

An examination of the six roles of the dental hygienist in relation to the field dependence-field independence construct

Melanie R. Hamer

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An examination of the six roles of the dental hygienist in relation to the field dependence-field independence construct

Abstract

Dental hygienists are seeking to remain viable health professionals in the midst of social, political, and economic changes which are occurring in the United States. These changes are expected to accelerate as the nation evolves from an industrial-based society to an information-based society (American Dental Hygienists' Association, 1988) (ADHA) . The shift to an information-based society will have an impact upon health care delivery in the future (Turner, 1988). If the dental hygiene profession is to remain viable in a rapidly changing society, dental hygienists' educational institutions must respond to change.

AN EXAMINATION OF THE SIX ROLES
OF THE DENTAL HYGIENIST
IN RELATION TO
THE FIELD DEPENDENCE-FIELD INDEPENDENCE CONSTRUCT

A Research Paper Presented
to the
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Master of Arts in Education

Melanie R. Hamer
University of Northern Iowa
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Charles V. L. Dedrick

Director of Research Paper

Melissa L. Heston

Co-Reader of Research Paper

Charles V. L. Dedrick

Graduate Faculty Advisor

Barry J. Wilson

Head, Department of Educational
Psychology & Foundations

12/4/92

Date Approved

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CHAPTER I

THE PROBLEM

Dental hygienists are seeking to remain viable health professionals in the midst of social, political, and economic changes which are occurring in the United States. These changes are expected to accelerate as the nation evolves from an industrial-based society to an information-based society (American Dental Hygienists' Association, 1988) (ADHA). The shift to an information-based society will have an impact upon health care delivery in the future (Turner, 1988). If the dental hygiene profession is to remain viable in a rapidly changing society, dental hygienists' educational institutions must respond to change.

Four specific changes will increasingly impact health care delivery in the United States. The first is an aging population with specific medical concerns. The second is the high cost of health care, coupled with reduced personal income (ADHA, 1988). The third is an increase in consumer health consciousness and a demand for reasonably priced health care. The fourth is an increase in alternate sites for the delivery of health care, such as community-based centers.

There has been little change in the structure of the dental hygiene profession since its inception in

1913. Created as an oral health subspeciality of dentistry, dental hygiene has operated under the direct purview of dentistry. Lacking professional autonomy--the ability to control the education, licensure, and practice of its members--dental hygiene can not currently be considered a profession (Walsh, Heckman, Hannebrink, Kerner, & Ishida, 1988). A lengthy, rigorous educational period and a body of knowledge specific to dental hygiene are two additional criteria of a profession which dental hygiene currently lacks (Lindeman, 1985; Tussing, 1989). Therefore, the term "profession," as applied to dental hygiene, is currently one of custom rather than one of definition.

Many educators and practitioners believe that, in order to remain viable, dental hygienists collectively must enhance professional status. Six professional roles define how dental hygienists will practice in the future. The educational preparation of dental hygienists will evolve from the six roles: clinician, researcher, administrator-manager, change agent, consumer advocate, and health promoter-educator.

Each role is considered to be a vital component of dental hygienists who can adapt to diverse populations and to sophisticated systems of health care (Thomson, 1989). The roles should prepare dental hygienists to work in private dental offices or in one of the

alternate practice settings. Alternate practice settings require new approaches to dental hygiene care, in addition to traditional knowledge and skills. Therefore, each dental hygienist should currently be educated to perform the six roles (Turner, 1989). This education may take place within formal dental hygiene preparatory programs or continuing education programs for graduate dental hygienists.

Statement of the Problem

Teaching of the six roles will require new educational approaches. Educators must develop innovative curricula to encompass the expanded scope of dental hygiene practice. New concepts of patient care which transgress the image of the dental hygienist as cleaner of teeth and toothbrush instructor must be taught (Woodall, 1990).

One way to examine the six roles is on the basis of a specific cognitive style: the field dependence-field independence (FD-FI) continuum. The examination may be performed by means of an analysis of the six roles. Through analysis, the degree to which each role requires a personal orientation, which may be labeled field dependent or field independent, will be determined. For example, a salient characteristic associated with field independence is a tendency to act independently of other people under certain

circumstances (Walker, 1981). Analysis will determine whether the ability to act independently of others is a requisite skill of the six roles. The skill, along with others, may be taught in dental hygiene preparatory programs.

Cognitive style research has increased in popularity since World War II and has numerous educational applications (Witkin, Moore, Goodenough, & Cox, 1977). There are more than 20 identified approaches to cognitive style, in addition to field dependence-field independence (Walker, 1981).

There are numerous definitions of cognitive style. Witkin defined cognitive style as "an individual difference in how a person perceives, thinks, solves problems and interacts with others" (cited in Brink, 1988, p. 11). Field dependence and field independence are contrasting ways of processing information (Witkin, Moore, Oltman et al., 1977). Field independence has been defined as an individual's tendency to rely on the self in information processing. Field dependence refers to the tendency to rely on sources outside the self. These tendencies find widespread expression in an individual's perceptual, intellectual, and social activities (Melancon & Thompson, 1989).

There are several reasons why field dependence-field independence is a suitable vehicle by

which to examine the six roles of the dental hygienist. First, FD-FI is a pervasive phenomenon. As noted, it manifests itself in the perceptual, intellectual, and personality domains of an individual's life. A person's manner of perceiving, solving problems, and interacting with others will determine the degree of success in carrying out each of the six roles. Second, FD-FI is stable over time (Jones, 1986). Although there is evidence that the degree of field dependence or field independence that an individual possesses may be altered, a field dependent person will remain field dependent, and a field independent person will remain field independent. Third, FD-FI is bipolar. This means that individuals lie along a continuum in regard to their perceptual, intellectual, and personality characteristics. Each extreme of the continuum, field dependent or field independent, has adaptive value under certain circumstances (Witkin, Moore, Goodenough et al., 1977). While some aspects of the six roles require field independent traits, such as the ability to act independently of other people, other aspects may favor field dependent characteristics.

Finally, FD-FI has many relevant educational applications (Witkin, Moore, Goodenough et al., 1977). Through education, dental hygienists will learn the concepts and competencies of the six roles. Field

dependence-field independence has been applied to research in dental and dental hygiene education. The construct constitutes a novel approach to the relationship between the practitioner and the patient. This is because part of the FD-FI manifestation is in the interpersonal area (DeVore, Beck, Clark, & Goorey, 1989).

This paper will investigate the relationship of cognitive style as determined by field dependence-field independence to the six roles of clinician, researcher, administrator-manager, change agent, consumer advocate, and health promoter-educator. The question to be answered is:

Which aspects of the six roles indicate a field independent approach, and which indicate a field dependent approach?

Significance of the Study

A limited number of studies were found which related FD-FI to dental hygiene. No studies discussed the six roles of the dental hygienist as a professional model. No studies were found which addressed the education of dental hygienists in the six roles. This paper provided an analysis of the six roles on the basis of the cognitive and personality components of FD-FI. Furthermore, the paper outlined the

implications of FD-FI for dental hygiene education in regard to the six roles.

Significant differences exist between field dependent and field independent individuals in perception, problem-solving abilities, and personality characteristics. Significant differences also exist between field dependent and field independent persons in the manner in which information is acquired and retained (Goodenough, 1976). A knowledge of the perceptual, cognitive, and personality aspects of FD-FI will give dental hygiene instructors greater latitude in selecting appropriate educational methods which complement the requirements of the six roles. Enhancement of the preprofessional learning, greater enjoyment of the teaching-learning process, and a broadened instructor teaching repertoire are anticipated results.

