

A Theoretical Analysis of Carper's Ways of Knowing Using a Model of Social Cognition

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Although Carper's model of the ways of knowing in nursing has played a critical role in delineating the body of knowledge that comprises the discipline, questions remain regarding the defining properties of the knowledge structures, how they relate to each other, and how they function in the process of knowing. In this article, we propose that the cognitive model of social knowledge developed within the field of social psychology can be used to extend our understanding of the form and function of the four types of nursing knowledge. Empirical, personal, esthetic and ethical knowledge are compared with semantic, episodic and procedural knowledge specified in the cognitive model, and the schema construct, which is defined as an organized package of these three types of knowledge, is proposed as an integrative framework for addressing the relationships among the four types of nursing knowledge and their role in the process of knowing. Implications for nursing theory development, education and practice are addressed.

Although almost 20 years have passed since the publication of Carper's seminal paper on the patterns of knowing in nursing, lively debate continues regarding the nature of knowledge that comprises the discipline. Clearly, one of the greatest contributions of Carper's model was that it not only highlighted the centrality of empirically derived theoretical knowledge, but recognized with equal importance and weight, knowledge gained through clinical practice

(Silva, Sorrell, & Sorrell, 1995). Personal knowledge and esthetic knowledge were conceptualized as subjective forms of knowledge acquired through experience and envisioned as fundamental to humane, personalized, and effective nursing care. Furthermore, with ethical knowledge, the importance of moral principles and values to the discipline was highlighted. Over the last 20 years, broad consensus has been reached regarding the centrality of each of the four types of knowledge to the discipline. Yet perhaps with the exception of empirical knowledge, defining properties of the types of knowledge remains a source of considerable debate. Furthermore, important questions regarding: (a) how the four types of knowledge relate to each other, and (b) how knowledge as structure functions in the active process of knowing remain unanswered (Silva et al., 1995).

The body of knowledge that comprises the discipline of nursing is broad, multidimensional and complex (Silva et al., 1995). In an attempt to specify the parameters of nursing knowledge, several theorists, including Carper herself, have identified important dimensions upon which nursing knowledge can be characterized. Jacobs-Kramer and Chinn (1988) suggested that nursing knowledge can be characterized according to its method of creation, means of expression, and processes used to assess its veridicality. In her 1992 article, Carper states that nursing knowledge varies according to two dimensions: content and syntax. In her descriptions of the four types of knowledge, however, Carper (1992; 1978) clearly suggests that nursing knowledge, assumes various forms, including conceptual knowledge, personalized memories, and action-based strategies and plans. Yet this dimension of knowledge, i.e., the form or the varying kinds of information stored in long-term memory, has received little attention in the nursing literature.

The purpose of this paper is to facilitate discussion of the forms and functions of nursing knowledge by comparing Carper's model of the four patterns of knowing to a broader model of knowledge structures developed within the field of cognitive social psychology. Kaplan (1965) emphasized the value of such comparison when he posited that some of the most exciting encounters within science, and those with great potential, are the result of using explanations in one field to examine quandaries in another. We begin our analysis of Carper's patterns of knowing by presenting a brief overview of the cognitive model of the forms of knowledge. Next, Carper's conceptualizations of empiric, personal, esthetic, and ethical knowledge are compared with the three forms of knowledge specified in the cognitive model: semantic, episodic, and procedural. The schema construct, which is defined as a dynamic memory structure comprised of semantic, episodic, and procedural knowledge, is then proposed as an integrative framework for addressing the relationships among the four types of nursing knowledge and their role in the process of knowing. Finally, the implications of this theoretical analysis for nursing theory development, education, and practice will be addressed.

THE COGNITIVE MODEL

The cognitive model is a broad theoretical approach to human social behavior that has become the prevailing paradigm within social psychology over the last 20 years (Markus & Zajonc, 1985). According to the cognitive model, a person's unique system of knowledge structures plays a central role in shaping the meaning assigned to social stimuli. Knowledge structures are mental representations of experience; they are stable, enduring organizations of information that are stored in long-term memory. In this model, knowledge structures are both what is known and central to the process of knowing. Knowledge structures are conceptualized as active, dynamic structures that, once established in memory, function as a framework for the subsequent processing of information.

Knowledge structures are formed around both nonsocial and social aspects of the environment. People thus form mental representations about inanimate object such as automobiles, about animate objects such as flowers, and about aspects of the social world, including conceptions of groups of people, social situations, and specific people (including the self). Although important differences between nonsocial and social knowledge have been identified, a prevailing assumption among social psychologists is that there is continuity in the basic forms and functions of mental representations across nonsocial and social domains (Cantor & Kihlstrom, 1987).

Three Forms of Social Knowledge

Building on a growing collection of neuropsychological studies that suggest that human memory is a complex system that consists of three distinct types of structures (Buckner & Tulving, 1995; Reber & Squire, 1994; Squire & Zola, 1996; Tulving, 1985), social psychologists posit that social knowledge is stored in three forms: semantic, episodic, and procedural (Cantor & Kihlstrom, 1987; Kihlstrom et al., 1988).

Semantic knowledge. Semantic knowledge refers to the concrete and abstract facts about the world that are stored in memory (Buckner & Tulving, 1995). It is conceptual knowledge that is consciously accessible. According to Tulving (1989), semantic knowledge is the "knowing that," "the impersonal, undated, and world-knowing facts" (p. 361). It is knowledge that describes the world but does not prescribe particular action.

