

## Commentary

## An evidence-based patient-centered method makes the biopsychosocial model scientific

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## ABSTRACT

**Objective:** To review the scientific status of the biopsychosocial (BPS) model and to propose a way to improve it.**Discussion:** Engel's BPS model added patients' psychological and social health concerns to the highly successful biomedical model. He proposed that the BPS model could make medicine more scientific, but its use in education, clinical care, and, especially, research remains minimal. Many aver correctly that the present model cannot be defined in a consistent way for the individual patient, making it untestable and non-scientific. This stems from not obtaining relevant BPS data systematically, where one interviewer obtains the same information another would. Recent research by two of the authors has produced similar patient-centered interviewing methods that are repeatable and elicit just the relevant patient information needed to define the model at each visit. We propose that the field adopt these evidence-based methods as the standard for identifying the BPS model.**Conclusion:** Identifying a scientific BPS model in each patient with an agreed-upon, evidence-based patient-centered interviewing method can produce a quantum leap ahead in both research and teaching.**Practice implications:** A scientific BPS model can give us more confidence in being humanistic. In research, we can conduct more rigorous studies to inform better practices.

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## 1. Introduction

Many are up-in-arms about the quality of care and caring they receive from their doctors, and they are not alone. The Institute of Medicine (IOM) has recognized that a gap exists in modern healthcare and has asserted that we must cross this “quality chasm” by implementing patient-centered practices to address the psychological and social dimensions of patients' health concerns [1]. For those with more severe psychosocial problems, the chasm for mental health care is even more substantial, and the overall picture is little changed over many years, as attested by the IOM [2] and others [3–6].

Not all of medicine has been oblivious. Dating from the 1970s and 1980s, for example, Goldberg, Engel and Romano, and Burns were among the first to call for improved training for physicians [7–9]. More recent appeals have come from the Institute of

Medicine (IOM) and Healthy People 2020 [1,3], the IOM further advising improved training across all years of medical school and residency [2,10]. The Association of American Medical Colleges (AAMC) has been similarly emphatic [11]. Responding to the need for physicians with increased psychosocial competence, the AAMC will add a large behavioral and social sciences section to the Medical College Admissions Test beginning in 2015 [12].

Nevertheless, the extent of training in most medical schools in psychosocial and mental health medicine has changed little over many years: typically 6–8 weeks of interview skills training in the first year and a 4–8 week clerkship on psychiatry in the third year, often on inpatient units with patients very unlike those that will be seen in an outpatient practice [13]. In residencies, 71–92% of program directors in internal medicine, pediatrics, and obstetrics indicate that their psychosocial and mental health training is minimal or suboptimal, significantly greater than the 41% indicated by family medicine directors [14]. As an example in internal medicine, the median number of hours per year devoted to psychosocial training is 17 [15]. These curricular deficiencies at both student and resident levels suggest that we need to change.

Most experts agree, however, that before making a fundamental curricular change, we first must develop and proceed from a sound

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conceptual base [16–19], our focus in this paper. George Engel proposed a theoretically informed framework when he articulated the biopsychosocial (BPS) model in 1977 [20]. It expanded medicine's long-established, highly effective biomedical model, the origin of all modern medical advances [20]. Patients would continue to be cared for from a disease standpoint but, additionally, psychological and social information would be given equal standing in the care process. Because it was based in General System Theory [21], Engel argued that, with subsequent empirical support, the BPS model had the potential to make medicine more scientific as well as more humanistic.

Few dispute that the BPS model provides more humanistic care and that such care is desirable. Nevertheless, medical education has failed to realign its curricula to fully incorporate the model and its requisite patient-centered approach as a goal or outcome of training. A major reason for this resistance stems from what many say are the questionable scientific qualities of Engel's BPS model. There has been recurring criticism that this model cannot be operationalized or defined, is not testable, and does not meet the standards of modern medical science [22]. To address this critique, we first review the BPS model and its shortcomings.

## 2. The biopsychosocial model

### 2.1. Theoretical perspective and general definition

The BPS model is a re-statement of the parts of General System Theory [20–22] that apply to medicine (Fig. 1). From the smallest discernible entity (system) in physics to the largest system in the cosmos, all reasonably stable systems are structurally and functionally interconnected from level to level with continuous feedback loops; e.g., Quarks – Atoms – **Molecules** – **Cells** – **Tissues** – **Organs** – **Body Systems** – **Human Being** – **Family** – **Community** – Society – Cosmos [20–22].