Assumptions

Analysis of the field dependent-field independent aspects of the six roles of the dental hygienist include four assumptions. They are:

1. Dental hygienists will ultimately practice in a variety of alternative practice settings in addition to traditional private practice. The required skills encompassed in the six roles will be identified by

educators, taught, and utilized by hygienists in all practice settings.

2. Dental hygienists will interact with a variety of patients, as well as other health professionals. Interpersonal skills are crucial to such interactions. In this paper, it was assumed that interpersonal skills are in place in dental hygienists, or they can be developed.

3. Some degree of change of an individual's position on the FD-FI continuum is possible. While FD-FI remains stable over time, resultant behaviors are able to be modified (Witkin, Moore, Goodenough et al., 1977). Required skills of a particular role, whether field dependent or field independent in nature, can be successfully taught.

4. Dental hygiene students can be tested for individual positions on the FD-FI continuum. Instruction may then be focused to their individual needs.

Limitations

Although aspects of this investigation may have relevance for education and health occupations education, its applicability is limited primarily to dental hygiene education. This is because of the specialized nature of dental hygiene and, in particular, the six roles.

Procedures for Obtaining Literature

The initial compilation of resources was accomplished through an ERIC search under the topic cognitive style. Because the listings for the topic are extensive, the search was further narrowed to include listings only for field dependence-field independence and a teaching emphasis in the postsecondary area.

Two ERIC searches were completed on the topic field dependence-field independence. The second search was extended to include works published from 1972.

Pertinent studies were selected from the ERIC listings. From the bibliographies of these studies, further studies were identified. In this manner, works by original investigators were located. Several studies were obtained from the project advisor, Dr. Charles Dedrick.

To focus upon the health occupations and dental hygiene literature, a MEDLINE search was conducted. The search extended to 1980. It included the topics dental education, nursing education, dental auxiliaries, and dental hygienists, in order to focus the search. Further studies were identified from the bibliographies of selected articles.

Two other searches were conducted. A UNISTAR search identified books on the topic of field

dependence-field independence. A search was conducted to include material from dissertation sources. Works from all searches which were not immediately available were obtained through interlibrary loan.

All sources revealed an abundance of literature on the topic of field dependence-field independence. After the first writing of the paper, the focus narrowed. The amount of literature, which was initially excessive was, therefore, narrowed as well.

Definition of Terms

Alternative Practice Settings: employment settings for dental hygienists other than the private dental office.

American Dental Hygienists' Association (ADHA): the largest professional organization representing the interests of dental hygienists. The tripartite structure of ADHA contains local, state, and national levels. The association does not possess legal status.

Dental Hygienist: a preventive oral health professional licensed in dental hygiene who provides educational, clinical, and therapeutic services supporting total health through the promotion of optimal oral health (ADHA, 1992).

Oral: A term which refers to the mouth.

Periodontal Disease: a term applied to a group of diseases, generally chronic in nature, which affect the gums and supporting structures of the teeth.

Summary

As a result of socioeconomic and cultural changes in the United States, health care delivery systems, including dental hygiene care, will undergo significant change (ADHA, 1988). In order to remain a viable oral health promoter and disease prevention resource, dental hygienists must position themselves to meet the evolving oral health needs of the American public.

Six professional roles provide an avenue by which dental hygienists may meet the previously stated needs. The roles will enable dental hygienists to function effectively in traditional private practice or in one of the emerging alternative practice settings.

The educational preparation of dental hygiene students in the six roles will require an understanding of the nature of the roles by dental hygiene educators. As a result, educators will be able to develop appropriate curricular and clinical applications.

The cognitive style field dependence-field independence represents a novel approach to the six roles and to their educational applications. In addition, FD-FI is a vehicle by which to examine the six roles. This is because FD-FI is a pervasive phenomenon, is stable over time, is bipolar in nature, and possesses relevant educational applications.

CHAPTER II

REVIEW OF RELATED LITERATURE

The purpose of this review of the literature was to provide background information for the analysis of the role responsibilities of the dental hygienist and the educational implications of those roles in relation to the FD-FI construct. This chapter will examine four topics: (a) the historical background of the FD-FI construct, (b) the salient traits of field dependent and field independent individuals, (c) the current applications of FD-FI in health occupations education, and (d) the direction of dental hygiene education and practice.

Historical Background

Field dependence-field independence emerged from laboratory studies on individuals' perception of vertical objects. Much of the research in this area was conducted by Witkin and his associates (Walker, 1981). Over the past 40 years, the construct has evolved from a perceptual phenomenon to a general construct possessing perceptual, intellectual, and personality components (Pitts & Thompson, 1984).

Educators have realized that pupils differ in many respects (e.g., ethnic background, social class, and sex). Other factors, such as attitudes, interests, and

personality traits and their relationship to school performance have been less widely studied. Among these factors is cognitive style (Kogan, 1971).

Definitions of cognitive style are numerous. Witkin stated, "It is an individual difference in how a person perceives, thinks, solves problems, learns and relates to others (cited in Ostrow, 1986, p. 149). Blackman and Goldstein (1982) referred to cognitive style as "the way individuals structure stimuli so that the world takes on psychological meaning" (p. 106).

Cognitive style possesses several essential features. First, cognitive style refers to the process or organization, rather than to the content of thinking (Witkin, Moore, Goodenough et al., 1977). Process refers to how individuals organize their thinking. Content refers to the subject matter of thinking (Blackman & Goldstein, 1982). Cognitive style is concerned with the manner of thinking (Kogan, 1971).

Second, cognitive style is pervasive (Witkin, Moore, Goodenough et al., 1977). This means that a given feature of cognitive style is apparent across different dimensions of an individual. For example, a person who utilizes information from others when formulating his or her own beliefs displays a field dependent trait that is evident both in the intellectual and personality realms. The pervasiveness

aspect also means that cognitive style can be determined by tests that do not rely upon an individual's verbal ability, such as the Rod-and-Frame Test (Witkin, Moore, Goodenough et al., 1977).

Third, cognitive styles are stable over time. This does not preclude development of characteristics of the other extreme of a particular cognitive style's continuum. For example, a field independent person may be able to develop specific behaviors associated with field dependence, such as remembering other people's faces (Walker, 1981). However, a person possessing a particular cognitive style will display the same style years later (Wilgenbusch, 1979).

Fourth, cognitive styles are bipolar. Biopolarity refers to a continuum of personal traits, with characteristics at each extreme having value in particular circumstances. There may be situations in which field dependence is desirable; there may be circumstances in which field independence is desirable. For example, an interest in other people, a trait associated with field dependence, is a valuable characteristic in occupations such as sales. On the other hand, a preference for an impersonal work setting, a trait associated with field independence, is an advantageous characteristic for a scientist or researcher. Witkin believed that this bipolarity

allowed individuals to escape labeling under a dimension such as ability. Ability often carries a value judgment (Witkin, Moore, Goodenough et al., 1977).

Several works have provided a comprehensive history of the evolution of FD-FI (Walker, 1981; Witkin, 1949; Witkin & Goodenough, 1981; Witkin, Moore, Goodenough et al., 1977). Witkin's early laboratory studies centered upon perception and utilized three classic tests: The Rod-and-Frame Test, the Rotating-Room Test, and the Tilting-Room-Tilting-Chair Test (Goodenough & Karp, 1961; Melancon & Thompson, 1989; Partridge, 1983).

The Rod-and-Frame Test involved placing the subject in a darkened room so that only a lighted rod suspended in the center of a lighted frame was visible. With all visual references to the vertical eliminated, the subject attempted to adjust the rod to the upright position while the frame, the subject's chair, or both, were placed in varying degrees of tilt. The number of degrees variation from true upright, over a series of three trials, constituted the individual's score, with greater deviations from upright indicating a greater degree of field dependence (Goodenough & Karp, 1961).