Within the social domain, semantic knowledge refers to concepts of persons, places, and events. It is the facts and beliefs held regarding people, places, and situations. Contrary to Tulving's (1985) idea that semantic knowledge is isomorphic with the stimulus, semantic knowledge within the social domain is thought to reflect the person's construal of the stimulus (Markus & Zajonc, 1985). According to this perspective, sensory information is not

encoded directly into memory but rather is manipulated cognitively to derive meaning. It is this conceptualization or construal that is then stored in long-term memory (Anderson, 1980).

Examples of semantic knowledge are simple facts such as that apples are red and grow on a tree, or more complex facts, such as that congestive heart failure results from diminished pumping efficiency of the ventricle. In the social domain, semantic knowledge includes conceptualizations of people, places, and situations, for example, that obese adults are at greater risk for heart disease, intensive care units disrupt circadian rhythms, and home-birthing centers promote family-focused childbirth experiences.

Episodic knowledge. Episodic memories are knowledge structures of personally experienced events that include both temporal and contextual information. Episodic memories are narrative in nature (Kihlstrom & Cantor, 1984). They preserve the linear ordering of events (Anderson, 1983; Andreasen et al., 1995) and include subjective elements of the experience, including one's thoughts, goals, and feelings at the time of the event (Kihlstrom et al., 1988). According to Tulving (1985, p. 388), "Representations in episodic memory additionally carry information about the relations of represented events to the rememberer's personal identity as it exists in subjective time and space." Consequently, episodic knowledge is by definition social knowledge in that it includes the perspective of oneself (Tulving, 1985).

An example of episodic knowledge is memory of specific experiences, such as taking the NCLEX-RN examination. This memory would include such contextual information as where one was seated, the temperature in the room, what one was thinking and feeling at the time, and whom one was seated next to, as well as such temporal information as what happened immediately before and after the examination.

Procedural knowledge. A third type of memory, procedural memory, refers to the stored knowledge of "how to do things" (Anderson, 1983, p. 215). Tulving (1985) conceptualizes procedural knowledge as the "blueprint for future action" (p. 387). He argues that it is prescriptive rather than descriptive. Procedural knowledge consists of the nonverbal, action-based memories that include not only knowledge of motoric skills and habits, such as riding a bicycle and typing, but also the knowledge underlying the performance of various intellectual tasks such as mathematical manipulations, rules of syntax, strategies for acquiring information, drawing inferences, and making judgments (Kihlstrom & Cantor, 1984). Procedural knowledge includes the rules and strategies for transforming and manipulating semantic and episodic knowledge (Cantor & Kihlstrom, 1987). It is acquired gradually through the repeated execution of behavior, and it is considered unconscious knowledge. That is, procedural knowledge is executed automatically without conscious thought.

Other examples of procedural knowledge are knowledge of motoric skills such as how to give an injection, as well as the cognitive manipulation of semantic knowledge, such as the rapid and effortless comprehension of the constellation of symptoms including restlessness, tachycardia, decreasing pulse pressure, and diaphoresis as impending shock. This type of knowledge is acquired through repetition and practice and, ultimately, is automatically executed without consciously thinking about the steps involved.

The Schema Construct: An Integrative Framework for the Three Forms of Knowledge. Although semantic, episodic, and procedural knowledge are defined separately, they are not conceptualized as completely discrete and unrelated systems. Within the field of cognitive social psychology, investigators have focused on how the three types of knowledge function together in the processing of social information. Rather than conceptualizing knowledge elaborated in memory as discrete storehouses or receptacles of information, semantic, episodic, and procedural knowledge are considered active, dynamic memory structures that together serve as the foundation of social intelligence (Cantor & Kihlstrom, 1987). The processes of perception, categorization, causal attribution, judgments, inferences, plans, and goal-directed behavior reflect the active, dynamic manipulation of semantic and episodic knowledge with procedural strategies and rules. From this theoretical perspective, knowing is the product of the coordination of all three types of knowledge.

Schemas as structure and function. Some cognitive social psychologists have focused on units of semantic, episodic, and procedural knowledge, referred to as a schema. A schema is defined as a large and complex package of knowledge in a single content area or domain (Anderson, 1980). Related to the social world, schemas may be formed around specific individuals (e.g., Bill Clinton or Princess Diana), groups of individuals (e.g., women, Hispanics), social situations (e.g., going to a restaurant or a classical music concert) or the self. In all cases, however, a schema is conceptualized as a hierarchically organized structure with abstract semantic knowledge at the highest levels of the hierarchy and specific episodic knowledge nested at lower levels (Taylor & Crocker, 1981). Schemas also include procedural knowledge in the form of rules specifying relationships among attributes, plans for gathering and interpreting relevant stimuli, and behavioral sequences enabling efficient and competent behaviors in the content domain (see Cantor, 1990; Hastie, 1981; Taylor & Crocker, 1981, for reviews).

