used by patients [38] and doctors [25] but none had the detailed two-level structure which we found necessary to classify the explanations in our studies. Two studies have described conversation analysis of consultations for medically unexplained symptoms [21,31]. Both focused on patients' responses to explanations for their symptoms; in the first, clinicians attempted to link physical symptoms to emotional stress or distress [21], while the other centred on variations around a single explanation of neuroendocrine arousal as the driver for symptoms [31]. Our approach of identifying a framework within which explanations can be constructed is compatible with a shift away from polemical explanation and counter-explanation and has the potential to facilitate formulations for shared explanation which have room for diverse components and values [14].

4.2 Practice implications

The taxonomy is designed to be suitable for further research and training. It is not limited to specific symptoms and can be adapted to a wide range of symptoms and clinical settings. In particular, it can be used to underpin studies which examine the value to patients of explanations of their "unexplained" symptoms. Within a training context it can be used to examine clinicians' explanations and help them develop new ones while cognisant of the features they are including. Studies using the taxonomy should seek to examine the impact of explanations in different situations: for instance complex explanations may be particularly helpful as a way of building common ground and shared understanding between doctors and patients with troublesome symptoms, but rational adaptive explanations may be more suited to promoting active symptom management and control. Likewise some patients may prefer a particular explanation type: applying this may help build shared understanding and more personalised delivery of care.

4.3 Conclusions

This taxonomy of clinical explanations gives clinicians a framework of explanation types and components which can be used to provide patients with much-needed explanations. It offers new insights into the way that different explanation types convey different messages about responsibility and agency in relation to symptoms. The taxonomy represents a new and potentially valuable tool for research and teaching about clinical explanation.

List of abbreviations

MUS – medically unexplained symptom(s)

DSM – Diagnostic and Statistical Manual of Mental Disorders

SCI – Symptoms Clinic Intervention

GP – general practitioner

MSS1 – Multiple Symptoms Study 1

MSS2 – Multiple Symptoms Study 2

PHQ-15 – Patient Health Questionnaire 15

Competing interests

The authors declare no competing interests.

Authors' contributions

LM collected the data for MSS2 and extracted explanations from both MSS1 and MSS2. LM conducted the initial thematic analysis of explanations and CB, AE, VD and JC participated in the group sort analysis. LM and CB synthesised the results of the thematic analysis and group sort, generated the working taxonomy, and further refined the taxonomy. LM wrote the first draft of the article and all authors contributed subsequent comments and revisions. The final version was approved by all authors.

References

[1] Haller H, Cramer H, Lauche R, Dobos G. Somatoform Disorders and Medically Unexplained Symptoms in Primary Care: A Systematic Review and Meta-analysis of Prevalence. Deutsches Arzteblatt International 2015;112:279-287.

[2] Peveler R, Kilkenny L, Kinmonth AL. Medically unexplained physical symptoms in primary care: a comparison of self-report screening questionnaires and clinical opinion. J.Psychosom.Res. 1997;42:245-252.

[3] Morriss R, Lindson N, Coupland C, Dex G, Avery A. Estimating the prevalence of medically unexplained symptoms from primary care records. Public Health 2012;126:846-854.

[4] Taylor RE, Marshall T, Mann A, Goldberg DP. Insecure attachment and frequent attendance in primary care: a longitudinal cohort study of medically unexplained symptom presentations in ten UK general practices. Psychol.Med. 2012;42:855-864.

[5] Nimnuan C, Hotopf M, Wessely S. Medically unexplained symptoms: an epidemiological study in seven specialities. J.Psychosom.Res. 2001;51:361-367.

[6] Deary V, Chalder T, Sharpe M. The cognitive behavioural model of medically unexplained symptoms: A theoretical and empirical review. Clinical Psychology Review 2007;27:781-797.

[7] Verhaak PF, Meijer SA, Visser AP, Wolters G. Persistent presentation of medically unexplained symptoms in general practice. Fam.Pract. 2006;23:414-420.

[8] McGorm K, Burton C, Weller D, Murray G, Sharpe M. Patients repeatedly referred to secondary care with symptoms unexplained by organic disease: prevalence, characteristics and referral pattern. Fam.Pract. 2010;27:479-486.

[9] Rief W, Broadbent E. Explaining medically unexplained symptoms-models and mechanisms. Clin.Psychol.Rev. 2007;27:821-841.

[10] Van Ravenzwaaij J, Olde Hartman TC, Van Ravesteijn H, van Rijswijk E, Lucassen PL. Explanatory models of medically unexplained symptoms: a qualitative analysis of the literature. Mental Health in Family Medicine 2011;7:223-231.

[11] Bourke JH, Langford RM, White PD. The common link between functional somatic syndromes may be central sensitisation. J.Psychosom.Res. 2015;78:228-236.

[12] American Psychiatric Association,. Diagnostic and statistical manual of mental disorders. Washington, DC: American Psychiatric Association, 2013.

[13] Sharpe M. Somatic symptoms: beyond 'medically unexplained'. Br.J.Psychiatry 2013;203:320-321.

