Collaborative development of middle-range nursing theories: Toward a theory of unpleasant symptoms

One promising approach to strengthening theory–research and theory–practice linkages is to place greater emphasis on developing and using theories of the middle range to underpin nursing research and practice. In this article, a postpositivistic definition of middle-range theory is advanced, an argument is made for shifting nursing's theory development activities from discipline-defining grand theories to middle-range theories, and a collaborative and incremental approach to middle-range theory development is described and illustrated. A sustained substantive example is provided by the beginning development of a theory of unpleasant symptoms.
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Elizabeth R. Lenz, PhD, RN, FAAN
Professor
School of Nursing
Senior Researcher
Center for Nursing Research
Milton S. Hershey Medical Center
Pennsylvania State University
Hershey, Pennsylvania

Frederick Suppe, PhD
Professor
Department of Philosophy
University of Maryland
College Park, Maryland

Audrey G. Gift, PhD, RN, FAAN
Associate Professor
School of Nursing
University of Pennsylvania
Philadelphia, Pennsylvania

Linda C. Pugh, PhD, RNC
Assistant Professor
School of Nursing
The Johns Hopkins University
Baltimore, Maryland

Renee A. Milligan, PhD, RNC
Assistant Professor
School of Nursing
Georgetown University
Washington, DC

NURSING LITERATURE abounds with admonitions that knowledge development requires strong links among theory, research, and practice. Nevertheless, the activities of building theory, conducting research, and engaging in clinical practice have traditionally occurred in relative isolation from one another. Recent efforts to strengthen the theory–research–practice linkages include heightened priority being given to research utilization, creative use of nurse researchers in clinical settings, initiation of journals that present research findings in a more integrated and user-friendly format, and published accounts of applying nursing's encompassing conceptual frameworks in practice.[1-3] In general, however, research–practice linkages have been more firmly established than those of nursing theory to research and practice.

Since the 1970s the term "nursing theory" has been virtually synonymous with a handful of abstract and broad-scoped conceptual

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frameworks (also termed "grand theories") that were designed as blueprints for the discipline but that are not easily used as free-standing guides to practice or as bases for research. One promising approach to strengthening theory–research and theory–practice linkages is to begin to place greater emphasis on developing and using theories of the middle range to underpin nursing research and practice.

According to Merton,[4] whose discussion of middle-range theory is congruent with the way the term is used in the nursing literature, *middle-range theories* are those theories that fall between the working hypotheses that are an essential part of conducting research and "the all-inclusive systematic efforts to develop a unified theory [of the discipline]."[4(p39)] They are abstract enough to extend beyond a given place, time, or population but specific enough and sufficiently close to empirical data to permit testing and to generate distinctive questions for study or specific interventions for practice.[5] A few middle-range theories have been developed by nurses, and they are currently being used in a growing number of clinical and research situations (eg, Mishel's[6,7] middle-range theory of uncertainty in illness, Cox's[8] interaction model of client health behavior, Morse and Johnson's[9] illness constellation model, and Pender's[10] model of health promotion and illness prevention).

One purpose of this article is to argue for a shift in nursing's theory development activities from discipline-defining grand theories to middle-range theories, because the role of the former in legitimizing the nursing discipline has been largely accomplished. Middle-range theories have greater potential to guide research and provide the basis for effective interventions. A second purpose is to describe and exemplify use of a collaborative and incremental approach to generating middle-range theories. Theory development at any level is difficult, and the literature—with the notable exception of Walker and Avant's[11] *Strategies for Theory Construction in Nursing*—provides little guidance. The authors' efforts to begin developing a middle-range theory of unpleasant symptoms using the strategies of analysis, derivation, and synthesis first at the single concept level and then at the theory level will help illustrate the use of these strategies. It will also demonstrate how middle-range theories may be developed by investigators who begin empirically developing single concepts and then extend their work through collaboration.

ROLE OF MIDDLE-RANGE THEORIES IN KNOWLEDGE DEVELOPMENT

A postpositivistic view of middle-range theories

It has been characteristic of would-be psychosocial science disciplines as they pursue legitimation as "real" sciences to devote much attention to the role of theory, particularly the sorts of theories that "ought" to be developed. When sociology fought these battles, Merton[4] introduced the clarifying distinction of middle-range theories from grand theories, and he focused the debate on the relative importance of each in the legitimation of sociology as a scientific discipline. Nursing science, too, has found Merton's distinction useful as it has waged its own battle for legitimation as a science.