In the Tilting-Room-Tilting-Chair Test, the subject attempted to adjust the body to the upright

position (Witkin, Moore, Goodenough et al., 1977). The individual sat in a chair located in a small enclosed room. The first eight trials, called the Room-Adjustment Test, required the subject to return the tilted room to a vertical position, while the chair remained tilted. In the remaining six trials, called the Body-Adjustment Test, the task was to align the chair upright while the room remained tilted. The mean deviation in degrees from true upright constituted the individual's score, with field dependent persons experiencing greater deviations than field independent persons (Goodenough & Karp, 1961).

The Rotating-Room Test required the individual to sit in an enclosed room. The subject was required to align the chair or room to the upright position. However, the room was rotated on a circular track, altering the gravitational pull on the subject's body. A series of eight trials was conducted (Witkin, 1949).

The initial conceptualization of FD-FI, therefore, was the degree to which an individual relied upon one of two referents to establish the upright. A person can see upright by looking at surrounding vertical objects (visual referent). In addition, he or she may rely upon forces acting on the body, such as gravity (postural referent). Witkin found that subjects differed in their reliance upon the visual or the

postural referents in determining the upright (Witkin, Moore, Goodenough et al., 1977). Persons who relied primarily upon the visual field were termed field dependent; those who determined the upright by postural referents were termed field independent (Witkin & Goodenough, 1981).

Witkin and his associates soon redefined FD-FI as the ability to see part of a background as discrete from the entire field. They identified a relationship between an individual's ability to perceive the upright and the ability to visually locate, or disembed, a simple pattern hidden in a complex background (Melancon & Thompson, 1989). Field independent subjects were able to disembed the figure more readily than field dependent persons (Goodenough & Karp, 1961). Disembedding ability was shown to be consistent in an individual whether tested by visual, auditory, or tactile means (Witkin, Moore, Goodenough et al., 1977).

Continuing research broadened the FD-FI concept further. Field dependence-field independence was now conceptualized as part of a larger construct. Witkin referred to the construct as an articulated-versus-global field approach (Witkin & Goodenough, 1981). Besides the perceptual aspect, which included disembedding ability, the articulated-versus-global construct included restructuring ability for solving

certain types of intellectual problems (Walker, 1981). Restructuring involved removing a critical element of the problem from its usual context and applying it in a different manner to arrive at a solution. Witkin, therefore, redefined FD-FI as the tendency to restructure a problem or field to arrive at a solution (Witkin & Goodenough, 1981).

Field dependence-field independence was further subsumed into the theory of psychological differentiation (Witkin, Goodenough, & Oltman, 1979). A differentiated person displays defined boundaries between needs, feelings, and attributes and the outer world. The outer world refers to other people and is defined as the nonself. A less differentiated person shows greater connectedness between the self and other people (Witkin, Goodenough, & Oltman, 1979).

Psychological differentiation theory evolved because of an inability of the articulated-versus-global construct to account for various aspects of personality. Body concept--the awareness of the relationships within and the outer limits of one's body--a sense of separate identity, and use of psychological controls and defenses, such as denial and repression, are concepts covered by the theory of psychological differentiation (Walker, 1981; Witkin, Goodenough, & Oltman, 1979). Therefore, the most

recent formulation described FD-FI as a construct having perceptual, intellectual, and personality aspects, located within the greater theory of psychological differentiation. Consistent with the broadened theory, Witkin and Goodenough (cited in Walker, 1981) formulated the latest definition of FD-FI. It is "tendencies to function with greater or less autonomy of external referents, manifested in both the cognitive and social domains" (p. 35).

The present tests of FD-FI were developed for ease of testing and for group administration. The Embedded Figures Test is an individually administered exercise. A simple shape is presented to the subject; the figure is then removed and the subject is asked to locate its outline with a complex background (Witkin, Moore, Goodenough et al., 1977). There are 12 shapes with a time limit of 3 minutes per shape. The mean amount of time needed to locate the figures constitutes the individual's score (Walker, 1981).

Group testing for the Embedded Figures Test is accomplished by means of the Group Embedded Figures Test. Eighteen scored figures and seven practice figures are presented during a 12-minute time limit. The subject must trace the outline of the figure within the background. The number of figures identified is the subject's score.

Melancon and Thompson (1989) described a multiple-choice, machine-scorable version of the Group Embedded Figures Test called the Finding Embedded Figures Test. This format eliminated the need for subjects to draw the figures and for trained personnel to score them.

The FD-FI Continuum

Field dependence-field independence forms a continuum (Jones, 1986). This means that individual scores on tests of FD-FI form a continuous distribution. Each person occupies a position between the extreme poles of field dependence and field independence (Witkin, Moore, Goodenough et al., 1977). For example, a field independent person would score closer to the extreme labeled greater autonomy of external referents under the most current definition. A person labeled field dependent would score closer to the extreme less autonomy of external referents. The continuum structure means that there are not two distinct classes of persons, field independent and field dependent.

The continuum structure is a strength of FD-FI. The extremes represent ways individuals behave and organize their environments across a variety of situation (Jones, 1986). Witkin stated, "each pole has adaptive value under specified circumstances, and so may be judged positively in relation to those

circumstances (Witkin, Moore, Goodenough et al., 1977, p. 16). Therefore, FD-FI represents a means of looking at an individual's behavior without making value judgments that may carry a negative connotation. In the case of ability, for example, more is good and less is bad. There are adaptive behaviors at each extreme of the FD-FI continuum.

The Salient Features of FD and FI Individuals

A fundamental difference between field dependent and field independent individuals is that a field independent person possesses an articulated cognitive style. A field dependent person possesses a global style (Manfredo, 1987).

An articulated style means that, in learning situations, the field independent person is able to analyze a problem--that is, to identify relevant components and to see part-whole relationships. This analytic ability has been termed cognitive restructuring. When restructuring a problem, the learner must be able to disembed relevant information and recombine it in meaningful ways to arrive at a solution (Clark, Ward, & Lapp, 1988). Frank (1984) described cognitive restructuring as the ability to disembed the basic elements from an organized field, as

well as to provide structure when the field is ambiguous.

The ability to restructure components of an academic problem imparts a flexible style of information processing to the field independent student (Kiewra & Frank, 1986). In a review of the literature on learning and memory, Goodenough (1976) noted that field independent students utilized a variety of features of a concept. In forming hypotheses as part of concept attainment exercises, field dependent students limited themselves to the most dominant features and ignored the nondominant ones. Thus, the field independent student's style of information processing allowed greater freedom to consider numerous aspects of a problem.

Disembedding ability is more rapid in field independent than in field dependent individuals. Wilson and Dunlap (1988) tested 50 senior dental students for speed and accuracy in identifying decay lesions in 10 composite radiographs (x-ray pictures). Field independent students required less time per radiograph to identify the lesions and observed more lesions than did the field dependent students.

The articulated field independent style is self-consistent. This means that if a person shows restructuring ability in perceptual tasks, he or she

will show the same ability in certain problem-solving tasks which involve the need to reorganize problem components (Goodenough, 1976).

Field independence has been associated with improved academic performance in certain areas. Goodenough and Karp (1961) reported that field independent subjects outperformed field dependent subjects on standard intelligence tests in the subtests Verbal Comprehension, Freedom from Distractibility, and Closure. The closure factor is defined by the Wechsler subtests Block Design, Object Assembly, and Picture Completion. The superior scores of field independent individuals on IQ tests may be related to the common requirement of these tests to overcome embeddedness (Goodenough & Karp, 1961).

