Psychological differentiation and the phenomenon of pain

This article deals with a theory of psychological differentiation, research supporting this theory and identified indicators of differentiation, and studies that connect several of these indicators with the phenomenon of pain. Problems for investigation are posed concerning the relationships between differentiation indicators and pain threshold, pain tolerance, relief measures, attention to pain, control, and counterirritation. An understanding of the kinds of variables affecting the pain experience can lead to a clearer perception and more astute evaluation of that experience and a more organized approach to the implementation of nursing care.

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THE LITERATURE[1,2] describes the evolution of cells toward increasing sophistication of genetic systems, increasing complexity and efficiency, more elaborate systems of chemical messengers, greater order and control, and greater differentiation. Using a different conceptual framework, Rogers (unpublished data, 1978) has identified postulated correlates of unitary human development and sees humans as evolving from less differentiated in the direction of more differentiated. Witkin et al[3] support a third definition of differentiation as typical of psychological development and have used differentiation theory extensively in experimental research.

Implications of Witkin's differentiation theory for nursing research focus on differentiation as it relates to the phenomenon of pain. This theory is not derived from a conceptual framework unique to nursing but rather a theory developed in another science discipline; adaptation to the nurs-

ing milieu can foster the growth of what Stevens[4] refers to as "shared knowledge."

DIFFERENTIATION THEORY

Differentiation is a "major formal property of an organismic system";[5(p2)] it is one aspect of personality. The degree of differentiation of any system is an important characteristic of its structure. A system that is more differentiated is relatively heterogeneous. A less-differentiated system is less complex in structure, being in a relatively homogeneous structural state.[3] Furthermore, complexity of integration, that is, relationships between system components and between the system and its environment, is determined in part by level of differentiation.

As development moves toward greater differentiation and attendant specialization, subsystems emerge that mediate specific functions.[6] It is expected and research has supported the view that there is self-consistency among various functional areas or psychological domains.[5-8]

Cognitive domain

Perception may be influenced by the organization of a field in which an item is contained. Greater differentiation is seen in individuals who are able to "experience parts of organized fields as discrete and to organize unstructured fields. . . ."[5(p3)] The labels *field dependent* and *field independent* are used in making distinctions in the cognitive domain. Greater differentiation is aligned with field independence. Field dependence is designated for individuals who cannot easily disembed an item from its context or solve problems requiring restructuring of data.[6]

Domain of body concept

The way in which self and the world are experienced may be more or less articulated. The degree of articulation of body concept is the "extent to which the body is experienced as having definite limits or 'boundaries,' and the 'parts' within these boundaries experienced as discrete, yet joined into a definite structure."[3(p116)] The neonate has no sense of boundaries but gradually gains an awareness of individuality and individual body parts and their interrelations. With development, the body concept becomes more sophisticated or articulated; however, there are variations in articulation in all age groups.

Articulation of body concept is a relatively stable dimension of psychological functioning that:

- increases markedly during the growth years with little change thereafter;[9]
- relates consistently to other indicators of differentiation;[6,10]
- may be affected by role differences between the sexes;[11,12]
- is not characteristically affected by socioeconomic level[13] or culture;[14,15] and
- is influenced by childrearing and other early life experiences.[3,16]

Nature of the self

A sense of separate identity is another indicator of differentiation. An individual's attributes are seen as separate and distinct from the attributes of others. Autonomous functioning in interpersonal situations and a variety of social attributes have been identified with regard to this area. "Persons with a developed sense of separate identity have developed inner frames of reference

available as guides to thinking, feeling, action."[6(p9)] Greater or lesser reliance on self versus external sources for self-definition characterizes greater or lesser differentiation, respectively.