In his discussion of middle-range theories, Merton[4] differentiated them from

grand theories using several criteria, including scope, level of abstraction, and particularly testability. Although testability of a theory, as advocated by the Logical Positivistic Received View, has been discredited by philosophers of science,[12] it is possible to divorce Merton's middle-range versus grand theory distinction from its positivistic underpinnings by recasting the definition of middle-range theories as follows: Theory and observation (experiment) use the same descriptive vocabularies. It is possible to distinguish those theories that postulate relationships between the (quantitative or objectively coded qualitative) values of those descriptors and those that do not. A time-relativistic distinction can be drawn between those descriptive terms that can currently be measured or objectively coded and those that cannot. Hence, at time *t*, a theory *T* is middle range if it postulates relationships between the (quantitative or objectively coded qualitative) values of its descriptors and if it is possible to measure or objectively code those descriptors. Thus, whether a given theoretical formulation can be considered middle range depends on the adequacy of its empirical foundations and is not simply a matter of its scope or level of abstraction. Moreover, a theoretical formulation that at the outset does not meet the above criteria can later attain that status.

Role of grand theory in the legitimation of nursing science

The relative importance of grand versus middle-range theory in an emerging scientific discipline depends on the position of the discipline in the legitimation process. Merton identified three stages in the legitimation process for sociology that have parallel applications to nursing:

> first, the differentiation of [the would-be discipline] from antecedent disciplines with its attendant claim to intellectual legitimacy; second, the quest to establish . . . [the would-be discipline's] institutional legitimacy or academic autonomy; and third, when this effort has been moderately successful, a movement toward the reconsolidation of . . . [the would-be discipline] with selected [others].[13(p49)]

In nursing, legitimation as a discipline involved distancing itself from medicine, a step that was accomplished by moving nursing education out of hospital schools into colleges and universities. That strategy quickly necessitated achieving academic legitimation, that is, making a case for having a distinct subject matter at a time when there was a paucity of research and middle-range theoretical accomplishments. Several nursing leaders proposed individual answers to the socially induced questions about the scope and nature of nursing and began to evolve unique systems of nursing. In the process, nursing not only became differentiated from other disciplines, but also became internally differentiated as competing articulated grand theories were advanced.

Merton's[13] third stage of disciplinary development is marked by increasing attention to substantive scientific research. It is characterized by detailed and limited investigations of specific and middle-range problems that the early legitimators had to forgo in the interest of defining the field. The theoretical and metatheoretical efforts of the early legitimators bought nursing sufficient time to develop a body of substantive research on which legitimation ultimately depended. The grand theories that dominated the nursing theory literature have been absolutely crucial to the disciplinary and institutional legitimation of nursing science. However,

to the extent they have been successful, their fate is to become increasingly marginal. They are products appropriate to Merton's first two phases of disciplinary development, and the function they have to play in a more mature legitimated nursing science is problematic.

When science is associated with a practice discipline such as nursing, the formative grand theories continue to have important roles to play in the socialization of people into the discipline; however, the role of these theories in knowledge generation diminishes once a critical mass of scientific accomplishment has been produced. For example, Rodman's[14] analysis revealed that a negligible role was played by global conceptual frameworks in advancing the development of testable theories in family sociology and in establishing empirical propositions.

Usefulness of middle-range theory for guiding research and practice

The burgeoning empirical literature in nursing, the existence of a discipline-specific National Institute of Nursing Research, and increased interdisciplinary collaboration provide evidence that nursing has entered the third phase of the disciplinary legitimation process. If nursing follows the pattern of sociology and other psychosocial sciences, the third phase will be one of accelerated attention to delimited and detailed investigation of specific phenomena, a pattern that has been advocated by nursing leaders.[15-17] Currently, the theoretical frameworks that are being used to generate research questions and hypotheses in published nursing research tend to be middle-range theories from other disciplines.[18]

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There has long been a call for theory-based practice, but relatively little has been documented about the extent to which current nursing interventions are actually grounded in theory or research. The few existing studies have revealed that there is a sparse theory or research base for many commonly used nursing interventions, and, when a theory base does underpin them, it tends to be a middle-range theory from another field.[19] Although there is some evidence of beginning use of nurse-generated middle-range theories as the basis for research and practice, more need to be developed and evaluated, and their use needs to be expanded. As nursing science progresses in the third stage of its development, its theoretical substance increasingly will be defined by the production of established middle-range theory.

Developing middle-range theories first involves sufficiently precise development of descriptors to make them measurable or objectively codable. Then, precise regularities between these descriptors must be identified. The mainstay of nursing research must increasingly become the development of the regularities between such identified descriptors with enough precision to enable them to guide nursing practice. The theory development process described here represents a focus on descriptor development,

with beginning efforts to document regularities between descriptors.