Although its intent is to describe the individual patient, Engel only generally defined the BPS model as encompassing all patient information from the bolded areas above and in Fig. 1. With the human being at the center, the physician integrates data from the human or psychological level with information from the biological level (below) and with data from the social level (above) to construct the BPS description of each patient. Each level in the hierarchy operates according to a unique action system; e.g., molecular interactions at the cellular level, perception and cognition at the psychological level, and attribution of “meaning”

at the social level [22,23]. Understanding the integration of these action systems is a critical element in harmonic interactions and health [23]. Communication between doctor and patient, accordingly, fulfills a basic need for integrating the various levels of action and understanding in the patient's BPS story [23,24].

### 2.2. Three consistent criticisms of the biopsychosocial model

#### 2.2.1. Not testable

Several authors have objected to calling the BPS model a “model” at all because it is vaguely defined and not operationalized in behavioral terms for the patient. As a result, predictions cannot be made and tested to evaluate it [22,25,26]. Critics call it a general theory or simply a pre-scientific or metapsychological rationale for the mind-body connection [22].

#### 2.2.2. Too general

Others propose that the very general description of the BPS model defines it as requiring virtually all biopsychosocial patient information. They assert that this represents “non-selective eclecticism,” is inefficient and time-consuming, and is not applicable for individual patients on a daily basis [25–32].

#### 2.2.3. No method

Many note that the model requires biopsychosocial information without providing the process for obtaining it from the patient; i.e., there is no specified method to operationalize (define) the BPS model for the individual patient [22,25,27–31,33].

### 2.3. The fundamental flaw of the biopsychosocial model

We find the answer to these three overlapping criticisms by addressing one question: “Exactly *how* do doctors *efficiently* identify *essential* biopsychosocial data when caring for an *individual patient* at a given point in time?” Put another way, we need a repeatable method that consistently identifies only the relevant biological, psychological, and social information needed to define the BPS model at each visit; i.e., an individualized, specific representation of Engel's general BPS model.

While data from other sources are important to an ongoing and complete BPS description (e.g., physical examination, diagnostic investigation, talking with families), the face-to-face interview with the patient is the most important source of BPS information. It is typically the platform on which the specifics of obtaining data from the other sources occurs; e.g., what to look for on physical exam or what tests to order or to whom one should speak in the family [34]. In the next section, we briefly review the evolution of the patient-centered interview and then offer our solution to the fundamental flaw critique of the BPS model.

## 3. The medical interview

### 3.1. “How” to conduct the interview

Shortly after Engel described the BPS model and also under the influence of Rogers, Kleinman, and Balint, Levenstein, McWhinney and colleagues [35] proposed the general concept that doctors become “patient-centered.” This meant that the physician followed the patient's lead and interests during the medical interview to identify the psychological and social components of the BPS model. These pioneers recommended inquiry that avoided interruption and used open-ended and non-directive questions. The patient-centered method differed from the standard “doctor-centered” approach where the doctor led the interaction by asking closed-ended questions designed to diagnose and treat diseases, the biological dimension of the BPS model.

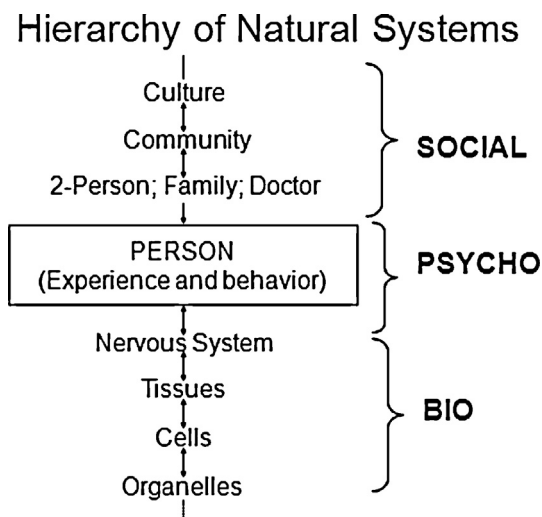


Fig. 1. The Biopsychosocial Model Within the Systems Hierarchy.

With the impetus of Engel, Rogers, McWhinney, and many others, wide dissemination of patient-centered practices was promoted by the American Academy on Communication in Healthcare [36], the European Association for Communication in Healthcare [37], and the Institute for Healthcare Communication [38] – as well as many other groups including several primary care organizations. Medical schools, accreditation groups, and governing boards embraced BPS/patient-centered ideas and implemented them by starting patient-centered interviewing courses in the preclinical years. In 2001, the Institute of Medicine identified patient-centered care as one of six domains of quality, thereby establishing the concept as a key to patient safety and effective, efficient care [1]. Teachers, scholars, and researchers moved the field ahead rapidly in many areas to provide initial scientific support for the BPS model.