Controls and defenses

Controls are increasingly structured to deal with impulses and energy expenditure as there is progression toward greater differentiation. Controls develop with biological growth, but they are also dependent on experience and socialization. Basic values and standards are internalized and form the foundation for regulating the expression of impulses and the expenditure of energy.[5]

Defenses may be thought of as more or less specialized, and they assist in "dealing with the consequences of potentially disturbing experiences."[5(p11)] More differentiated individuals tend to use more specialized, complex defenses; for example, isolation, projection, and intellectualization. On the other hand, less differentiated individuals have been found to deal with consequences primitively or more globally, that is, by using denial and repression.[3] Although these defenses are not used exclusively at either level of differentiation, they are used with greater frequency in the above patterns.

Other domains

Additional domains have been implicated in the differentiation construct; restructuring skills, interpersonal competencies, and cerebral lateralization. Witkin et al state that "specialization of the functions of the two hemispheres may be taken as an indicator of neurophysiological differentiation, much as specialization has served for us as an indicator of psychological differentiation."[5(p19)] This is a fruitful and interesting area for research.

Degrees of differentiation are reflected by many indicators. Self-consistency among these domains has been documented in countless studies.[5-7] Based on these findings, individuals of greater and lesser differentiation can be readily identified (Table 1). Two areas of caution, however, have been pointed out in the literature:

1. "People's perceptual performances vary markedly according to the nature of the tasks with which they are required to deal."[12(p464)]
2. The various characteristics identified for each domain are adaptive and "are thus not inherently good or bad. Their value can only be judged with reference to their adaptiveness in particular life circumstances."[17(p682)]

IMPLICATIONS FOR NURSING RESEARCH RELATED TO PAIN

The gate control theory of pain[18,19] postulates that a "gate," specifically the cells of the substantia gelatinosa in the dorsal horn of the central nervous system, modulates the transmission of nerve impulses to receptors (T cells). If a signal of sufficient magnitude is received through the reticular system, the gate opens, and the signal enters a complex loop for interpretation, then reaction.

This theory integrates cognitive-evaluative, motivational-affective, and sensory-discriminative activities in explaining behavioral responses to a painful stimulus.[20] These activities incorporate psychological processes in pain perception. Since theory does not explicitly define "what and how psychological variables affect which activ-

Table 1. Characteristics of individuals with respect to differentiation

Domain	Extent of differentiation: Greater	Extent of differentiation: Lesser
Cognitive	Field independence; analytical; better memory for past events; active in problem solving	Field dependence; global approach; passive
Body concept	Figure drawings reflect a high degree of narcissistic investment in the body, sophisticated defenses against anxiety, self-assurance, strong drive, manipulative tendencies in controlling drives	Figure drawings reflect low body esteem, infantile defenses against anxiety, lack of self-assurance, passivity, difficulty in accepting an adult role
Nature of self	Internal frame of reference; able to function with little guidance and support from others; firmly maintains own direction in the face of contradicting attitudes, judgments, and values of others	External frame of reference; social conformity; likely to adapt views to conform with those of others; uses social environment to set personal standards
Controls	Structured to deal with impulses and energy expenditure; expression of affect modulated or mediated	Less structured; more impulsive
Defenses	More specialized; primarily isolation, projection, intellectualization	Less specialized; primarily denial and repression; deals with consequences more globally
Cerebral lateralization	Greater lateral specialization of left hemisphere (for verbal and motor control processing); greater lateral specialization of right hemisphere (for configurational-Gestalt processing)	Lesser lateralization, as demonstrated by less specialization of right and left hemispheres with regard to same factors

ity with what results,"[20] investigations of psychological variables and pain perception through clinical and other research efforts are needed.

The total pain response is determined by such factors as threshold, tolerance, attention to pain, action of pain relievers, counterirritation measures, summation, expectations, and perceptions. Jacox[21] states that such factors contribute to the condition with which pain is associated, the interpretation of and response to the pain sensation, the tendency to report the pain, and the individual's response to treatment. Interception of the pain signal can be achieved at varying points in the sensation-perception-reaction sequence, for example, by using techniques of distraction, imagery, or massage; by administering drugs; or by applying heat or cold for a counterirritation effect.