A very large and diverse collection of studies has shown that schemas function as active information processors that play a central role in shaping goal-directed behavior (see Fiske & Taylor, 1991; Kihlstrom & Klein, 1994; Markus & Zajonc, 1985; Markus & Wurf, 1987; Rojahn & Pettigrew, 1992; Taylor & Crocker, 1981, for reviews). Schemas guide attention and enhance the encoding and recall of schema relevant information (Anderson, Klatzky, &

Murray, 1990; Bargh, 1982; Bradley & Mathews, 1983; Macrae, Milne, & Bodenhausen, 1994). Individuals with a schema in a domain are more likely to direct attention to information that is consistent with the schema, while ignoring inconsistent information. Furthermore, because the schema provides a highly elaborated framework for ordering and structuring information, information that is consistent with a schema is generally more likely to be encoded in memory and recalled at a later point in time (Dunning & Hayes, 1996; Markus, Smith, & Moreland, 1985). In situations in which the stimulus is vague, missing features can be inferred and the stimulus more fully elaborated by relying on information encoded in the schema (von Hippel, Jonides, Hilton, & Narayan, 1993; see also Fiske, 1993; Markus & Zajonc, 1985, for reviews). Individuals with a schema in a domain are able to access information at any level of the hierarchy and, therefore, are able to recall specific past experiences with ease and make predictions about future events with confidence (Markus, 1977). The large and diverse collection of semantic and episodic knowledge included in a schema serves as a basis for problem solving, goal setting and planning (see Taylor & Crocker, 1981, for review). Finally, studies have shown that schemas influence behavioral responses in a domain. The motor skills and other procedural knowledge encoded within a schema enable reliable, efficient and persistent enactment of effective behavior in the domain (Kendzierski, 1988; Kendzierski & Whitaker, 1997; Stein & Hedger, 1997).

THE SOCIAL-COGNITIVE MODEL OF KNOWLEDGE TYPES AS A FRAMEWORK FOR UNDERSTANDING PATTERNS OF KNOWING IN NURSING

In her 1978 article, Carper specified the defining attributes, the method of acquisition, and the mode of expression of each of the four types of nursing knowledge. In this section, the basic properties of empirical, personal, aesthetic and ethical knowledge will be reviewed and compared to the three basic types of memory structures identified in the social-cognitive model. Although Carper's model preceded the cognitive model of multiple memory structures by some 10 years, the similarities between the types of knowledge specified in the two models are striking.

Empirical Knowledge

Carper describes empirics as the science of nursing. In her description, she makes clear the idea that empirics is the factual knowledge of the discipline: the conceptual structures and theoretical models that are acquired through research efforts and theory development. Empirics consists of "abstract" and

"generalized" categories [which] describe behaviors and traits that groups have in common" (Carper, 1978, p. 19). Carper implies by her comparison with personal knowledge that empirical knowledge is broader, more abstract and less personal than a specific instance or case. Rather, it is a generalized conceptualization that is derived by abstraction across a collection of specific instances (Carper, 1992). Clearly, Carper's description of empirics in nursing corresponds with the properties of semantic knowledge as defined within the cognitive model. Empirics and semantic knowledge are factual, abstract, descriptive conceptions about persons, places, or situations.

Empirical knowledge, like semantic knowledge, is consciously accessible. It is knowledge that is acquired by observation, inspection and deductive reasoning or "inventing explanations." Empirical knowledge is "discursively formulated and publicly verifiable" (Carper, 1978, p. 254). According to Carper (1992), empirical knowledge is factual knowledge obtained by direct and indirect observation and expressed as "descriptions or in statements of relationships between phenomena" (p. 76). The empirics of nursing, like semantic knowledge, may be referred to as "knowing that" (Cohen & Squire, 1980).

Personal Knowledge

Importantly, Carper begins her description of personal knowledge by stating what it is not. She states repeatedly and clearly that personal knowledge is not empirical knowledge. That is, personal knowledge is not the product of abstract conceptualization or classification (Carper, 1992). It is not generalized information nor is it mediated by preexisting semantic knowledge in the form of "a complex of concepts, expectations, beliefs and stereotypes" (Carper, 1978, p. 258).

Carper (1978) describes personal knowledge as "subjective, concrete and existential" (p. 258). These three properties of personal knowledge correspond with the defining properties of episodic memory. Subjectiveness refers to the fact that the knowledge is personal and reflects the perspective of the perceiver (Carper, 1992). Carper uses Polanyi's idea of "passionate participation" to convey the idea that the perceiver herself, her moods, attitudes and opinions, are a part of personal knowledge. Like episodic memories that include the perspective of the self, Carper describes personal knowledge as a product of an "I-thou" encounter. It is the knowing that comes from "the standing in relation to another human being and confronting that human being as a person" (Carper, 1978, p. 256). Clearly, personal knowledge reflects personally experienced events that include not only information about the other, but also the self (Carper, 1992).

The term concrete is defined as "belonging to the immediate experience of actual things or events" (Webster's Dictionary, 1961, p. 172). Antonyms of concrete are "abstract" and "general." The concreteness of personal knowledge

refers to the fact that it is concerned with specific interpersonal interactions, relationships and transactions. Personal knowledge is comparable with episodic knowledge in that it reflects specific persons or events. Carper states that personal knowledge is "concerned with the knowing, encountering and actualizing of the concrete, individual self" (Carper, 1978, p. 19).

Finally, Carper (1978) emphasizes that personal knowledge is existential, and, in doing so, seems to be highlighting the linear, temporal ordering of the structure. She argues that personal knowledge is founded on the assumption that people are continuously in a state of becoming or evolving over time. Rather than reflecting a fixed category, personal knowledge conveys dynamics—evolution and change over time. For example, I can recall in detail Ms. Smith's level of energy and vigor at the time of her admission, yesterday when she first returned from surgery, and this morning as she completed her bath. My memories focus on specific transactions that are linear and include temporal and contextual information.