Field independent children, who pay selective attention to relevant academic information, tend to outperform field dependent children, who are less able to discriminate relevant from irrelevant factors in classroom work. This advantage disappears by college, indicated by grade point average (Blackman & Goldstein, 1982). A reason for the grade leveling was suggested by Witkin (cited in Renninger & Snyder, 1983), who found that college students tend to take, and earn higher grades in, courses suited to their individual degree of FD-FI.

In a longitudinal study of 1,422 college students from enrollment until graduation, Witkin found that field independent students outperformed field dependent students in mathematics and the natural sciences. While males selected these subjects more frequently than females, the field independent women generally displayed outstanding academic aptitude (Witkin, Moore, Oltman et al., 1977).

In the interpersonal realm, field independence manifests as an autonomy of external referents. External referents refers primarily to other people (Witkin & Goodenough, 1981). There are firm boundaries between the field independent person's inner self and the external world. This individual does not rely upon others for self-definition (Jones, 1986).

Goodenough (1976) reviewed studies relating the social orientation of field independent and field dependent people to certain types of learning. While field independent people outperformed field dependent people in learning-memory tasks in general, field dependent people excelled at learning social material. An early study found that field independent subjects performed less well than field dependent subjects when identifying cutout pictures of facial parts, including partial pictures of their own faces. Goodenough concluded that field independent persons tend to pay

less attention to their social surroundings than field dependent persons. If specifically directed, however, field independent persons will attend to social information.

Field independence has been associated with individual characteristics that may cause a person to appear aloof, less considerate of others, and manipulative (Jones, 1986). Field independent individuals are not as easily distracted from activities as field dependent individuals (Crow & Piper, 1986). Field independence is a different quality than simply freedom from distractibility (Karp, 1963).

Oltman, Goodenough, Witkin, Freedman, and Friedman (1975) studied the effect of a conflict situation upon various pairings of 40 field independent and field dependent female college seniors. They found that pairs containing 2 field independent members resolved the conflict less frequently than pairs in which one or both members were field dependent. When a pair of mismatched members reached consensus, a change of opinion had occurred in the field dependent member. Field independent subjects were more likely to adhere to their initial positions in the conflict and

displayed less willingness to accommodate the views of others and to avoid hostility.

Field dependence-field independence affects a person's choice of educational major and career. Field independent people are likely to select college majors which emphasize analytical abilities, deal with abstract subject matter, and favor an impersonal work setting. In the longitudinal study by Witkin and his colleagues, described earlier, the researchers found that, consistent with their hypothesis, field independent students entered majors in the cluster containing natural sciences, mathematics, and medical science (Witkin, Moore, Oltman et al., 1977).

Field independent individuals are found in greater numbers in careers such as physics, biology, and chemistry (Linder, 1991; Witkin, Moore, Goodenough et al., 1977) and in engineering and technical areas (Frank, 1986). In occupations such as teaching, field independent individuals gravitate toward specialties utilizing analytical competencies, such as science and mathematics.

In the health professions, physicians, dentists, and psychiatrists are predominantly field independent (Witkin, Moore, Goodenough et al., 1977). Newell and Davison (1984) administered the Group Embedded Figures Test and the Mirror Tracing Test to 47 first-year

dental hygiene students. The Mirror Tracing Test is a test of perceptual and motor skills and appears to be related to the FD-FI dimension. Subjects are required to trace various geometric shapes by indirect vision utilizing a mirror. Mean Group Embedded Figures Test scores indicated that the dental hygiene students were more field independent than the norm for female college students. Current research indicates that both dental and dental hygiene students are more field independent than typical college students (DeVore, Beck, Clark, & Goorey, 1989).

Field Dependence

The field dependent person displays a global cognitive style (Manfredo, 1987). Characteristic of a global style is an inability to see elements of a situation or problem as discrete (Ostrow, 1986). The field dependent person tends to accept the situation or problem as given (Jones, 1990).

In the acquisition of information, field dependence is associated with a spectator role. The individual is described as passive and intuitive. When making inferences from prose material, field dependent students did not explore the number and range of alternate interpretations that field independent students provided (Pitts & Thompson, 1984).

In concept-attainment exercises, field dependent students showed gradual increases in learning over successive trials of the problem. In contrast, field independent students did not display improved comprehension until they discovered the correct hypothesis. The number of trials required to master the concept was the same between students (Goodenough, 1976).

When learning academic material, field dependent students experience greater difficulty than field independent students when the material is presented in an unorganized format (Pittman, 1983). When mediators that provide structure to the material are supplied, performance by field dependent students improves. A study of 96 college students indicated that field dependent students who received an informational article containing key words listed as center and side headings outperformed field independent students on an objective test of the content. The reverse was true when no organizing headings were used (Thompson & Thompson, 1987).

Field dependent individuals excel in the learning of material with social content, paying selective attention to social cues (Goodenough, 1976; Walker, 1981) and remembering messages with social content (Oltman et al., 1975). The superior learning of social

information by field dependent people is a function of the greater attention paid to the situation.

Field dependence has been associated with difficulty in certain motor activities. Wilson, Suddick, Shay, and Hustmyer (1981) studied the relationship between field dependence and field independence, measured by the Embedded Figures Test, the Perceptual-Motor Abilities subtest of the Dental Admissions Test, and the Mirror Tracing Test for 20 sophomore dental students. The two latter tests contain exercises related to perceptual and motor activities involved in the practice of dentistry. The researchers found that the field dependent students scored lower on the Perceptual-Motor Abilities Test than the field independent students. No significant relationship was found between the Embedded Figures Test scores and scores on the Mirror Tracing Test. Blackman and Goldstein (1982) reported inconsistent findings in the performance of field dependent and field independent individuals on perceptualmotor tasks.

The most salient characteristic of field dependence is a strong interpersonal orientation (Witkin & Goodenough, 1977). This orientation affects the field dependent person's school performance under various types of reinforcement. Witkin suggested that field dependent students do not learn academic material

as well as field independent students under conditions of intrinsic motivation (Witkin, Moore, Goodenough et al., 1977). The degree of learning is the same for both groups under conditions of extrinsic reinforcement.

Field dependent students are more affected than field independent students by externally provided rewards in the form of verbal praise or tangible rewards. A study by Kronstadt and Forman (1965) examined the performance of 38 field dependent and field independent fourth graders on a clerical task under conditions of verbal approval and disapproval by an adult examiner. Field dependent children performed more poorly on the task than field independent children when examiner statements conveyed disapproval. When disapproval followed approval in subsequent sessions, the tendency of the field dependent subjects to improve with practice was reversed.

The tendency to rely on external referents manifests in the social as well as the intellectual domain (Walker, 1981). Field dependent persons rely on others' opinions more, especially in ambiguous situations in which they are less able to analyze the situation on their own. The interpersonal competencies of field dependent persons may aid them in getting along with those upon whose opinions they rely. When

the situation is well-structured, field dependent and field independent persons display similar responses to external referents (Witkin & Goodenough, (1977). Field dependent individuals appear to be able to think for themselves in less ambiguous situations.

Descriptors of field dependent persons include a strong interest in others and a preference to be physically close. In two studies designed to determine field dependent and field independent persons' perception of optimal interpersonal space, researchers found that field dependent individuals sat significantly closer to the person with whom they were interacting than field independent individuals did (Witkin & Goodenough, 1977).

In conflict situations, field dependent persons may avoid directing hostility at other persons and, therefore, may change opinion to aid in achieving consensus. In the study of 40 college women sequentially paired on the basis of field dependence or field independence, the field dependent subjects were rated by their partners as being better liked (Oltman et al., 1975).