THEORY DEVELOPMENT PROCESS

Overview

Because concepts are indeed the building blocks of theory, it is not surprising that the process of middle-range theory development begins at the level of single concepts (ie, descriptors). In the two examples of theory development that follow, three individual investigators began work almost simultaneously on two different concepts that represent unpleasant symptoms: dyspnea and fatigue. The initial collaboration occurred when the two investigators studying fatigue at two different perinatal phases (authors Pugh[20] and Milligan[21]) combined their ideas to develop a model of fatigue during childbearing.[22] The second collaborative activity was undertaken when investigators studying fatigue and dyspnea (authors Gift[23,24] and Pugh[20]) realized that they were conceptualizing their concepts similarly and identified commonalities between the two symptoms[25]; this work was at the next (multiple-concept) level of generality. Finally, the decision to examine other, potentially similar concepts for incorporation into a more general theoretical formulation was based on having evolved a model that could be extended to multiple symptoms and different clinical populations.

A diagrammatic representation of the theory development process is shown in Fig 1. It demonstrates how three programs of study about single concepts in different clinical populations generated information that was then integrated to identify common-

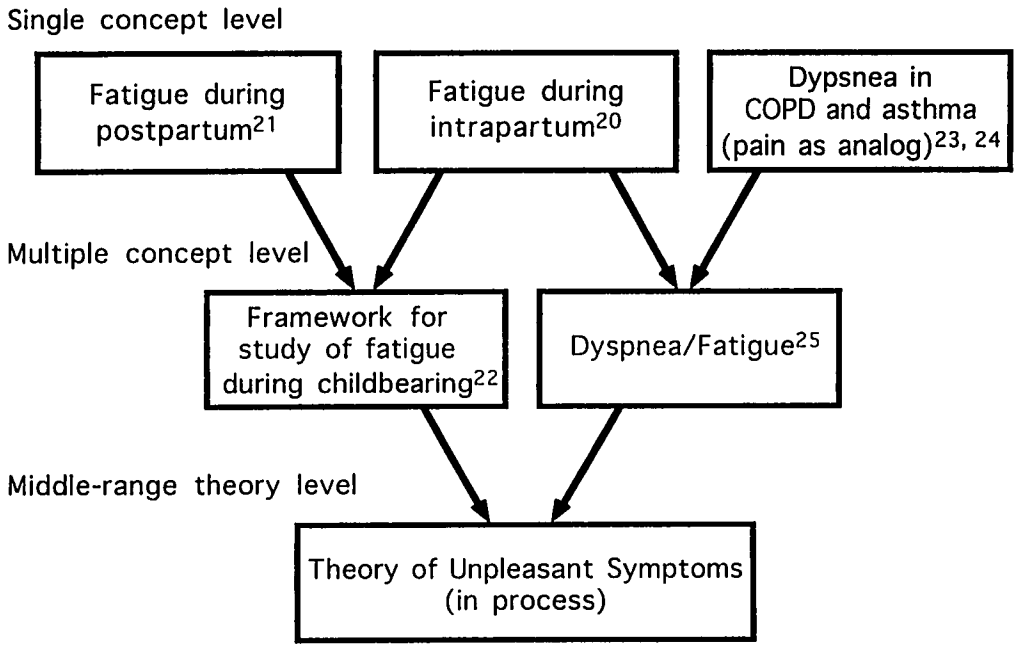

Fig 1. Overview of theory development process. COPD = chronic obstructive pulmonary disease.

alities across phases and concepts. Work undertaken at the multiple-concept level has provided the basis for a more encompassing middle-range theory. The theory development process includes development of two concepts, integration across the concepts, and extension to the theory level.

Development of the concept of dyspnea

The initial steps in the development of the concept of dyspnea involved combining extensive practice-based observations with a thorough understanding of the dyspnea literature. The literature review was carried out using the techniques of concept analysis, which involves examining the attributes, characteristics, and dimensions of a concept by identifying its various uses and defining its attributes, empirical referents, and antecedents and consequences.[11] The literature was fairly consistent in presenting dyspnea as a subjective symptom, not an objective sign. It should not be confused, as it often is, with a rapid respiratory rate, with deep breathing, or with other signs of respiratory distress. It can be detected only by the patient reporting the sensation of difficult or labored breathing. In support of the fact that dyspnea is a sensation is the finding that pulmonary function studies are not correlated with dyspnea.[26]

In reviewing the literature it was noted that many authors described dyspnea as similar to pain. This discovery led to the second phase of concept development, concept derivation, which employs an analogy or metaphor in redefining a concept.[11] Using pain as an analog, dyspnea was conceptualized first as having physiologic and psychologic components. The physiologic aspects of dyspnea involve the underlying pathology that initiates the impulse, such as the stimulation of sensory receptors. Schwartzstein and colleagues[27] described dyspnea as occurring when there is a mismatch between the efferent signals emanating from the brain and going to the respiratory muscles and the afferent signals returning from chest wall to the brain.