Carper (1978) describes personal knowledge as "the most difficult to master, and to teach....yet the most essential to understanding the meaning of health in terms of individual well-being" (p. 255). Carper states that personal knowledge is "the achievement of engagement rather than detachment" and implies that personal knowledge is acquired through interactions and transactions between the nurse and the patient/client. Therefore, personal knowledge cannot be taught in the classroom. Rather it is the product of the personal experiences that occur in clinical practice. It is acquired gradually and reflects the unique experiences of the individual practitioner.

Carper does not specifically address the expression of personal knowledge. Within the cognitive model, however, episodic knowledge is considered consciously accessible and is expressed in "remembering" (Tulving, 1989) details of the unique individual in context.

Esthetic Knowledge

The third type of knowledge identified by Carper is esthetic knowledge, which she describes as the art of nursing. According to Carper (1978), esthetic knowledge includes both the manual and technical skills of the profession and the "active transformation of the immediate object—the patient's behavior—into a direct, nonmediated perception of what is significant in it..." (p. 254). In this broad description of the parameters of esthetic knowledge, Carper insightfully and comprehensively captures the type of knowledge underlying the performance of nursing practice. Consistent with the defining properties of procedural knowledge, esthetic knowledge in nursing includes both motor skills and the intellectual skills necessary for comprehending, planning and intervening in clinical situations.

According to Carper, esthetic knowledge is "expressive rather than merely formal or descriptive" (Racer, 1960, quoted by Carper, 1978, p. 254). Like

procedural knowledge, esthetic knowledge is action-oriented and cannot be articulated semantically (Carper, 1992). Rather, Carper states, "an esthetic experience involves the creation and/or appreciation of a singular, particular, subjective expression of imagined possibilities or equivalent realities which resist projection into the discursive form of language" (1978, p. 16). This implies that esthetic knowledge is behavioral but can either be overt, as in the form of active behavior, or covert, as in the form of cognitive processing of information. Carper (1978) defines esthetic knowledge as perception, as going beyond recognition to "an active gathering together of details and scattered particulars into an experienced whole for the purpose of seeing what there is" (p. 255). Clearly, Carper is arguing that the mental manipulation of information through perceiving, evaluating, judging, and inferring that occurs prior to the behavioral response is as much esthetic knowing as the overt action itself.

Within the field of cognitive social psychology, procedural knowledge is defined as the rules for transforming and manipulating semantic and episodic knowledge (Kihlstrom & Cantor, 1984). Carper also addresses this aspect of esthetic knowledge when she refers to esthetic knowledge as the coordination between the means and the end. She quotes Orem (1971) to express this idea: "The art of nursing is creative in that it requires development of the ability to envision valid modes of helping in relation to 'results' which are appropriate" (Carper, 1978, p. 69). In this statement she acknowledges that semantic and episodic knowledge about the current state, possible outcomes or desired states, and strategies and plans are mentally coordinated to form an organized and coherent plan of action.

Carper (1978) acknowledges that esthetic knowledge is acquired through "felt experience" or the actual enactment of the behavior. Esthetic knowledge is, at least in part, the product of "imitative learning style and the acquisition of knowledge by accumulation of unrationalized experience" (Carper, 1978, p. 254). She also argues, however, that the intellectual skills of coordinating means and ends are acquired, at least in part, through empathic observation. According to Carper, alternative modes of perceiving reality can be acquired through observations of specific others. Finally, Carper clearly states that esthetic knowledge, both the motor skills and the intellectual skills, is expressed through nursing action. Esthetic knowledge, like procedural knowledge, is "knowing how" (Cohen & Squire, 1980).

Ethical Knowledge

Unlike her descriptions of empirics, personal knowledge, and esthetics, which focus broadly on the form of the knowledge, Carper's description of ethical knowledge focuses primarily on the content of the knowledge structures. For example, she describes empirics as abstract and generalized categories and esthetic knowledge as motor skills and the rules for mental transformation of information, whereas she defines ethical knowledge in terms of the content of

the concepts in the domain. She states that ethical knowledge "focuses on matters of obligation and what ought to be done" (Carper, 1978, p. 257). Ethical knowledge has to do with what is right, good and desired. It includes philosophical principles and models of obligation. When one shifts attention from the content to the form of the knowledge, however, ethics, like empirics, may be considered semantic knowledge. Structurally, ethical knowledge is abstract, conceptual, descriptive, discursively formed, and verbally communicated. Furthermore, Carper indicates that ethical knowledge is consciously accessible knowledge. She states, "The examination of the standards, codes and values by which we decide what is morally right should result in a greater awareness of what is involved in making moral choices and being responsible for the choices made" (Carper, 1978, p. 257). Clearly, Carper is indicating that ethical knowledge is consciously accessible, abstract and generalized knowledge that is used as the foundation for ethical judgments and nursing behaviors. With ethical knowledge, however, Carper suggests that there is a specific domain of semantic knowledge which is fundamental to the discipline of nursing.

The Four Types of Nursing Knowledge as Structure and Function

The advantage of drawing on the cognitive model of social knowledge to inform nursing's model of the ways of knowing is that it provides a framework for considering the relationships among the four types of knowledge and a means for addressing how they work together in the *processes of thinking and knowing*. Rather than viewing empirical, personal, esthetic and ethical knowledge as four distinct and unrelated memory structures, when framed within the cognitive model, they may be considered the elements that comprise the complex domain-specific knowledge structures referred to as schemas. Packages of empirical, personal, esthetic and ethical knowledge in specific content areas such as care of the cardiac patient, care of the healthy child, or nutritional health of adolescent and young adult women, acquired through formal classroom education and clinical experience, form the foundation of nursing expertise in the domain. In addition to clinical practice, expertise in nursing science and administration may be viewed as an expression of complex packages of the four types of nursing knowledge.