In their longitudinal study tracking career preferences of 1,422 college and graduate students, Witkin, Moore, Oltman et al. (1977) observed that field dependent individuals gravitate to occupations where

interpersonal skills are utilized (e.g., social work, the ministry, sales, advertising, and administration). Frank (1986) followed the choice of specialization of 468 undergraduate students in 21 areas of a teacher education program. He found that the students' degree of field dependence or field independence was related to the selection of specialty area. In particular, students specializing in the social sciences, humanities, family and child development, home economics, special education, and speech pathology tended to be field dependent.

Within the nursing profession, Quinlan and Blatt (1972) found that student nurses performing well in psychiatric nursing tended to be field dependent, while students performing well in surgical nursing displayed field independence. The specialty choice reflected the nature of the tasks involved. Surgical nursing requires analytic, disembedding skills, such as being able to locate an instrument on a tray. Psychiatric nursing places more emphasis on interpersonal contact with patients (Witkin, Moore, Oltman et al., 1977).

DeVore et al. (1989) stated that field independence may present difficulties in the heavily interpersonal realm of patient-practitioner interactions. The dental patient, who is generally unable to evaluate the technical expertise of the

practitioner, often bases judgment of the quality of care on the practitioner's interpersonal skills. The empathy of the practitioner is a major factor in patient compliance with prescribed dental therapies.

Fixity and Mobility

A person's position on the FD-FI continuum tends to remain stable over time (Witkin, Moore, Goodenough et al., 1977). Furthermore, an individual tends to maintain his or her degree of field dependence or field independence relative to others (Walker, 1981).

Efforts to alter field dependence or field independence have been in the direction of increasing field independence. Kogan (1971) noted that a field independent person's approach to learning academic material is considered a more mature, adaptable approach than the field dependent approach.

On the continuum, the position of most people is between extreme field independence and extreme field dependence. However, Walker (1981) noted that certain individuals may display characteristics of both ends of the continuum. "People who show the characteristics prototypical of either FD or FI with regularity are designated as fixed, while people who have access to

the characteristics of both poles of the continuum are designated as mobile" (p. 48).

The concept of fixity or mobility is significant because certain types of education and life experiences may be able to promote mobility (Walker, 1981). *Therefore, a person may acquire access both to the interpersonal strengths of the field dependent extreme of the continuum and to the restructuring competencies of the field independent extreme.*

Witkin believed that certain behaviors resulting from field dependence or field independence are malleable (Witkin, Moore, Goodenough et al., 1977). For example, a field dependent person may be encouraged to use a hypothesis-testing approach to concept attainment if explicit directions for doing so are provided.

Current Applications of FD-FI to Education

Because FD-FI manifests itself in a wide variety of areas of an individual's life, the construct has been related to a variety of topics. Current aspects of FD-FI have particular relevance to health occupations education. From a factor analysis, Goodenough and Karp (1961) concluded that the Rod-and-Frame Test, the Embedded Figures Test, the Body-Adjustment Test, and the Hidden Pictures Test (similar to the Embedded Figures Test) contain a common

requirement for overcoming embeddedness. Witkin (cited in Walker, 1981), therefore, considered FD-FI to be an aspect of intelligence but not its equivalent.

Clark, Ward, and Lapp (1988) examined the performance of 25 field independent and 30 field dependent college students on mathematics word and visual identification problems. Although the groups were matched on computational skills, field independent students outperformed the field dependent students on the word problems, but not on the visual problems. The researchers concluded that the necessity to restructure elements of the word problems prior to solving them accounted for the superior performance of the field independent students.

Heitmeyer and Thomas (1990) found that field independent postsecondary home economics students displayed significantly higher cumulative GPAs than their field dependent counterparts. The researchers noted that field independent students may be at an advantage in traditional school systems that focus lecture material to the analytic field independent student.

Standard intelligence tests may inadvertently favor the field independent subject. Crow and Piper (1986) determined that 47 of the 80 items on the Otis-Lennon Mental Ability Test, a well-known IQ

measure, contained a field independent bias. Educators who utilize this test to identify students with analytical skills essential to success in science courses should be aware of this bias.

A study by Kiewra and Frank (1986) tested the recall of factual material by field dependent and field independent college students under various forms of structure: notes, outlines, or organizational charts. According to FD-FI theory, field dependent students will benefit from externally provided structure. Field independent students are generally not affected by structure. The field dependent college students recalled more information when the same recall cues were provided at the time of the lecture and at testing, or no cues were provided. Field independent students recalled more information under unequal conditions, that is, cues provided at the lecture and none at recall or vice versa.

Health Occupations Applications

In addition to the topics of the previous section, recruitment and retention of qualified applicants are current issues of concern to health occupations educators. Attrition is costly for both students and programs. Students may attribute school difficulty to lack of ability in basic knowledge and skills (Pittman, 1983). Field dependence-field independence may affect

student success within the basic educational period, as well as in professional life.

Jones (1990) studied the effect of FD-FI and anxiety on the first-term grades of 85 freshmen medical students. Scores on the Group Embedded Figures Test and the State-Trait Anxiety Inventory, a self-report measure of anxiety, did not singly or in combination predict term grades. However, the Group Embedded Figures Test linked field independence with success in human anatomy. In this course, field independent students can more easily disembed body structures from a complex background than field dependent students can.

Several researchers investigated the relationship between method of instruction, FD-FI orientation, and their effect upon student achievement and satisfaction. Pittman (1983) reviewed six theories and instruments which reflect dimensions of cognitive style and their application to health occupations. They are: FD-FI; Meyers-Briggs Type Indicator, a measure of personality; Hill's Cognitive Mapping of a student's learning in seven areas; the Learning Preference Inventory, constructed to determine preferred learning modes of health occupations students; the Productivity Environmental Preference Survey, which identifies learner preferences in 18 physical, psychological, and sociological areas; and Canfield and Lafferty's

Learning Style Inventory, a diagnostic tool for determining obstacles to learning. Pittman concluded that health occupations instructors have access to a variety of well-researched models for matching instructional mode to learning. Instructors should utilize these models effectively to enhance student learning.

Brink (1988) described the implications for nursing education of FD-FI plus Kolb's four basic learning styles of diverger, assimilator, converger, and accommodator. The latter are individual adaptations stemming from a person's characteristics and experiences acting upon a four-stage cycle of learning. In addition to describing the dominant mode of learning in each of Kolb's types, Brink recommended group interaction, shared responsibility by teachers and students, and specific, structured cues for field dependent students. For field independent individuals, an emphasis upon the lecture and discovery methods, fewer structured cues, and definition of objectives by the learner were recommended.

Ostrow (1986) found that 75 baccalaureate-degree nursing students scored higher on an objective test and expressed greater satisfaction with the teaching method, regardless of GPA or degree of FD-FI, when taught critical care concepts by the Personalized

System of Instruction (PSI), rather than by lecture. The PSI is an individualized system of instruction featuring small units, self-pacing, immediate feedback, and deductive thinking. The hypotheses that field dependent students with low GPAs would score higher than their field independent counterparts under the PSI method was not supported.

Newell (1986) reviewed the research on FD-FI and the implications for dental hygiene education in the areas of social learning, feedback, cue salience, and support structure. For field dependent students, greater attention to and learning of social information, greater need for external feedback, the tendency to focus on the most prominent aspects of a situation, and the need to provide more external structure were discussed. The use of mediators, such as advance organizers, to provide structure to lecture material was advocated.

Walker (1981) examined the effects of age, type and number of years of experience, and academic ability on the learning behaviors of 162 associate-degree nursing students enrolled in an initial nursing course offering a modular format. By means of a proficiency examination, students were able to challenge individual modules or the entire course. All students took the Group Embedded Figures Test and filled out a

questionnaire to determine age and previous nursing experience. Academic ability was determined by ACT scores and achievement records in the specific course. Results indicated that the 16 course challengers tended to be field independent with a higher level and years of experience than the group as a whole. The field independent students with a higher level of nursing experience challenged more modules than the field dependent students with lower levels of experience. Field independent challengers also mastered the modules with fewer attempts than the field dependent students. On the course examination, field independent students achieved the highest scores. Coupled with a higher level of nursing experience, field independent students were more likely to pass the examination on the first try.