This new field, however, recognized the need for stronger, more rigorous teaching and research [39,40]. Many, including Engel [41], noted that a specific definition of the patient-centered interview and explicit directions for its practice were lacking [41–46]. This precluded effective teaching and experimental research [47,48], in both of which cases we need a well-defined, repeatable interview. Otherwise, the result is a highly variable, sometimes contradictory patient-centered interview [42,43]. Educators and investigators recommended that learners needed to know exactly what to say, with behaviorally defined patient-centered skills broken down into specific, definable components that were sequenced and prioritized [42,44,45]. In addition, educational experts endorsed the use of specific behavioral models for teaching any complex topic [23]. Research further demonstrated that such well-defined methods produced flexible, skilled students and doctors able to understand the unique personal and social aspects of their patients [42,49].

Three of the authors recently reviewed the literature of behaviorally defined patient-centered methods studied as interventions in randomized controlled trials (RCT) [50]. Of all 321,219 reported RCTs, only 1475 (0.5%) even mentioned ‘patient-centered,’ and only 13 of these (0.9%) employed behaviorally defined interventions. Just 4 of these 13 were rated as generalizable and associated with positive outcomes, one concerning basic data-gathering and emotion-handling and all four concerning informing and motivating. Since this publication in 2010, one additional evidence-based method for data-gathering and emotion-handling has been reported by one of the authors [51]. The two data-gathering and emotion-handling methods are the focus of this paper and, we propose, the means for making the BPS model scientific.

### 3.2. Evidence-based, behaviorally defined patient-centered interviewing methods

Two very similar behaviorally defined methods were developed independently in 1996 by two of the authors (RMF, RCS) [52,53]; see Tables 1 and 2. Randomized controlled trials (RCT) of each method later demonstrated effective and efficient learning [49,51], one demonstrating also that the patient-centered method was associated with positive health outcomes in two subsequent clinical trials [54,55]. Although quite similar, the method in Table 1 is designed more for beginning learners and presents more detailed data-gathering and emotion-handling behaviors for conducting the initial parts of the patient-centered interview, while the method in Table 2 presents greater detail about ending the interview. One can easily integrate the two methods without compromising the integrity of their research support.

Such behaviorally defined methods are repeatable and provide the consistent approach required to define the subject of any science, which in medicine is the patient [56]. While the specific

**Table 1**

Integrated patient-centered and doctor-centered interview model.

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**PATIENT-CENTERED INTERVIEWING METHOD (5-STEPS, 21-SUBSTEPS)**

STEP 1 – Setting the Stage for the Interview

1. Welcome the patient
2. Use the patient's name
3. Introduce self and identify specific role
4. Ensure patient readiness and privacy
5. Remove barriers to communication
6. Ensure comfort and put the patient at ease

STEP 2 – Chief Concern/Agenda Setting

1. Indicate time available
2. Indicate own needs
3. Obtain list of all issues patient wants to discuss; e.g., specific symptoms, requests, expectations, understanding
4. Summarize and finalize the agenda; negotiate specifics if too many agenda items

STEP 3 – Opening the History of Present Illness (HPI)

1. Open-ended beginning question focused on Chief Concern
2. ‘Nonfocusing’ open-ended skills (Attentive Listening): silence, neutral utterances, nonverbal encouragement
3. Obtain additional data from nonverbal sources: nonverbal cues, physical characteristics, autonomic changes, accouterments, and environment

STEP 4 – Continuing the Patient-Centered History of Present Illness (HPI)

1. Physical Component of Story – Obtain description of the physical symptoms [Focusing open-ended skills]
2. Personal and Social Component of Story – Develop the more general personal/social context of the physical symptoms [Focusing open-ended skills]
3. Emotional Component of Story – Develop an emotional focus [Emotion-seeking skills]
4. Empathic Responses – Address the emotion(s) [Emotion-handling skills: name, understand, respect, support]
5. Expand Story and Responses – Expand the story to new chapters (focused open-ended skills, emotion-seeking skills, emotion-handling skills)

STEP 5 – Transition to the Doctor-Centered History of Present Illness (HPI)

1. Brief summary
2. Check accuracy
3. Indicate that both content and style of inquiry will change if the patient is ready

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**DOCTOR-CENTERED INTERVIEWING METHOD (7 STEPS)**

STEP 6 – Overview and Summary of History of Present Illness (HPI)

STEP 7 – Completing the History of Present Illness (HPI) Primarily Using Closed-ended, Directive Interviewing

STEP 8 – Other Health Issues; e.g., diet, functional status, health hazards, sexual practices

STEP 9 – Past Medical History; e.g., medications, prior hospitalizations and surgery, allergies

STEP 10 – Social History; e.g., current living situation, early development, marital history

STEP 11 – Family History; e.g., family genogram, diseases in family

STEP 12 – Review of Systems; e.g., review for any symptoms not previously given by the patient

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BPS information will of course vary from patient to patient, these data will be collected in the same way with every patient. This means that all researchers and teachers can define the biological, psychological, and social information of patients in the same way, and that researchers can conduct experimental studies to test a consistently defined patient-centered intervention, something not previously possible.