While the research reported in the literature was helpful in gaining an understanding of dyspnea, this understanding was difficult to reconcile with clinical realities, because the research had been based on a different model of dyspnea than nurses experience with patients. In research studies examining the physiologic mechanism for dyspnea it was induced, but this induced dyspnea is not comparable to the sensations experienced by patients. The research design chosen to study the concept of dyspnea for the purposes of concept development followed the technique outlined by Wilson[28] of comparing model cases (those clearly an example of the concept) with contrary cases (those clearly not an example of the concept). A prospective repeated-measures design was used to compare times of dyspnea to times without dyspnea in the same individuals. The important features of the concept were thereby identified for clinical nursing practice.

The psychologic or distress aspects of dyspnea were found to be similar to pain and to be related to anxiety, depression, and somatization.[23,29-32] Anxiety is higher during times of high dyspnea and is accompanied by high plasma cortisol levels.[23,31] Depression has been found to be higher during times of high dyspnea in some studies and may be related to the steroid medications taken by the more depressed subjects.[23] Somatic complaints are increased during times of high dyspnea and are not related to physiologic changes such as hypoxemia.[30]

Other similarities between dyspnea and pain are that pain has intensity and distress components and is defined as acute, chronic, or cancer pain. The sensory component of dyspnea that involves the nerve transmission to the cortex is essential to dyspnea intensity, as is the perception or the cognitive aspect.[24,33] The psychologic aspects of dyspnea, which have been referred to as "dyspnea distress,"[24] are similar to the distress components of pain. And as with pain, patients can separate the intensity and distress components of dyspnea.[34]

Further analysis of the literature revealed that the personal response style of the person, the manner of coping, or both influence dyspnea. Those who minimize their symptoms and avoid health care, as well as those who are panicky, are more likely to be treated with intensive steroid regimens and have poorer outcomes.[35]

An attempt was then made to synthesize the literature related to dyspnea.[24] As described by Walker and Avant,[11] *synthesis* is a process of identifying and then creatively bringing together the results of observation and evidence (one's own and others' as reported in the literature) gathered across time and space. Synthesis resulted in dyspnea being conceptualized as having five components: sensation (stimulation of the receptors and nervous transmission to the cortex), perception (the cognitive interpretation of dyspnea), distress (the psychologic component of dyspnea), response (coping with dyspnea), and reporting (the many factors contributing to a person describing dyspnea to others). Later, the components were relabeled to facilitate identification of interventions. Sensation was changed to the physiologic component, perception to the cognitive component, distress to the psychologic component, and response and reporting to the social component.[33] These components might be considered domains of the concept or ways in which dyspnea can be manifest. Variable dimensions of dyspnea were identified to include its duration, its strength or intensity, the degree of distress experienced, and its quality.

Synthesis *is a process of identifying and then creatively bringing together the results of observation and evidence gathered across time and space.*

Development of a framework for fatigue during childbearing

As depicted in Fig 1, development of a framework for fatigue during the phases of childbearing evolved from individual projects: Milligan's[21] inductive analysis of fatigue during the postpartum period and Pugh's[20] deductive analysis of fatigue during the intrapartum period. Milligan's conception of postpartal fatigue was developed by combining clinical observation with a study that included qualitative interviews with postpartal mothers and data from a quantitative measure of fatigue. From these studies emerged some important elements that were used in later work, such as the differentiation of fatigue from depression[36] and the differentiation of mental and physical fatigue.[37]

Pugh's work with intrapartal fatigue was based on several models that had been developed to explain fatigue in illness.[38,39] In her initial study she identified physiologic, psychologic, and situational factors that influence fatigue during childbirth.[20] From

Pugh's[40] research has also come evidence that fatigue is a multidimensional phenomenon with subjective, physiologic, and cognitive components that were revealed through different theoretical approaches. Milligan,[21] using an inductive approach in her qualitative study, identified a phenomenon called "pile-up" that was identified as mothers discussed overwhelming fatigue that "snowballed." Pugh,[20] using a quantitative deductive approach, also identified that fatigue is cumulative and has a snowball effect.

Pugh and Milligan, studying the fatigue concept at different phases of childbearing, began to realize that there were definite similarities between the causes, manifestations, and effects of fatigue at the two different childbearing phases. For example, energy depletion from the work of labor was found to influence fatigue not only during labor but also during the postpartum period. The researchers worked together to develop a framework of fatigue during childbearing.[22] The development process involved analysis of the information in existing tests and theories and synthesis of information from published research, their own clinical practices, and joint studies of fatigue during pregnancy and in breastfeeding women. The resulting framework includes the three major factors, each having a set of subaspects that can be applied across all phases of childbearing.