Field dependence-field independence is associated with other factors besides academic success. Linder, Janus, Bauer, and Dishman (1991) correlated scores on the Group Embedded Figures Test with student hand dominance in 77 second-year dental students. They found that right-handed students tended to be field independent. The researchers cautioned educators to recognize that performance discrepancies among students may be attributed to differences in field dependence or

field independence rather than to lack of basic knowledge and skills.

Factors Influencing Dental Hygiene Education and Practice

The previous section outlined how FD-FI is utilized in education and in health occupations education. The relationship of FD-FI to the future of dental hygiene will be better understood when dental hygiene's past history is known. A brief account of the factors influencing the education and practice of dental hygienists will follow.

History, Education, Licensure, and Supervision

History

The founding of dental hygiene is credited to Dr. Alfred C. Fones. In 1906, Fones trained Irene Newman to remove deposits from children's teeth. Although the prevention of tooth decay was the initial focus for dental hygiene, there were dentists who foresaw the prevention of periodontal disease as dental hygiene's greatest contribution to oral health.

Education

Fones held the first formal dental hygiene class in 1913-1914. By 1950, the minimum length of educational preparation had reached 2 years (ADHA, 1983).

The American Dental Hygienists's Association was established in 1923. ADHA's mission has included concerns of women in the workplace, the relationships of dental hygienists to organized dentistry, and the improvement of the oral health of the public (Rosen, 1983). The ADHA currently represents about 30,000 dental hygienists (Turner, 1989) and is the author of the professional model, the six roles.

Program accreditation began in the 1940s (ADHA, 1983). Accreditation is controlled by the American Dental Association on Dental Accreditation (ADA CODA), which sets the minimum standards for education of dental hygienists. In response to recent attempts by the ADA CODA to lower education standards for dental hygiene, the ADHA in 1990 passed a resolution declaring the intent to regulate its own education, licensure, and practice (Gurenlian, 1991).

Licensure

Licensure of dental hygienists began in 1951 (Rosen, 1983). To obtain a license, dental hygienists must graduate from an accredited program and pass written and practical (patient-centered) board examinations. Both the examination and licensure process are controlled by individual state boards of dental examiners (Gurenlian, 1991).

Supervision of dental hygiene practice is controlled by individual state dental practice acts. All states have laws relating to the scope of functions which a dental hygienist may perform and the degree of required dental supervision. More than half the states allow dental hygienists to work under general supervision. This means that the dental hygienist may carry out the prescribed patient care without the physical presence of the dentist in the treatment facility. Direct supervision requires that the dentist must be present while treatment is rendered. In 1986, Colorado became the first state to win legislative consent for dental hygienists to practice without dental supervision (Benicewicz & Metzger, 1989). Unsupervised practice is referred to as independent practice.

Practice

The primary employers of dental hygienists have been dentists in private practice. Over 90% of dental hygienists work in private dental offices.

Traditional dental hygiene functions have included scaling and polishing (removing hard and soft deposits from teeth), administering fluoride treatments for prevention of decay, exposing radiographs (x-rays), and recording medical history and oral examination findings. Additional functions vary from state to

state and include up to 26 separate duties (Woodall, Dafoe, Young, Weed-Fonner, & Yankell, 1989).

The specialty of periodontics, the treatment of diseases of the gums, will afford the avenue of greatest expansion of dental hygiene functions (Tate, Schierling-Wilkes, & Frese, 1987). Periodontal disease has replaced decay as the primary oral health concern in the United States. Additional dental hygiene functions associated with the management of periodontal disease have been incorporated into numerous state dental practice acts. The most prevalent functions are root planing (the removal of diseased tissue from the roots of teeth) and the injection of local anesthesia for the control of pain.

The practice of dental hygiene is based upon a long-standing model of care (Burt & Eklund, 1992). According to this model, dental hygienists must assess patient conditions and needs, plan treatment based upon assessment findings, implement treatment, and evaluate the results of the treatment. The dental hygiene model provides a vehicle for numerous aspects of patient care besides the traditional functions.

Private practice and public school systems have employed the majority of dental hygienists. Recently, there has been increased interest in alternative practice settings. Nontraditional employment settings

(e.g., hospitals, geriatric centers, prisons, and centers for the physically and mentally handicapped) offer the dental hygienist an opportunity to increase expertise and responsibility. The number of dental hygienists employed in alternative settings has increased (Woodall et al., 1989).

Professionalization of Dental Hygiene

The ADHA has elected to enhance the profession of dental hygiene. The term enhance is used because dental hygiene has always been referred to as a profession. The movement to enhance the profession has several arms. One is the recognition of six professional roles for dental hygienists. A second is the intent to move from a technical-based field of study to a knowledge-based profession. Incorporation of a knowledge-based curriculum may necessitate a lengthening of the educational period from 2 academic years, characteristic of the majority of dental hygiene programs, to 4 years. A third is the intent of dental hygienists to control the education and licensure of their own members. A fourth arm is working toward the easing of dental supervision restrictions for dental hygienists.

The Six Roles

In 1984, ADHA held the first of three national workshops in order to ascertain the direction of dental

hygiene education and practice. The workshop participants identified six roles for dental hygienists. These roles, which were adopted by ADHA in 1985 as the professional model, are clinician, researcher, administrator-manager, change agent, consumer advocate, and health promoter-educator (Thompson, 1989; Turner, 1988).

Clarification of dental hygiene roles will benefit both society and dental hygienists (Campbell, 1989). The roles will expand the traditional emphasis upon the technical-based performance of repetitive tasks (Thompson, 1989). A clear conceptualization of roles will facilitate the public's acceptance of dental hygienists as professionals.

No model describing the six roles was found in the literature. However, some individual roles and their educational and practice implications were discussed.

Administrator-Manager

Thompson described the role of the manager, who utilizes data and communication skills to justify the initiation and development of health care in private dental practice. In addition, Campbell (1989) discussed the necessary skills of the manager role and educational strategies for its development.

Change Agent

Woodall (1992) provided philosophy underlying the role of change agent as one who has the knowledge and critical thinking skills to challenge authority. She stated that dental hygiene educators do not currently encourage students to function as change agents.

Consumer Advocate

Woodall (1988) described ways in which the dental hygienist may function as a consumer advocate within private practice. Answering patient inquiries about proposed dental treatment casts the hygienist in the role of "a safe second opinion" (p. 10). This is because the dental hygienist is acquainted with the patient's history and often has input into the proposed treatment.

Health Promoter-Educator

Brownstone (1987) reviewed the past and present roles of dental hygienists as health promoters-educators. Health education is defined as a process or means seeking to prevent disease. Health promotion is a broader term, inclusive of disease prevention, which stresses positive life practices to enhance health. As oral health promoters, dental hygienists utilize individual or collective means to promote optimal oral health in the public. Brownstone also suggested that health promotion-education efforts may require more

comprehensive skills, such as behavior modification, than have been traditionally employed by dental hygienists.

Summary

In 30 years, field dependence-field independence has evolved from a solely perceptual phenomenon to a construct possessing perceptual, intellectual, and personality aspects. Field dependence-field independence currently resides within the theory of psychological differentiation. According to the theory, behaviors which reflect the degree of an individual's differentiation are interrelated. Therefore, there is self-consistency in the individual's manner of functioning across the three domains (Witkin, Goodenough, & Oltman, 1979).