[14] Greco M. The classification and nomenclature of 'medically unexplained symptoms': conflict, performativity and critique. Soc.Sci.Med. 2012;75:2362-2369.

[15] Nettleton S. 'I just want permission to be ill': Towards a sociology of medically unexplained symptoms. Soc.Sci.Med. 2006;62:1167-1178.

[16] Giroldi E, Veldhuijzen W, Mannaerts A, Van Der Weijden T, Bareman F, Van Der Vleuten C. "Doctor, please tell me it's nothing serious": An exploration of patients' worrying and reassuring cognitions using stimulated recall interviews. BMC Family Practice 2014;15.

[17] Nunes JM, Ventura T, Encarnação R, Pinto PR, Santos I. What do patients with medically unexplained physical symptoms (MUPS) think? A qualitative study. Mental Health in Family Medicine 2013;10:67-79.

[18] Marks EM, Hunter MS. Medically Unexplained Symptoms: an acceptable term?. Br.J.Pain 2015;9:109-114.

[19] Picariello F, Ali S, Moss-Morris R, Chalder T. The most popular terms for medically unexplained symptoms: the views of CFS patients. J.Psychosom.Res. 2015;78:420-426.

[20] Peters S, Rogers A, Salmon P, Gask L, Dowrick C, Towey M, Clifford R, Morriss R. What do patients choose to tell their doctors? Qualitative analysis of potential barriers to reattributing medically unexplained symptoms. J.Gen.Intern.Med. 2009;24:443-449.

[21] Burbaum C, Stresing AM, Fritzsche K, Auer P, Wirsching M, Lucius-Hoene G. Medically unexplained symptoms as a threat to patients' identity? A conversation analysis of patients' reactions to psychosomatic attributions. Patient Educ.Couns. 2010;79:207-217.

[22] Kirmayer LJ, Groleau D, Looper KJ, Dao MD. Explaining medically unexplained symptoms. Can.J.Psychiatry 2004;49:663-672.

[23] Olde Hartman TC, Hassink-Franke LJ, Lucassen PL, van Spaendonck KP, van Weel C. Explanation and relations. How do general practitioners deal with patients with persistent medically unexplained symptoms: a focus group study. BMC Fam.Pract. 2009;10:68.

[24] Olde Hartman TC, van Rijswijk E, van Dulmen S, van Weel-Baumgarten E, Lucassen PL, van Weel C. How patients and family physicians communicate about persistent medically unexplained symptoms. A qualitative study of video-recorded consultations. Patient Educ.Couns. 2013;90:354-360.

[25] Salmon P. Conflict, collusion or collaboration in consultations about medically unexplained symptoms: the need for a curriculum of medical explanation. Patient Educ.Couns. 2007;67:246-254.

[26] Burton C, Lucassen P, Aamland A, Hartman TO. Explaining symptoms after negative tests: towards a rational explanation. J.R.Soc.Med. 2015;108:84-88.

[27] Burton C, Weller D, Worth A, Marsden W, Sharpe M. A primary care symptoms clinic for patients with medically unexplained symptoms: pilot randomised trial . BMJOpen 2012;2:000513.

[28] Morton L, Elliott A, Thomas R, Cleland J, Deary V, Burton C. Developmental study of treatment fidelity, safety and acceptability of a Symptoms Clinic intervention delivered by General Practitioners to patients with multiple medically unexplained symptoms. J.Psychosom.Res. 2016;84:37-43.

[29] Reader T, Flin R, Lauche K, Cuthbertson BH. Non-technical skills in the intensive care unit. Br.J.Anaesth. 2006;96:551-559.

[30] Parker SH, Yule S, Flin R, McKinley A. Surgeons' leadership in the operating room: an observational study. Am.J.Surg. 2012;204:347-354.

[31] Aiarzaguena JM, Gaminde I, Clemente I, Garrido E. Explaining medically unexplained symptoms: Somatizing patients' responses in primary care. Patient Educ.Couns. 2013;93:63-72.

[32] Moghaddam A. Coding issues in grounded theory. Issues in Educational Research 2006;16:52-66.

[33] Frank AW,. The Wounded Storyteller: Body, Illness and Ethics. Chicago: Chicago University Press, 1995.

[34] Nettleton S, Watt I, O'Malley L, Duffey P, Nettleton S, Watt I, O'Malley L, Duffey P. Understanding the narratives of people who live with medically unexplained illness. Patient Education & Counseling 2005;56:205-210.

[35] Roter D, Larson S. The Roter interaction analysis system (RIAS): utility and flexibility for analysis of medical interactions. Patient Educ.Couns. 2002;46:243-251.

[36] Del Piccolo L, de Haes H, Heaven C, Jansen J, Verheul W, Bensing J, Bergvik S, Deveugele M, Eide H, Fletcher I, Goss C, Humphris G, Kim YM, Langewitz W, Mazzi MA, Mjaaland T, Moretti F, Nubling M, Rimondini M, Salmon P, Sibbern T, Skre I, van Dulmen S, Wissow L, Young B, Zandbelt L, Zimmermann C, Finset A. Development of the Verona coding definitions of emotional sequences to code health providers' responses (VR-CoDES-P) to patient cues and concerns. Patient Educ.Couns. 2011;82:149-155.