To guide clinical research, the framework was designed to improve understanding of how to prevent, ameliorate, or reduce the impact of fatigue on childbearing women. Multiple factors were posited to be associated with childbearing fatigue through synthesis of information from traditional maternity nursing texts, clinical journals, and reports of research about childbearing fatigue. The framework, consistent with classical work about fatigue,[41–43] emphasizes the physiologic effects of fatigue, subjective feeling of fatigue, and decreased work performance associated with increased fatigue. Other theoretical work within nursing about fatigue associated with specific health and illness conditions was evaluated for congruency with this framework,[38,39,44,45] and the basic theory structure was modified accordingly.

Factors posited to place the mother at risk in terms of the body's recuperation or performance of activities of daily living were termed "performance factors" and shown as consequences of fatigue. The definition of *fatigue* that informed the framework is that developed for the classification of nursing diagnoses: "an overwhelming sustained sense of exhaustion and decreased capacity for physical and mental work."[46(p73)]

As the framework was being developed it was apparent that there was little empirical research available to guide the organization and temporal ordering of factors related to childbearing fatigue. Available research was predominantly cross-sectional and descriptive, so that directions of relationships and causal inferences were tentative. Limited data were available about conditions that mediate or moderate fatigue, and little was known about mechanisms through which fatigue develops and dissipates. No experimental studies of nursing interventions to ameliorate childbearing fatigue were available. Thus, factors were positioned in the framework based on work about fatigue in general and fatigue in health-related conditions.

Identifying similarities between dyspnea and fatigue

In a parallel activity, the results of which were recently reported, Gift and Pugh[25] be-

gan to examine the similarities between the concepts of dyspnea and fatigue, a process that was facilitated by the similarities in their conceptualizations of the two concepts. For example, both are defined as subjective sensations or symptoms; both have been categorized as acute or chronic; both occur under normal and abnormal or illness conditions; both can result from or be exacerbated by excessive anxiety or depression; and some of the same physiologic, psychologic, and situational factors have been proposed as related to both. In addition, dyspnea and fatigue often occur together in the same clinical population, such as patients with chronic lung diseases and possibly women during the childbearing year. Both populations also report other symptoms occurring simultaneously. Both fatigue and dyspnea affect functional ability or performance, including role performance, activities of daily living, and social interaction.

There were also differences in the conceptualization of the two symptoms that had to be reconciled during the theory development process. For example, Gift and Cahill,[23] Gift,[24] and Pugh[20] viewed the symptom as multidimensional but identified different dimensions. In the Gift model of dyspnea, the concept was seen as a multidimensional phenomenon with psychologic, physiologic, cognitive, and social aspects. The Pugh conceptualization of fatigue also depicted it as multidimensional; identified physiologic, psychologic, and situational or environmental factors in fatigue; and stated that it affects functioning. In the combined conceptualization,[25] physiologic, psychologic, and situational factors are viewed as affecting the symptoms, rather than as component aspects, and the symptoms are considered to influence functioning.

Toward a theory of unpleasant symptoms

The two activities of generating a framework for the study of fatigue during multiple phases of childbearing and identifying similarities between the concepts of dyspnea and fatigue provided the basis for beginning a theory that would encompass the two symptoms (Fig 1). Fig 2 portrays the basic structure of the theory. It is proposed that three categories of factors—physiologic, psychologic, and situational—affect one's predisposition to or manifestation of a given unpleasant symptom. Within each category are several examples that apply across more than one symptom. Each symptom can vary in duration, intensity, quality, and distress. In addition, the level and nature of the symptom experience are proposed to affect the patient's performance, which includes functional status, cognitive functioning, and physical performance.

Development of this theory is in the beginning stages, so it cannot yet be considered a true middle-range theory. In keeping with the postpositivistic definition of middle-range theory, future work needs to focus on development of measurable or codable descriptors and postulation of relationships among those descriptors. Considerable literature already exists at the level of the specific symptoms regarding their measurement, predictors, correlates, and consequences. More work is needed, however, to move to the level of abstraction and generality required for a theory that encompasses several symptoms. It will be necessary to more clearly differentiate the theory's components and identify measurable descriptors using the strategies of concept-based measurement, then discern relationships that are common to more than one symptom and more fully explicate them