Based on the cognitive perspective, knowing in nursing, the active and creative processes of assessing, planning, intervening and evaluating, may be viewed as the dynamic coordination of all four types of knowledge. Once elaborated in memory, the packages of knowledge or schemas *function* as active and dynamic information processors guiding judgments and behaviors in the relevant domain. Packages of semantic and episodic knowledge in a content domain are manipulated and transformed using the relevant procedural

knowledge to develop explanations, make inferences and predictions, and execute behavioral responses. For example, a psychiatric nurse with an elaborated schema of schizophrenia is able to deploy, manipulate and transform her semantic knowledge about the subtypes of the disorder, the constellation of symptoms associated with each, the ethical principles associated with the care of vulnerable populations and her episodic memories of specific transactions with specific individuals who suffered with the disease to skillfully engage a frightened, preoccupied and disorganized young adult in a therapeutic alliance. Her schema of schizophrenia serves as the organizing framework to assess individuals for and with the disorder and to plan and evaluate their care.

IMPLICATIONS OF THE THEORETICAL INTEGRATION FOR NURSING THEORY DEVELOPMENT AND RESEARCH

Using the cognitive model to inform our thinking about the ways of knowing in nursing holds considerable potential for advancing our theoretical and empirical understandings of the structure of our disciplinary knowledge. Clearly, many dimensions of the body of knowledge that comprises the discipline of nursing are unique and idiosyncratic. The theoretical integration presented in this paper, however, suggests that the basic forms of nursing knowledge, as conceptualized by Carper, map onto a contemporary and widely accepted model of human memory. Using this mapping, new and exciting ways for conceptualizing and empirically investigating nursing knowledge become available.

The cognitive approach to social information processing has been the prevailing paradigm in the field of social psychology for the last 20 years (Cantor, 1990). In addition, the theory that human knowledge is stored in three forms including semantic, episodic and procedural memories, serves as the foundation for much of the contemporary empirical work in other specialties in psychology, including the fields of neuropsychology and cognitive, personality, and developmental psychology. Consequently, a very large and diverse collection of theoretically based empirical findings about the structure and function of knowledge are available and can be drawn upon as a foundation for our continued investigations of the nature of nursing knowledge.

In delineating the base of knowledge that comprises the discipline of nursing, one of the most important challenges has been to clearly specify the defining properties of each of the four types of knowledge (see Chinn, Maeve, & Bostick, 1997; Moch, 1990; Sarvimäki, 1995; Smith, 1992, for examples of this effort). Establishing clear theoretical definitions of the types of knowledge is the essential first step before meaningful operational definitions can be developed and the role of the knowledge types in clinical practice, systematically

explored. Because the basic properties of the three forms of knowledge in the cognitive model have been empirically established, conceptualizing nursing knowledge as semantic, episodic and procedural knowledge enables us to infer defining properties that can be validated through empirical testing. For example, procedural knowledge has been empirically shown to be unconscious, nonsemantic, action-based knowledge. Therefore, conceptualizing esthetic knowledge as procedural knowledge enables us to move beyond Carper's statement that esthetic knowledge "resists projection into the discursive form of language" to hypothesize that esthetic knowledge is, in fact, not consciously accessible. In addition, research methodologies used to test the unconscious property of procedural knowledge may serve as a starting point for developing methodologies to test characteristics of knowledge identified by Carper's criteria to be examples of esthetic knowledge. In this way, the congruence between esthetic and procedural knowledge can be examined, and, more broadly, the suitability of the cognitive model of forms of knowledge as a framework for defining forms of nursing knowledge can be empirically tested.

Another challenge that has faced the discipline has been to identify the means of acquiring the various forms of nursing knowledge. Jacobs-Kramer and Chinn (1988) began to address this issue by focusing on what they refer to as the "creative dimension" of nursing knowledge, "the interrelationship between the processes of knowledge creation and the product created" (p. 131). The cognitive model of knowledge forms may be used to extend that work by offering empirical evidence of the means through which semantic, episodic and procedural knowledge are acquired. For example, studies have shown that procedural rules for inferring characteristics of unknown others are acquired unconsciously through mere exposure to patterns of covarying attributes (Lewicki, Czerwaska, & Hoffman, 1987; Lewicki, & Hill, 1987; Reber, 1989). These findings provide evidence to suggest that procedural rules for inferring patterns of events, such as associating subtle visual indicators with an impending cardiac arrest, may be unconsciously learned through repeated exposure to the sequence of events. Building on available methodologies, studies could be constructed to test the hypothesis of the acquisition of esthetic knowledge through exposure to target events and to identify sources of individual differences that either enhance or hinder this type of unconscious procedural learning.