[37] Ring A, Dowrick CF, Humphris GM, Davies J, Salmon P. The somatising effect of clinical consultation: what patients and doctors say and do not say when patients present medically unexplained physical symptoms. Soc.Sci.Med. 2005;61:1505-1515.

[38] Mabeck CE, Olesen F. Metaphorically transmitted diseases. How do patients embody medical explanations?. Fam.Pract. 1997;14:271-278.

Table 1, Summary of Explanation Types and Components identified in MSS1 & MSS2 symptom explanations

Explanation Types

- Rational Adaptive

    It is understandable that…if X, then you would Y…but that can become unhelpful

- Automatic Adaptive

    Your body is designed that…if X, it should do Y…but sometimes that is the wrong response / it works in other ways…which means that…

- Complex

    Your body has complex and interacting systems to manage X…but sometimes these don't work properly / are out of balance / have cascade or cycle effects…which means that…

Explanation Components

Facts	*Causes*	*Mechanisms*
Statements of "popular science" which are general rather than specific to the individual and their illness.	Statements about candidate causal factors for the specific person and symptom.	Statements about biological, neurocognitive, psychosocial processes by which a patient's specific symptom(s) may arise or persist.

Table 2, Symptom mechanisms observed in MSS1 & MSS2

Mechanism	Description	Example
Somatic	Specific bodily state, e.g. descriptions of abdominal symptoms, muscle tension	*…if your muscles are always tense, then that's always creating pain…*[a]
Sensitisation	Central sensitisation and amplification	*…What seems to happen with some people, or with anybody after enough pain, is that the pain barrier starts to become less effective so you can't switch pain off at all, even when it's been there for a very long time and it's not telling you anything useful…*[b]
Exhaustion	Dimensions of fatigue (e.g. tiredness, sluggishness)	*…your sleeping centre and your arousal centre buttons are not working as they should, they're not switching properly and…you're left aroused at night and you're left…feeling kind of urgh and like you're in a fog…*[c]
Dissociation	Dissociative light-headedness, functional weakness, non-epileptic attacks	*…sometimes what happens is the brain becomes a bit overwhelmed by all these messages and it's almost like it needs to sort of reset itself, and sometimes you can get these little episodes – you describe them as sort of not really being there…being sort of outside yourself…*[d]
Alarm	Feeling of panic or palpitations	*…But in some people that alarm system goes off more readily, you know, it's almost like a false alarm that's going off, so if you experience something then your body is on an alert and that can cause you to feel a bit more sick than you should do…*[d]
Attention	Threat scanning, heightened awareness	*…to kind of learn that when you're ill you've got to watch out for things that …might make you ill and kind of you've got to read the signs very carefully which sometimes is really necessary when you're very ill but kind of gets a bit less necessary when things are running smoothly, but it's a habit…*[b]
Avoidance	Staying away from or reducing activity levels	*…fatigue's a…difficult one to overcome, um, because what…people tend to find is that being tired stops them doing things, and so they're not doing as much, and that can make fatigue worse.*[e]

[a] GP A, MSS2
[b] MSS1 GP
[c] GP B, MSS2
[d] GP D, MSS2
[e] GP C, MSS2

Figure 1, Automatic Adaptive explanation incorporating Fact, Mechanism, and Causal components from MSS2

GP D: *So normally we experience pain when we damage our body, when we injure our body, and what happens is that if you imagine you injured your knee, the pains in the knee would send messages initially up to the spinal column and then on up to the brain to say to the brain that the knee has been injured…*	**Fact**
...but what can happen in some people is that the signals from the nerves become amplified, they become louder if you like in the brain, so that things that shouldn't be uncomfortable become painful.	**Mechanism: Sensitisation**
Patient: *Okay.*	
GP D: *And there are some theories as to why this happens. We think that some people have a genetic likelihood to experience this chronic pain…*	**Cause: Predisposition**
…sometimes it follows some sort of trauma or physical insult and you mentioned that you thought a lot of this had started after you had your bowel operation which was obviously very traumatic the way it happened and the way it affected you for a number of years, so that may have been...	**Cause: Trigger Event**
Patient: *A trigger.*	
GP D: *...a trigger for this…* *…The thought is that it's due to chemical changes in the brain and as a result of those chemical changes, as I mentioned, the messages from the pain nerves are turned up, the volume is much louder than it should be, and there are a number of things that can help to turn it back down again.*	**Mechanism: Sensitisation**

Table 3, Number of mechanism and cause components present in each type of explanation

	Rational Adaptive		Automatic Adaptive		Complex	
	N	%	N	%	N	%
Mechanism categories						
0	0	*0*	1	*2.2*	3	*7.1*
1	7	*22.6*	28	*62.2*	28	*66.7*
2	17	*54.8*	12	*26.7*	8	*19*
3+	7	*22.6*	4	*8.9*	3	*7.1*
Cause categories						
0	7	*22.6*	30	*66.7*	7	*16.7*
1	16	*51.6*	11	*24.4*	18	*42.9*
2+	8	*25.8*	4	*8.9*	17	*40.5*