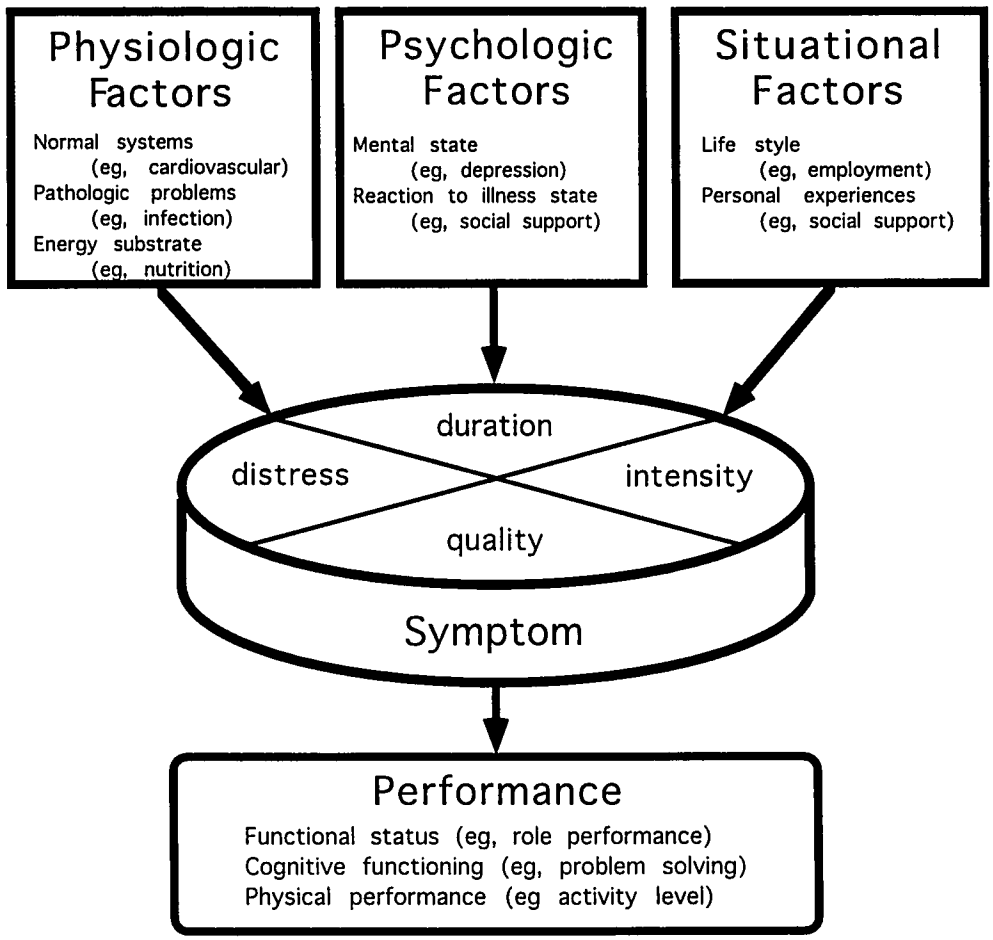

Fig 2. Middle-range theory of unpleasant symptoms. → = influences.

through research.[47] Beginning efforts to do so for the symptoms of dyspnea and fatigue are reflected in the examples in Fig 2, but the theory must be more fully elaborated, as well as extended to other unpleasant symptoms. In addition, a number of matters need to be resolved, including how to represent the processes involved in the experience of symptoms; how to account for the reality that the individual can experience more than one unpleasant symptom simultaneously; and how to account for the potential for symptoms to cumulate, snowball, interact, relate reciprocally to one another, and even have a multiplicative effect.

DISCUSSION

This article argues that the discipline of nursing will benefit from increased attention

to the development of middle-range theories that are sufficiently specific to guide research and practice, yet sufficiently general to cross multiple clinical populations and to encompass similar phenomena. In the case of unpleasant symptoms, there is reason to believe that some of the same factors may be involved in the experience of a number of symptoms and that some of the same interventions might be effective in alleviating more than one. To the extent that research about several symptoms can be carried out by multiple researchers working within the same general theory or model, there is increased potential that the results will be cumulative and cross-cutting and ultimately used in practice. The theory represents an efficient way to organize and integrate a large body of literature and to sensitize researchers to aspects of unpleasant symptoms that are important to investigate.

The theory of unpleasant symptoms can also be used to identify preventive interventions to modify some of the factors that produce symptoms or to develop innovative treatments that can be applied across symptoms when they occur. Relaxation techniques, for example, have been successfully used to ameliorate dyspnea and nausea and to promote rest for the alleviation of fatigue. In addition, preventive or ameliorative interventions could be directed toward effecting changes in physiologic factors such as nutrition, psychologic factors such as self-efficacy, or situational factors such as social support.

The process described in this article to begin development of a theory of unpleasant symptoms was not preplanned. Rather, it occurred spontaneously and naturally, because investigators who at the outset were only vaguely aware of each others' work communicated frequently to share ideas and brainstorm. Only after considerable work by the individuals alone and in pairs did the idea to work toward such a theory materialize. The theory continues to evolve.