Finally, and perhaps most important, the cognitive model holds potential for enabling nurses to address the science-art dichotomy of the discipline with an integrative theoretical approach. Since Carper's original conceptualization of the ways of knowing in nursing, there has been a broad recognition of the "inter-relatedness and interdependence" among the types of nursing knowledge. Yet, rather than being viewed as interdependent forms of knowledge that together function to give rise to expert clinical practice, the types of knowledge have come to be viewed as warring factions that represent varying camps within the

discipline. Recently, Maeve (1994) characterized the science-art dichotomy by stating:

A consequence of this history of division between the intelligentia and the working class of nurses is that the knowledgebase [sic] posited as the core of nursing does not meet the reality of practice. While formalized knowledge presented through a curriculum is basic to "knowing that," clinical knowledge is "knowing how" and is personal, dependent on contextualized experience. Knowledge in the high hard ground of academia, as Schone noted, is more abstract and can be applied with greater certainty. Knowledge in the swamp, however, is a continually changing process characterized by complexity, instability, and uncertainty and is full of value conflicts, just like the real life it reflects....Hence, the theory-practice gap, the elite class-working class gap, and the "knowing that"-"knowing how" gap all describe the same phenomenon—the chasm that has developed between the two worlds of nursing (p. 11).

As suggested by Maeve, the body of knowledge that comprises the discipline of nursing has become dichotomized, with empirical knowledge separated from personal, esthetic and moral knowledge into two seemingly competing factions. Although integration of the science and art remain a core value in the discipline (see Silva et al., 1995), remarkably little progress has been made in specifying how the various types of nursing knowledge function together to give rise to expert clinical practice.

The schema construct provides a theoretical approach to the question of how the diverse types of knowledge work together to give rise to the expert processes that characterize nursing practice. Schemas are by definition coordinated packages of semantic, episodic and procedural memories that focus on a specific content domain and serve as the cognitive foundation of organized thinking and behaving in the domain (Cantor, 1990). From this perspective, the question to be addressed is not whether semantic (i.e., empirical), episodic (personal) or procedural (esthetic) knowledge is used as the foundation of complex clinical decision making. Rather, the question becomes, "What are the processes of semantic, episodic and procedural knowledge deployment, manipulation and coordination that give rise to effective clinical thinking and behavior?" With this approach, the focus of research and theory development is on packages of knowledge in a specific content domain and how they function in clinical practice.

Within the field of cognitive social psychology, the role of schemas in information processing and behavioral regulation has been widely explored. A large and diverse collection of studies has focused on the influence of these knowledge structures on attention and other information-gathering strategies (Wittenbrink, Gist, & Hilton, 1997; White & Carlson, 1983), ability to encode and recall essential elements of a situation (Rojahn & Pettigrew, 1992), processes of inference and prediction (Markus, Smith, & Moreland, 1987; Smith, Stewart, & Buttram, 1992; von Hippel, Jonides, Hilton, & Narayan, 1993), and behavioral motivation and self-regulation (Markus & Ruvoilo,

1989; Stein & Hedger, 1997; Stein, Roeser, & Markus, 1998). These findings may serve as an important foundation for the development of testable research hypotheses about the role of schemas in information processing and behavioral regulation in clinical practice. Furthermore, as already stated, the research methodologies developed within the field of cognitive social psychology may be used to stimulate ideas about creative ways to test and measure the effects of schematic thinking in clinical practice.

The idea that the science and art of expert nursing practice can best be understood through exploration of the structure and function of coordinated packages of theoretical and experiential knowledge is becoming more widely accepted in the discipline. Benner's highly influential work on the nature of the transition from novice to expert practitioner highlights the pivotal role of experiential knowledge and automatic information processing in expert level nursing practice (Benner, Tanner, & Chesla, 1992; Tanner, Benner, Chesla, & Gordon, 1993). Hampton (1994) argues that models of associated networks of knowledge structures such as chunks, networks or schemas could be profitably used to explore nursing expertise. Finally, Sarvimäki (1995) argues a similar position when she states that morality in nursing reflects an "integration of theoretical, personal, situational, and action knowledge" (p. 350). She states: "Theoretical knowledge that is not manifested in action, personal knowledge without theoretical understanding, and action knowledge that is not integrated in the person, for instance, will in the long run be detrimental to the quality of patient care" (p. 349).

IMPLICATIONS OF THE THEORETICAL INTEGRATION FOR NURSING EDUCATION AND PRACTICE

Conceptualizing the ways of knowing in nursing with the input of the cognitive model of social psychology also has implications for approaches to nursing education and practice. First, the model provides a framework for structuring learning experiences across all levels of nursing education. For example, semantic knowledge may be viewed, at least in part, as a product of formal educational experiences. Professional journals, textbooks and lectures may be seen as important sources of both empirical and ethical knowledge. In contrast, esthetic knowledge, when conceptualized as procedural knowledge, is more complex and includes both motoric skills and strategies and rules for the mental manipulation of information. The modes of acquisition of esthetic knowledge may include not only the "hands-on" skill-building experiences such as laboratory sessions and bedside experiences but also opportunities to observe experts problem solving in relevant situations. From this perspective, learning contexts such as clinical rounds, clinical seminars and the psychiatric nursing model of clinical supervision may be forums for demonstrating,

encouraging and supporting the development of rules and strategies for the mental manipulation of empirical, personal and ethical knowledge that become encoded in the emerging schema as procedural knowledge. At the doctoral level, opportunities to participate in ongoing research projects, as well as seminars that focus on such issues as translating theoretical and clinically-based knowledge into testable research questions or developing study designs to test research questions, may be important means for developing procedural knowledge about the process of scientific inquiry in nursing. Finally, personal knowledge when conceptualized as episodic knowledge is acquired through personal experience, and therefore, cannot be transmitted through more formal academic means. Clinical experience, both as student and graduate, is the forum for the interpersonal transactions necessary for the development of episodic knowledge. With each clinical encounter, the student not only has an opportunity to elaborate the procedural knowledge, but, in addition, is acquiring knowledge about the self-in-interaction with another.