The bipolar nature of FD-FI indicates a continuum with two extremes. Most individuals lie between the two extremes in their degree of FD-FI. The personal characteristics of each extreme possess adaptive value under specified circumstances.

The perceptual, intellectual, and personality characteristics associated with FD-FI have numerous applications to education. Within health occupations education, many of these applications have relevance.

The history and current issues of a specific health occupation, dental hygiene, form the background

against which six professional roles and their relationship to FD-FI will be examined. The background also forms a basis for consideration of the implications of FD-FI for dental hygiene education.

CHAPTER III

ANALYSIS OF THE SIX ROLES

The review of the literature has provided pertinent background data on field dependence-field independence and on the profession of dental hygiene. This chapter will analyze the six roles of the dental hygienist (e.g., clinician, researcher, administrator-manager, change agent, consumer advocate, and health promoter-educator) in relation to the background data.

Clinician

The clinician role will remain central to dental hygiene practice in all practice settings. The clinician role will follow the dental hygiene model of assessment of the patient's status, planning of dental hygiene treatment, implementation of treatment, and evaluation of the effects of treatment. The analysis of the field dependent and field independent aspects of the clinician role will be based upon specific duties of the first three phases.

The initial part of the assessment phase is the medical-dental interview. The objective of the interview is to obtain accurate information about the individual's state of health because the health status affects dental hygiene treatment.

During the interview, the clinician will review the patient's responses to the history questions. Two field independent characteristics that result in a successful interview are a tendency not to accept the field as given and the ability to analyze ambiguous information.

Refusal To Accept the Situation as Given

The dental hygienist must not automatically accept the information provided by the patient as given. This means that the clinician must continue to ask the patient to clarify responses or to give additional information until definitive answers to the history questions are obtained. This is because patient drug regimens or medical conditions may have profound effects upon dental hygiene treatment. Necessary interventions must take place before dental hygiene treatment is initiated. An example is the necessity to prescribe antibiotics for a person with certain types of heart conditions prior to any treatment which results in bleeding of the mouth tissues.

Field independence will benefit a clinician in the interview process. Witkin, Moore, Oltman et al. (1977) suggested that field independent students perform better in science than field dependent students. The field independent clinician may, therefore, possess a better understanding of the scientific bases of dental

hygiene interventions upon the body. Second, extraneous factors, such as running behind in the schedule, may cause a clinician to hasten the interview process and fail to question the patient thoroughly. Field independent persons better resist the influence of extraneous factors. Third, field independence is associated with the ability to identify alternatives. If medical factors preclude immediate dental hygiene treatment, the clinician must be able to direct the patient to acceptable alternative courses of action. The field independent clinician will be less likely to minimize factors in the assessment phase which will necessitate the determination of alternative courses of action.

Analyzing Ambiguous Information

During the interview, the field independent clinician will be more likely than the field dependent clinician to distinguish essential from nonessential background information. Patients differ in their ability to understand or to discuss their medical conditions. Brands and dosages of medications are frequently altered by the patient's physician. The result may be confusion over what drug is being taken or why. The clinician must retain the objective of the interview and focus the questions on the relevant information. Disembedding accurate responses from an

ambiguous field is necessary when the interview does not present a clear-cut situation.

Maintaining Initial Position in Confidence

In the planning phase, the clinician will utilize the results of the interview and oral cavity examination to determine the necessary treatment. Treatment may be simple or complex, requiring several appointments.

Conflicts between the clinician and the patient may arise during the planning phase. Failure of the clinician to adequately communicate the treatment plan underlies many conflicts. Patients may have unrealistic expectations of the scope and length of treatment. If a fee is assessed for each appointment, the patient may question the need for multiple appointments.

In conflict situations, field independent persons are less likely than field dependent persons to depart from their initial positions. When patient compliance with treatment regimens is essential, the field independent clinician will possess an advantage. The patient must comply or be dismissed from treatment.

Need for External Referents

When questions arise during the planning stage, the clinician may need to consult with the dentist. The need for external social referents is a characteristic associated with field dependence. Field dependent clinicians will be more likely than field independent clinicians to seek another's opinion. When pathology of the mouth is suspected, two pair of eyes are better than one. A field independent clinician, who relies more on internal referents, may fail to seek a second opinion. Failure to seek a second opinion may carry grave consequences for both patient and clinician.

Disembedding Skills

Implementation of the dental hygiene treatment plan involves disembedding skills. The clinician must disembed deposits from the surfaces of teeth as well as dental instruments from a tray. Disembedding skills are associated with field independence.

Removal of hard and soft deposits from the teeth involves identification of the deposits from surrounding tooth structures which look and feel similar. Therefore, disembedding is both visual and tactile in nature. Furthermore, disembedding must be rapid. A clinician working on a time schedule may have

20 minutes to identify and remove deposits from approximately 112 tooth surfaces.

The selection of instruments from a tray also involves visual disembedding skill. A dental hygiene instrument tray may contain a dozen instruments. Most instruments possess two similar-appearing working ends on a single handle. The clinician must rapidly select the needed instrument from among many on the tray. The field independent clinician carries an advantage in the selection of instruments from extensive tray setups.

Disembedding is less rapid in field dependent individuals. With practice, however, field dependent individuals may adequately perform tasks requiring disembedding abilities.

Researcher

The role of researcher is not one which every dental hygienist will assume. Although all dental hygienists will not conduct research, all should be discriminating consumers of research.

Hypothesis-Testing Approach

The researcher utilizes a scientific method to formulate questions, gather and analyze data, and document and interpret results. The steps of the scientific method involve problem definition, accumulation and analysis of data, hypothesis construction, and hypothesis testing.

The scientific method is a statement of the hypothesis-testing approach, which describes the learning approach of the field independent individual. The hypothesis-testing approach to knowledge accumulation has been termed a participant role (Goodenough, 1976). Therefore, the field independent dental hygienist actively seeks knowledge through the vehicle of research.

Impersonal Work Setting

Several aspects of the researcher role suit the field independent individual. First, the solitary work setting of the researcher is typical of that favored by field independent persons. Second, the analysis of data involves working with material of an abstract, impersonal nature. Third, research involves the restructuring of data. The researcher must perform appropriate tests upon an undifferentiated numerical field and recombine the data in a meaningful way to arrive at a conclusion.

Intrinsic Motivation

The nature of the researcher's job requires a reliance upon intrinsic motivation. Field independent persons perform better than field dependent persons under conditions of intrinsic motivation.

Extrinsic rewards for performing research are few in the dental hygiene profession. The salaries of some

dental hygiene faculty are remuneration for teaching and community service, as well as for research.

Research grants may cover only the cost of materials and equipment. Recognition by colleagues may or may not be present. Therefore, the dental hygienist who possesses self-defined goals and internal motivation will prefer the research setting.

Interpersonal Competencies

Although the researcher role indicates a field independent approach, there are occasions upon which the interpersonal characteristics of a field dependent person may be valuable. Depending upon the nature of the research, involvement with other people may be great or minimal. When doing survey research or studies involving the observation of subjects, the researcher must persuade others to cooperate in the research effort. Permission must be gained to enter a classroom, for example. If the field independent researcher does not possess skills such as an interest in other people, tact, and the ability to talk and listen to others, he or she may discover that the necessary cooperation is missing.

Structured Work Setting

Several other aspects of the researcher role may suit a field dependent person. If the research situation is highly structured, with a clearly defined

progression of steps, a field dependent researcher may perform ably. If the individual works in a group research project, there will be others to consult in ambiguous situations in which the field dependent person may be unable to structure the information.

Administrator-Manager

A variety of dental health care settings utilize the services of an administrator-manager. Specific background knowledge and skills make the dental hygienist an ideal person for the role of administrator-manager (Thompson, 1989).