At the concept level, the work of concept analysis and clarification that provided the underpinnings for subsequent theory development has several characteristics that facilitated progress. First, it was strongly grounded in research and clinical practice. Second, it combined inductive and deductive insights that were gained through research studies and a very thorough knowledge of the literature, initially about each of the concepts separately, and later through repeated discussions and analogical reasoning. Importantly, the analogies were not taken from other fields, which is the usual method of derivation described by Walker and Avant.[11] Rather, the question of whether the second concept was analogous remained open initially until sufficient similarities had been discerned to warrant thinking about them as analogs to one another. Third, in each case the work was informed by existing theories but was not necessarily constrained by them. The fact that existing theories and even some research findings did not quite fit the reality of the clinical situation stimulated thinking that went beyond the theories and findings. Fourth, the investigators' ability to make steady progress in integrating and synthesizing large bodies of literature was influenced by the professional environment, including some major changes in the state of the science in recent years. The major attention that has been directed toward clinical phenomena, including symptoms and their management, has done much to stimulate relevant research and theory building.

The theory-building activities involved all three strategies described by Walker and Avant,[11] and they were applied at concept and theory levels. In the kind of theory development described here, in which movement is from the specific to the more general and is based on looking for commonalities, derivation is particularly useful. It brings to light insights and possibilities that would not otherwise have been gained.

The theory development activities described here have been an exercise in true professional collaboration. Several factors facilitated it. All three of the investigators on whose empirical work the theory is based are graduates of the same doctoral program in nursing, so all have been exposed to the same socializing influences and share at least some elements of a common world view. All are in reasonable geographic proximity, which facilitates frequent communication but is not an absolute requisite. All continue to practice clinically, so they have had a chance to develop and explore their ideas in the practice environment. All have considerable expertise in their own specialty area, and they have continued to develop it. Last, all are extremely open to sharing their ideas—regardless of how preliminary—and inviting collegial critique and input.

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In discussing directions for nursing knowledge development in the 21st century, Meleis[16] envisioned that theorists would not work alone to develop theories bearing their names, but would be working as integral parts of research teams developing knowledge in a substantive area. That is the kind of collaborative model used in the beginning development of this middle-range theory. Middle-range theories that are relevant to nursing practice are the direction for nursing's future knowledge development efforts. They are not esoteric; they are understandable and useful. These theories are best developed not in an ivory tower, but by clinically knowledgeable and involved researchers working collaboratively.

REFERENCES

1. Barnsteiner JH. The online journal of knowledge synthesis for nursing. *Reflections.* 1994;20(2):10–11.
2. Weiss ME, Hastings WJ, Holly DC, Craig DI. Using Roy's adaptation model in practice: nurses' perspectives. *Nurs Sci Q.* 1994;7:80–86.
3. Kirchoff K. The role of the nurse researcher in the clinical environment. *Annu Rev Nurs Res.* 1992;11:169–182.
4. Merton RK. On sociological theories of the middle range. In: *Social Theory and Social Structure.* New York, NY: Free Press; 1968.
5. Moody L. *Advancing Nursing Science through Research.* Newbury Park, Calif: Sage; 1990;1.
6. Mishel MH. Uncertainty in illness. *Image J Nurs Schol.* 1988;20:225–232.
7. Mishel MH. Reconceptualization of the uncertainty in illness theory. *Image J Nurs Schol.* 1990;22:256–262.
8. Cox CL. An interaction model of client health behavior: a theoretical prescription for nursing. *ANS.* 1982;5(1):41–56.
9. Morse JM, Johnson HK. Toward a theory of illness: the illness constellation model. In: *The Illness Experience: Dimensions of Suffering.* Newbury Park, Calif: Sage; 1991.
10. Pender NJ. *Health Promotion in Nursing Practice.* Norwalk, Conn: Saunders; 1987.
11. Walker LO, Avant KC. *Strategies for Theory Construction in Nursing.* 2nd ed. Norwalk, Conn: Appleton & Lange; 1988.
12. Suppe F. *The Structure of Scientific Theories.* 2nd ed. Urbana, Ill: University of Illinois Press; 1977.
13. Merton, RK. Social conflict over styles of work. In: *The*