The integration of the ways of knowing in nursing with the cognitive model may provide an effective means for considering the processes associated with the transition from novice to expert clinician as described by Benner (1984). Schemas are considered the cognitive foundation of expertise (Cantor, 1990). They enable the rapid, efficient, and automatic performance in a domain that characterizes the expert (Taylor & Crocker, 1981). Therefore, movement from novice to expert could be conceptualized in terms of the development of a network of schemas in the domain. The novice stage of professional development may be conceptualized as a "pre-schematic phase" during which discrete and unrelated pieces of attribute-based semantic and context-free procedural rules are articulated in memory. At this stage, the individual is beginning to acquire knowledge but has not yet begun to integrate it into organized packages or schemas. At the advanced beginner stage, rudimentary schemas may be formed. The individual has acquired sufficient relevant episodic memories and procedural knowledge that basic pattern recognition is evident and rule-based interventions occur. Finally, the stage of expert may be characterized as the acquisition of a rich, highly elaborated network of schemas. The complex and seemingly intuitive skills of an expert such as: (a) rapid and relatively effortless identification of complex patterns of symptoms, (b) recognition of key-shared properties among very diverse and seemingly unrelated clinical situations, and (c) immediate association between the pattern recognition and appropriate behavioral response (Benner & Tanner, 1987) may be viewed as the highly efficient, automatic and nonconscious processing of information that stems from the availability of a network of schemas in the domain.

In summary, the cognitive model of social psychology provides a rich, promising and exciting framework for furthering our understanding of Carper's model of the ways of knowing in nursing. It builds on the basic definitions of empirical, personal, esthetic and ethical knowledge and provides a means for addressing how the knowledge structures relate to each other and form the

foundation for active, creative thinking and knowing. As such, consideration of the ways of knowing with the cognitive model offers opportunities for advancing understanding of the foundational knowledge of the discipline of nursing.

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Response to "A Theoretical Analysis of Carper's Ways of Knowing Using a Model of Social Cognition"

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There has been an impressive body of scholarly work developed over the past 20 years in response to Barbara Carper's article on the fundamental patterns of knowing in nursing (1978). As one of the most innovative works of philosophical inquiry in nursing, Carper's epistemological study has been used extensively to define how it is nurses know and understand their world and to further delineate the relationship between theory and practice. It seems fitting, therefore, to respond to the latest addition by Stein and colleagues with a brief overview of the criteria for developing knowledge in a discipline. As these criteria are generally accepted in nursing, they will then be used to consider Stein's article in context with two other meta-theoretical works that also were developed from Carper's original study.

Philosophical inquiry in nursing is concerned with the essence, or form, of things. It seeks to discriminate differences in our universe by grappling with questions that originate in common-sense experience (Simmons, 1992). In advancing the meaning of a discipline's phenomena of interest through analysis, reasoning and logical arguments, philosophical inquiry also furthers knowledge development by explaining or expanding on the work of scientific inquiry. According to Simmons (1992), who draws from the work of Adler (1965), philosophical and scientific modes of inquiry share five commonly accepted conditions in order to be considered intellectually respectable. In brief, the criteria state that scholarly inquiry must:

1. occur in a public forum
2. pursue probable truths about reality
3. be subject to confirmation by appropriate truth criteria
4. accept responsibility for asking and answering domain specific questions, and
5. be relatively autonomous while remaining connected to the established body of human knowledge.

One additional criterion for philosophical inquiry is that it cannot be esoteric (Adler, pp. 79-80, as cited in Simmons, 1992).

As Stein and colleagues point out in their article, there is relatively little debate about the typology, content, or importance of the four patterns of nursing knowledge. Derived from general nursing texts and journals over a 10-year period from 1964-65 to 1974-75 (Carper, 1992), the content and syntax of the model is clearly developed and its authenticity is both intuitively and experientially understandable to nurses. Rather, the discussion has concentrated on matters of degree, on further substantiating Carper's work by examining the distinctions and relationships among the four types of knowing, and on the influence of the four patterns of knowing in the discipline's knowledge development. As a whole, the three meta-theoretical articles reviewed here (Stein et al., 1998; Jacobs-Kramer & Chinn, 1988; and Silva, Sorrell, & Sorrell, 1995) have concentrated, therefore, on developing additional domain-specific knowledge and critiquing Carper's work using relevant criteria. Through the use of accepted methods of philosophical inquiry, they have contributed to the discipline's autonomy while maintaining and strengthening its relationship to other academic disciplines.

The latest work, by Stein and colleagues is significant for its interdisciplinary comparison of Carper's model with the theory of social cognition. As the dominant conceptual framework in social psychology (Markus & Zajonc, 1985), social cognitive theory states that social stimuli are processed through knowledge structures and their schemas, hierarchically organized systems of domain-specific information. This process creates three forms of social knowledge: semantic, episodic, and procedural. Stein et al successfully argue that the semantic form of social knowledge is theoretical, knowledge that is "consciously accessible" (Stein et al.) and analogous to Carper's empiric and ethical ways of knowing. Episodic knowledge is based on individualized, personal experience. It is time and context dependent and comparable to Carper's personal knowing. Procedural knowledge, also time and context dependent, provides the 'knowing how' (Polanyi, 1962) or esthetic knowing (Carper, 1978) for future action. The social cognitive model's process system is open, dynamic and iterative: social knowledge structures continuously receive, transform, store, and produce information. And although each type of social knowledge is discussed individually, the three forms are interrelated and integral to the final product of knowing and meaning.