In addition, compared to isolated doctor-centered interviewing, both methods provide a more representative or complete description of the patient by integrating the psychosocial dimensions with disease information. Because research, including that on one method presented here [54,55], has demonstrated improved health outcomes and patient satisfaction when physicians include psychosocial data [57,58], the methods are meaningful as well as repeatable.

We now specifically define the BPS model for use at each patient visit. The BPS model comprises all patient-centered and doctor-centered information derived from the History of Present Illness (the first seven steps in Table 1; the first three habits in Table 2).

**Table 2**  
Four habits interviewing model.

|   |
|---|
| <b>HABIT 1 – Invest in Beginning</b>                            |
| i) Demonstrate familiarity with the patient                     |
| ii) Greet warmly  |
| iii) Make small talk  |
| iv) Ask open-ended questions                                    |
| v) Encourage expansion of patient's concerns                    |
| vi) Develop the full agenda of the patient's needs              |
| <b>HABIT 2 – Elicit the Patient's Perspective</b>               |
| i) Determine patient's understanding of problem                 |
| ii) Elicit patient's goal(s) for visit                          |
| iii) Determine the impact of the problems on the patient's life |
| <b>HABIT 3 – Demonstrate Empathy</b>                            |
| i) Encourage emotional expression                               |
| ii) Accept/validate feelings                                    |
| iii) Identify/label feelings                                    |
| iv) Display effective non-verbal behaviors                      |
| <b>HABIT 4 – Invest in the End</b>                              |
| i) Frame information using the patient's perspective            |
| ii) Allow time for information to be absorbed                   |
| iii) Explain clearly/little jargon                              |
| iv) Give rationale for treatment and tests                      |
| v) Evaluate patient's comprehension of material presented       |
| vi) Encourage patient involvement in decision-making            |
| vii) Explore acceptability of treatment plan                    |
| viii) Explore barriers to implementation                        |
| ix) Encourage questions   |
| x) Makes follow-up plans  |

Research demonstrates that the methods produce highly relevant disease, personal/social, and emotional information – rather than all BPS information. The personal and emotional information typically provide the human context in which symptoms of illness or disease reside. Responding to emotion empathically maximizes communication and the relationship and is the interactional pinnacle where doctor and patient appreciate the full “meaning” of a problem. While the mechanism is unknown (and ripe for psychodynamic, neuro-physiological, linguistic, and nonverbal study), given the chance, patients rapidly express their relevant BPS story. Most doctors require no more than three to five minutes to elicit this essential information in the patient-centered component.

For readers interested in the research application, following Popper [59], an intervention can evaluate testable (falsifiable) hypotheses comparing the integrated patient-centered method, as the predictor or independent variable, to usual care (an isolated doctor-centered method) in a RCT. For example,

**Hypothesis.** An antidepressant intervention for patients with chronic pain that uses the integrated patient-centered and doctor-centered method (Steps 1 to 7; Habits 1 to 3), compared to a non-patient-centered control receiving the same antidepressant regimen, will have superior biological (physical symptoms and function), psychological (depression, satisfaction, adherence), and social (relationships, cost) outcomes.

Similarly, a RCT for diabetes or hypertension would employ the same research design (patient-centered method vs. usual care, non-patient-centered methods). Critical to analyses are identifying mediators and moderators of the patient-centered effect [60,61].

The BPS diagnosis resulting from the method identifies the specific bio-psycho-social elements that are addressed in the treatment plan at each visit; e.g., what specific treatment for a man's prostatic cancer (biological), addressing his fear of debility (psychological), and finding satisfactory insurance coverage for him (social). For treatment the same patient-centered skills (open-ended elicitation of the patient's BPS story, emotion seeking and empathic responses) are integrated with higher-level

treatment-specific patient-centered skills involved in sharing decisions and negotiating treatment plans; e.g., patient education, end of life issues, known psychosocial treatments (such as cognitive-behavioral treatment or group therapy), and pharmacologic and other biomedical treatments [54,55]. The main point is that the basic patient-centered method described here would be the centerpiece of more complex patient-centered treatment interventions that require additional specific skills.