DIFFERENTIATION THEORY AND PAIN: GENERATING QUESTIONS

To generate appropriate questions that initiate the research process, it is necessary to look at existing theory and research in the field of interest. Of major concern is

the question of how pain determinants and perceptual style, vis-à-vis psychological differentiation, are related in the total pain experience. The research discussed below attempts to answer this question, in part.

Staub et al[22] investigated the relationship between control and pain tolerance. Reactions to a sequence of electric shocks were assessed in subjects (N = 20) equally divided into self-control and no-control groups.

In the self-control group, a switch enabled subjects to control the administration of shocks, and they were advised when the intensity of the shock was increased during the experiment. This information was not available to no-control subjects, and no switch was made available. Results suggest that people who perceive themselves as capable of controlling their environment may perceive stressful or aversive experiences as less stressful and may enhance their tolerance for such experiences. Self-control subjects were able to endure stronger shocks and reported discomfort at higher shock levels than no-control subjects ($t = 2.44$; $P < .02$). Self-control subjects also endured stronger shocks than no-control subjects ($t = 1.82$; $P < .06$). However, a small sample size limits the strength of these findings.

Controls are increasingly structured as differentiation increases. Could it be that highly differentiated persons who exert greater self-control and are less dependent on environmental cues for direction and judgments will exhibit higher pain thresholds and greater pain tolerance than persons who are less differentiated?

Expectations and perceptions are affected by experience. Memories may be part of that experience because they represent a recording of the past. In attempting to support the validity of early memories as a projective technique, Lord[23] related activity and affect to several aspects of self-concept.

Thirty-two boys, aged 13 to 16, from diverse socioeconomic backgrounds, were asked to measure body concept and were rated according to specific criteria[3] as well as a specially constructed code (interscorer reliability, 0.82) that measured directed activity in current self-representation. An active positive response was typically made by subjects who were more articulated. Although sample size was small and conclusions, therefore, were limited, it should be investigated whether memories of pain experiences would follow a similar trend. Are interpretations of pain experiences as active-positive or passive-negative characteristic of greater or lesser articulated individuals? Can memory influence sensory input?

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Adler and Lomazzi[24] and others[25] studied the relationship between field orientation and pain tolerance. These variables were not correlated in their first study.[24] From this and similar studies, they concluded that perceptual style and pain tolerance are correlated only when such factors as anxiety are kept at a modest level, to reduce their influence on somaethetic afferent

conduction. These results suggest that anxiety, at moderate or high levels, can physiologically have a synergistic effect on the pain experience. This study was limited by its population (30 paid male physicians and medical students), methods (open-ended interviews of about 15 minutes to obtain psychologic data), and imprecise pain measurements. Therefore, findings must be viewed accordingly.

A second study[25] sought to confirm a relationship between field orientation and pain tolerance, using similar tools (N = 48 healthy, paid male volunteer physicians and medical students) and methods. However, an anxiolytic agent, benzoctamine (Tacitin), was added to eliminate anxiety that investigators identified as disruptive of the hypothesized correlation of the earlier study. Although a better correlation was obtained, statistical significance was not reached. More adequately founded and executed studies of these variables are recommended.

Haslam[26] confirmed that pain threshold and field orientation are correlated. It was hypothesized that stimulus scale-interval (subjects select from a series of stimuli the one that creates minimal pain) would influence pain threshold. This sequence of stimuli was viewed as the field or context within which the "painful" stimulus is embedded. The embedded figures test was used as a measure of field orientation. A lowered pain threshold was positively correlated ($P < 0.005$, one-tailed) with field dependence, and field-dependent subjects were influenced by the "pain field." A small population (N = 20) limited generalizability of findings, although results were clearly in support of the hypothesis.