Sociology of Knowledge: Theoretical and Empirical Investigations. Chicago, Ill: University of Chicago Press; 1973.
14. Rodman H. Are conceptual frameworks necessary for theory building? The case of family sociology. *Sociol Q.* 1980;21:429–441.
15. Meleis AI. ReVisions in knowledge development: a passion for substance. *Schol Inq Nurs Pract.* 1987;1:5–19.
16. Meleis AI. Directions for nursing theory development in the 21st century. *Nurs Sci Q.* 1992;5:112–117.
17. Hinshaw AS. Nursing science: the challenge to develop knowledge. *Nurs Sci Q.* 1989;2:162–171.
18. Moody LE, Wilson ME, Smyth K, Schwartz R, Tittle M, Van Cott ML. Analysis of a decade of nursing practice research: 1977–1986. *Nurs Res.* 1988;37:374–379.
19. McCabe SV. *Analysis of Citations Underpinning Frequently Used Psychiatric Mental Health Nursing Interventions.* Baltimore, Md: University of Maryland at Baltimore; 1994. Dissertation.
20. Pugh LC. Psychophysiologic correlates of fatigue during childbearing. *Diss Abstr Int.* 1990;51:01-B.
21. Milligan RA. Maternal fatigue during the first three months of the postpartum period. *Diss Abstr Int.* 1989;50:07-B.
22. Pugh LC, Milligan RA. A framework for the study of childbearing fatigue. *ANS.* 1993;15:60–70.
23. Gift AG, Cahill C. Psychophysiologic aspects of dyspnea in chronic obstructive pulmonary disease: a pilot study. *Heart Lung.* 1990;19:252–257.
24. Gift AG. Dyspnea. *Nurs Clin North Am.* 1990;25:955–965.
25. Gift AG, Pugh LC. Dyspnea and fatigue. *Nurs Clin North Am.* 1993;28:373–384.
26. Wolcove N, Dajczman E, Colocone A, Kriesman H. The relationship between pulmonary function and dyspnea in obstructive lung disease. *Chest.* 1989;16:1247–1251.
27. Schwartzstein RM, Manning HL, Weiss JW, Weinberger SE. Dyspnea: a sensory experience. *Lung.* 1990;168:185–199.
28. Wilson J. *Thinking with Concepts.* Cambridge, England: Cambridge University Press; 1980.
29. Brown ML, Carrieri V, Jansen-Bjerklie S, Dodd MJ. Lung cancer and dyspnea: the patient's perception. *Oncol Nurs Forum.* 1986;13:19–24.
30. Gift AG. Psychologic and physiologic aspects of acute dyspnea in asthmatics. *Nurs Res.* 1991;40:196–199.
31. Gift AG, Plaut M, Jacox AK. Psychologic and physiologic factors related to dyspnea in subjects with chronic obstructive pulmonary disease. *Heart Lung.* 1986;15:595–601.
32. Janson-Bjerklie S, Carrieri V, Hudes M. The sensations of pulmonary dyspnea. *Nurs Res.* 1986;35:154–159.
33. Gift AG. Therapies for dyspnea relief. *Holistic Nurs Pract.* 1993;7(1):57–63.
34. Wilson RC, Jones PW. Differentiation between intensity of breathlessness and the distress it evokes in normal subjects during exercise. *Clin Sci.* 1991;80:65–70.
35. Dirks JF, Kinsman RA, Staudemayer H, Kleiger JH. Panic–fear in asthma: rehospitalization following intensive long-term treatment. *J Nerv Ment Dis.* 1979;167:615–619.
36. Milligan RA, Parks PL, Lenz ER. Distinguishing between postpartum depression and postpartum fatigue. Presented at the Council of Nurse Researchers 1993 National Nursing Research Conference; November 15, 1993; Washington, DC.
37. Milligan RA, Parks PL, Lenz ER. Interaction between social support and predictors of postpartum fatigue. Presented at NAACOG Eighth Annual Meeting; June 12, 1991; Orlando, Fla.
38. Potempa K, Lopez M, Reid C, Lawson L. Chronic fatigue. *Image J Nurs Schol.* 1986;18:165–169.
39. Piper B. Alterations in energy: the sensation of fatigue. In: Baird S, McCorkle R, Grant M, eds. *Cancer Nursing: A Comprehensive Textbook.* Philadelphia, Pa: W.B. Saunders; 1991.
40. Pugh LC. Measurement of fatigue during childbirth. *J Nurs Meas.* 1993;1:57–66.
41. Bartley S, Chute E. *Fatigue and Impairment in Men.* New York, NY: McGraw-Hill; 1947.
42. Grandjean EP. Fatigue. *Am Ind Hyg Assoc J.* 1970;1:401–411.
43. Kinsman RA, Weiser PS. Subjective symptomatology during work and fatigue. In: Simonson E, Weiser PC, eds. *Psychological Aspects and Physiological Correlates of Work and Fatigue.* Springfield, Ill: Charles C Thomas; 1976.
44. Sparks SM, Taylor CM. *Nursing Diagnosis Reference Manual.* Springhouse, Pa: Springhouse Corp; 1993.
45. Aistairs J. Fatigue in the cancer patient: a conceptual approach to a clinical problem. *Oncol Nurs Forum.* 1987;14(6):25–30.
46. North American Nursing Diagnosis Association. *NANDA Taxonomy I.* Rev ed. St. Louis, Mo: NANDA; 1990.
47. Waltz CF, Strickland OL, Lenz ER. *Measurement in Nursing Research.* 2nd ed. Philadelphia, Pa: F.A. Davis; 1991.