## 4. Discussion and conclusion

### 4.1. Discussion

Engel's general BPS model is not definable and therefore not testable as we presently use it. Its resulting non-scientific status accounts in large part for its limited penetration into mainstream medicine, especially research. Non-testability stems from not using a behaviorally defined patient-centered method that identifies BPS data in a repeatable way for each patient visit.

We propose that educators and researchers can make Engel's general model scientific by specifically defining it for each patient as the data produced by the integrated methods in Table 1 (Steps 1–7) or Table 2 (Habits 1–3). Thus, the method transforms the general model into a specific model for each patient encounter. We make explicit that the BPS model and the interviewing method are the inseparable content and process sides, respectively, of the same coin (Fig. 2). Put another way, the interviewing method itself defines the BPS model, not unlike a telescope defines (what we know about) the cosmos. As Heisenberg said, “We have to remember, that what we observe is not nature in itself but nature exposed to our method of questioning” [62].

There are at present no other behaviorally defined, evidence-based interviewing methods described in the literature [50]. In addition to having been extensively taught and researched for more than 15 years [49,51,52,54,55,63], the methods recommended meet the requirements for defining the BPS model by comprising the 6 recommended criteria of “operationalism:” (i) logically consistent, (ii) specific, in behavioral terms, (iii) empirically based, (iv) technically feasible, (v) repeatable, and (vi) aimed at creating a concept that will function as a theory/model of greater predictability [23].

Additionally, neither method was developed de novo, both derived from a rich patient-centered literature and considerable input from experts. Each also is easily quantified so that the teacher or researcher can ensure fidelity to the method, and each also has a well-validated evaluation tool to verify a positive impact on the patient [49,51]. Further, because the methods' focus on emotion

## FLIP SIDE OF SAME COIN

|              |                     |
|--------------|---------------------|
| <u>BPS</u>   | <u>INTEGRATED</u>   |
| <u>MODEL</u> | <u>INTERVIEWING</u> |



**Fig. 2.** The Patient-Centered Method and BPS Model as Two Sides of the Same Coin.

and the provider–patient relationship, they also comprise the four key elements of the Finset/Mjaaland theory that affect regulation is the central dynamic in patient-centered communication [64]. Finally, the method in Table 1 is the focus of a textbook by all authors of this paper that is endorsed by the American Academy on Communication in Healthcare [34].

Nevertheless, just as the Hubble telescope improved on land-based astronomy methods, improved patient-centered methods will evolve via future research to define a better BPS model, the two being inseparable until they are supplanted as the field further matures. A corollary is that the BPS model is never final, always an operational model [59].

Many will understandably be skeptical because a repeatable and meaningful patient-centered method still does not explain what occurs between the method and improved patient outcomes, nor does it tell us about the mechanism of other factors such as ‘meaning’ to the patient and doctor or pathways associated with improved outcomes [60,61,65]. We agree and offer this perspective. A systematic method is simply the first research step. Without a repeatable method, any interventional study of ‘patient-centered’ will be fundamentally flawed because the patient-centered predictor (independent variable) is not defined, a moving target varying considerably from one study to the next. This impairs study of the mechanisms, meanings, or pathways of a patient-centered approach. We recently took advantage of the repeatability provided by the method in Table 1 to conduct otherwise impossible studies. To evaluate the mechanism of patient-centeredness, we compared patients who had received the method to those who did not and found striking and sometimes unexpected changes in the underlying linguistic features of both patient and doctor and in the neurobiological responses of patients [66,67]. Similarly, we cannot accurately determine the pathways of impact on outcomes when the definition of patient-centered varies from study to study, nor can we well understand the meanings of patient-centered interactions to doctors, patients, and others. In sum, we believe that using a standard, operational definition is needed for the research studies that can lead to further evolution in the scientific rigor of this new, rapidly progressing field of health care communication.

#### 4.2. Conclusion

By making the BPS model scientific using a common patient-centered method, both teaching and research in our field will be poised for a quantum leap ahead. Educators can train learners systematically to make and interpret a BPS description of their patients at each encounter, and researchers can systematically define the model for more rigorous study in clinical trials and other research. In these ways, medicine will become more scientific as well as more humanistic – much more able to meet growing societal demands for medical care that is competent, caring, and comprehensive.

#### 4.3. Practice implications

Using a scientific BPS model in our practices can give us more confidence in being humanistic. In our research, we can conduct more rigorous studies to inform better practices.

#### Conflict of interest

The authors have no conflicts of interest.

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