The studies by Adler and Lomazzi[24] and by Adler et al[25] as well as the Haslam[26] study focus on field orientation. Since self-consistency among indicators of differentiation has been demonstrated, it is possible to consider implications regarding other indicators. Is there a relationship between pain threshold, as one determinant of the pain response, and articulation of body concept? Can pain thresholds be raised in individuals who experience themselves as more discrete or articulated? Do people who have a well-developed sense of separate identity exhibit different pain thresholds and tolerance levels from those whose sense of separate identity is such that they rely heavily on external frames of reference for cues?

Nichols and Tursky[27] studied two aspects of body image: body boundary and body anxiety, as well as pain tolerance. It was hypothesized that individuals anxious about their bodies would be less tolerant of pain and that definite-boundary individuals would be more tolerant of pain than indefinite-boundary individuals. Thirty male college students were tested with regard to the body image variable on a first session. The Holtzman Inkblot test and the Fisher and Cleveland index were scored for body barrier, which was considered an index of "body concept" as viewed by Witkin. Body anxiety was measured using the Secord Homonym Test.

The second session, 1 to 4 weeks later, focused on the administration of electrical stimulation as a method of laboratory-induced pain, to test pain tolerance. Findings supported the body boundary hypothesis, in that as definiteness of body boundary increased, pain tolerance increased, and subjects judged stimuli to be painful at higher levels of induction (higher

threshold). Three pain response measures were related to the barrier score; that is, painful ($r = .33$, $P < .05$), unmotivated tolerance ($r = .52$, $P < .005$), and motivated tolerance ($r = .38$, $P < .05$). Replication studies and other studies that look at the body image boundary relationship are suggested. Confirmation of these findings will provide support of nursing intervention specific to these variables.

Additional research regarding differentiation and pain is proposed, specifically with respect to the following problems.

- What is the relationship between attention to pain and the various differentiation indicators? For example, is a field-independent individual more likely to use distraction measures in dealing with pain than a field-dependent individual?
- What is the relationship between body concept and type of pain relief measures preferred? For example, would massage or therapeutic touch be useful for some individuals, yet unacceptable to others, depending on degree of articulateness of body concept? Is drug therapy most acceptable to some individuals?
- What is the relationship between control and counterirritation measures? When intense pain is applied to other body parts to counter the initial pain experience, how successful will this method be with more or less controlled individuals?
- Is the description of the pain experience different for individuals who differ in degree of development of a sense of separate identity? What terms are most frequently used by individuals with greater and lesser development in this area in describing pain? Can the nurse, ultimately, use such descriptors to guide nursing practice?
- What is the relationship between control and choice about therapeutic modalities for pain alleviation? For example, how do more or less controlled individuals respond to having choices about methods of pain control? Once control regarding methods is exerted, how is pain tolerance affected?

These queries point to several directions for investigating differentiation theory and its relationship to the phenomenon of pain. They focus on basic theory development, replication of existing research, and prescriptive theory development. By asking questions unique to nursing, in this case using theories developed in other disciplines, the development of shared nursing theories can be guided. Establishing connections between the differentiation indicators and pain "is prerequisite to identifying predictive principles that will guide pain management."[28(p66)] It is anticipated that at least some of the previously posed questions will be the focus of future research.

MORE COMPLETE KNOWLEDGE ESSENTIAL

Pain presents many theoretical, experimental, and methodological questions for the nurse researcher and clinician. Since nursing focuses on well and ill individuals in an effort to prevent or relieve suffering, the development of a more complete knowledge base with respect to pain is essential. Possessing knowledge about variables that affect the pain experience

enables the nurse to identify more accurately the unique pain experience of patients and to plan specific interventions that maximize the potential for pain relief.

According to Fawcett, "it seems reasonable to conclude that shared knowledge deals with significant nursing questions."[29(p10)] Pain care theory development, shared with social psychology, neurophysiology, and other disciplines, can provide answers to such questions. For example, knowledge of the nature of relationships between differentiation and pain may precede alteration of the pain response and more effective application of relief measures to alleviate or prevent distress. Much work needs to be done to arrive at this point.

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