Each of these theoretical frameworks (Carper's four patterns of knowing and social cognitive theory) is essentially an explanation for how human beings know and understand their world. Stein et al. have effectively used the more abstract framework, social cognitive theory, to explain the structure and function of Carper's more specific model of knowing in the nursing world. As the more empirically based model, social cognitive theory offers the possibility of extending Carper's work from the philosophical to the scientific realm. The cognitive model has generated an extensive body of neuropsychological research (see Stein et al.). With its more holistic approach to memory and knowledge structures, nursing

could utilize the two more abstract frameworks to develop middle-range theories at a more comprehensive level. These middle-range theories could then be utilized to analyze and explain how patients and/or nurses amass and organize domain-specific knowledge, derive meaning from this knowledge, and subsequently produce clinical outcomes. Development of this type of middle-range theory has implications for both nursing practice and education. For example, in exploring Carper's ethical pattern of knowing, a researcher could develop and test models that study the schemas used by patients and nurses to organize their knowledge regarding end-of-life decision making.

In addition to the authors who have developed persuasive arguments in support of the content and boundaries of specific types of knowing (see Stein et al.), Jacobs-Kramer and Chinn (1988), and Silva and associates (1995) have used meta-theoretical approaches in analyzing and extending Carper's work. In their article describing a model of nursing knowledge, Jacobs-Kramer and Chinn (1988) discussed Carper's four patterns of knowing from a holistic perspective, arguing that hierarchical distinctions among the patterns are counterproductive to the development and utilization of nursing knowledge. Further, Chinn and Kramer provided a typology of two coextensive dimensions, creative and expressive, for each pattern of knowing. The creative dimension is considered essential for making sense of each type of knowing; the expressive dimension, for communicating our understanding. For example, to understand ethical knowing, nurses use the creative processes of valuing and clarifying; to explain those values, they use the expressive dimension of clarification and advocacy. Additionally, if one pattern is used exclusively, the framework for knowing is so limited that there is distortion and disorder rather than clarity of understanding (Chinn & Kramer, 1995). Thus, in both their earlier articles (1988) and their expansion into a book chapter (1995), Chinn and Kramer have provided essential and valid philosophical reasoning in support of Carper's work.

Stein and colleagues support an integrative model similar to that of Chinn and Kramer with their premise that Carper's four patterns of knowing are not discrete; rather, according to the social cognitive model, the patterns are conceptualized as complex, interrelated, domain-specific knowledge structures (schemas). Further, Stein and associates also argue that complex clinical decision making requires all three knowledge structures, semantic (empirical and ethical knowledge), episodic (personal), and esthetic (procedural knowledge).

Silva and colleagues (1995) used a slightly different approach in their analysis of Carper's work. First, like Stein and associates and Chinn and Kramer, Silva and colleagues also argue for a wholly integrated approach to the four patterns of knowing. Through an elegant use of literary resources to illustrate each pattern of knowing, Silva and colleagues then proposed extending the epistemological focus of Carper's study to one that includes ontological issues. Ontology is the branch of philosophy concerned with the nature of being and existence; thus, ontological philosophical inquiry would address the reality and boundaries of nursing. Appropriate questions for each way of knowing are then extended, from "What do I know" and "How do I know?" (Carper), to "What is the meaning of what

I know?" (Silva et al., 1995). As Kikuchi (1992) noted, nurse scholars have rarely addressed ontological questions. Thus, the article by Silva and colleagues, while congruent with Carper and the previously discussed authors, also presents a creative new direction in philosophical inquiry.

In the work of building the knowledge of nursing, scholars have often noted our reliance on isolated and individualistic approaches. And although we generally agree that nursing is much more than evidence-based practice, philosophical inquiry often seems to be overlooked for its valuable contributions. Thus, the integrated, cumulative work of Carper and colleagues is significant for a number of reasons. First, whether considered individually or together, the work adheres to the criteria for scholarly inquiry. It thus demonstrates that nursing scholarship increasingly is focused on the development and interpretation of substantive content. Second, the collective meta-theoretical work is a significant contribution to the establishment of the nursing discipline's boundaries and identity. And finally, the collected works demonstrate that philosophical and scientific inquiry have much in common and that each can guide, inform, and extend the other.

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ReVisions in Knowledge Development: A Passion for Substance*

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Members of the nursing community have been engaged in numerous debates, some of which are related to the roles of holism and particularism in the care of clients and in the development of nursing knowledge. Others center on most and least congruent methodologies for nursing research. These healthy debates have played a significant role in invigorating the discipline of nursing. If they continue without special attention to nursing's substance, however, they may detract from its knowledge development. By refocusing the debates on substance, that is, on the major phenomena and theoretical propositions considered central to nursing, progress in the development of nursing knowledge will be enhanced. Other reVisions include co-opting some existing methods in knowledge development that are congruent with feminist approaches and not limited to certain strata of populations or certain nations, thus highlighting international nursing as an arena for the generation of gender-sensitive and culture-sensitive theories. Finally, the commitment to reVisions in knowledge development means a personal commitment of nursing scholars to health care in general and to the discipline of nursing in particular.

VISIONS

Visions about nursing by those who dared to dream helped make nursing a fulfilled and acceptable profession. The visions ranged from hopes, in the early days, for some kind of education for a new breed of workers called nurses, to

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