Data Analysis

At times, an administrator-manager must utilize numerical data to evaluate and modify specific dental health programs. For example, a dental hygienist who administers a school-based fluoride rinse program for the reduction of tooth decay may wish to evaluate the effectiveness of the program by studying yearly indices of decayed, missing, and filled teeth. Initially, the data will exist as undifferentiated groups of numbers. The dental hygienist must disembed the relevant data and restructure it into meaningful conclusions for the modification of the program.

The preference for working with abstract information and the ability to see part-whole relationships enables the field independent individual

to fit new ideas into the existing operation of a dental practice. Both field independent and field dependent persons may possess sufficient background knowledge of dental practice operations. However, a field independent person perceives and utilizes information differently than a field dependent person. A field independent person will be more likely to analyze new ideas and information, disembed the relevant aspects, and restructure them to complement the goals of the practice.

Problem-Solving Abilities

Problem solving is a primary responsibility of an administrator-manager. Problem solving involves the ability to identify alternatives, to go beyond the information given, to put structure on an ambiguous field, and to form and test hypotheses. All abilities are identified with the field independent extreme of the FD-FI continuum.

Interpersonal problems are inevitable when groups of individuals work together. Incidents which provoke disputes between employees frequently mask underlying personal problems. For example, a long-standing employee of a dental practice may resort to criticism of a new employee. The administrator-manager must go beyond the information given and recognize that the salient features of the situation may mask the true

cause of the conflict. An enhanced understanding of the problem also involves the ability to see part-whole relationships. If the older employee expresses insecurity in a variety of ways, the administrator-manager must recognize that a problem exists, identify the individual involved, and define its underlying cause. Such actions place structure upon the ambiguous situation.

In an attempt to resolve the problem, the administrator-manager may formulate alternate strategies or hypotheses. The employees in the earlier example may be assigned separate duties or shifts. Mature employees may be asked to resolve the problem on their own. Definition of a problem, identification of alternative strategies, and evaluation of the outcome parallel the hypothesis-testing approach to learning utilized by field independent persons.

Sense of Separate Identity

The role of administrator-manager requires definite self-nonsel self boundaries. Personal opinions may often be subordinated to the goals of the practice. A field independent individual is better able to resist the influence of other people and to function independently of the social field than a field dependent individual.

A field independent administrator-manager should be aware of potential shortcomings in the interpersonal area. Lack of qualities such as listening skills and concern for others may create a person who is viewed as aloof and uncaring. If specifically directed to do so, a field independent individual is generally able to direct attention to the interpersonal aspects of a situation and, therefore, to develop competency within the interpersonal realm.

Interpersonal Competencies

Interpersonal relations are an inescapable aspect of the administrator-manager role. The ultimate success of the role may lie more with adequate interpersonal relationships than with technical expertise. For example, a degree of sensitivity to the feelings of others will soften the impact of occasional unpopular decisions.

A field dependent person will be more likely than a field independent person to identify social cues from others. Social cues, although significant, are often unspoken. An example is the use of body language or facial expressions. A field independent administrator-manager may ignore social cues and risk alienation from others in the workplace.

Increased Learning over Successive Trials

In concept attainment, field dependence is associated with increased learning over successive trials of a problem. In the managerial context, learning over successive trials may be interpreted as learning from one's mistakes. The individual who possesses the ability to profit from mistakes possesses a field dependent quality which every administrator-manager should cultivate.

Change Agent

Whenever a dental hygienist identifies the need for and effects change, that person is functioning as a change agent. Changes may be small or great; they may enhance the work environment, aid in the meeting of personal and professional goals, or bring about a legislative mandate. Although certain field dependent characteristics may be useful, field independent qualities comprise the essence of the change agent role.

Refusal To Accept Situation as Given

The change agent does not accept the field, or situation, as given. There is, at the heart of the change agent's role, a discontent with some aspect of the status quo. Since a field dependent person tends to accept a situation as given, a change agent is more likely to be field independent.

Analytical Abilities

A change agent must recognize the need for change. Once the need is identified, the change agent must translate the need into a specific strategy for change. In terms of field dependence-field independence (FD-FI), the individual is providing structure to an ambiguous field. There is a greater likelihood that a field independent individual, rather than a field dependent individual, will be able to structure an ambiguous field or situation.

The change agent must identify and analyze the barriers to change. The components of the problem (i.e., barriers) must then be restructured to arrive at a meaningful plan of action. To be effective, the change agent must possess a flexible, rather than a rigid, style of processing information. The identification of alternative strategies to effect change is an example of a flexible style. Once change is affected, the individual must be able to evaluate, or analyze, the effectiveness of the change.

Participant Approach to Learning

The change agent most likely possesses an active approach to learning. When gathering information about the situation to be changed, the change agent will undoubtedly consult a variety of sources. Restructuring information also involves an active,

rather than a spectator, approach. There may be several strategies, or hypotheses, which are tested and discarded before one is accepted.

Self-Defined Goals

A change agent needs to have self-defined goals. This is because change is usually a slow process. In addition, if a person accepts goals defined by another, he or she may lack the impetus to press for change. Finally, goals must be redefined as the process of change continues.

An example might illustrate the field independent characteristics of the change agent. There is an increased interest in the detection and management of periodontal disease in the U.S. population. Many dental hygienists have instituted specific programs within private practices to address this chronic disease.

A dental hygienist has noticed that the periodontal status of certain patients has deteriorated in spite of routine cleaning of their teeth (need identification). The dental hygienist has learned about a specific periodontal maintenance program which, if instituted, would better address the patients' periodontal problems (need translated into specific strategy for change). However, the office manager of the dental practice, who must learn new procedures in order to schedule the patients into the program, has

demonstrated resistance to the program (barriers to change identified).

The dental hygienist has gathered information about the program through reading and observation of other dental hygienists who are utilizing the program (participant role in learning). In addition, the dental hygienist has identified several strategies to assist the office manager in learning the new protocol (identification of alternate strategies to effect change). One of these strategies may be writing a procedure manual for the manager's use.

Once change has taken place, the dental hygienist must evaluate the results of the change. Evaluation is an ongoing process. Analysis of the results of change provides an enhanced knowledge of fellow employees and a guide for future change (evaluation of change).

Maintaining Initial Position in Conflict Situations

If the process of change involves conflict, a field independent dental hygienist may experience difficulty achieving desired goals. This is particularly true if the change agent is perceived as being unconcerned about people. Difficulty may also occur if field independent individuals possessing opposing viewpoints are involved.

A field dependent person may be more likely to change opinion in a conflict situation. However, he or

she must not sacrifice the vital aspects of the goal in order to achieve consensus.

A field dependent person may be a valuable member of a group working for change, such as a legislative lobbying effort. There are numerous tasks, such as clerical duties, which contain high amounts of structure. Fellow workers provide external referents to consult when the situation becomes ambiguous. If personalities are a critical factor in a lobbying situation, a field dependent person may identify social cues which a field independent person would ignore.

Consumer Advocate

In the role of consumer advocate, the dental hygienist represents the interests of the public's oral health to individuals or groups who possess the authority to enact changes that affect those interests. In private practice, the dental hygienist has traditionally acted as liaison between the dentist and the patient (Thomson, 1989).

In order to act as a consumer advocate, the dental hygienist must possess strong field independent characteristics. Although advocacy implies caring about people, a characteristic associated with field dependence, field independence is necessary to effect change which will benefit the individuals concerned.

Analytical Skills

The analytical skills of the field independent individual comprise an important part of patient advocacy. Whether the dental hygienist acts individually or as a member of a group, he or she must be able to see part-whole relationships within a situation or problem. There must be an understanding of the overall situation, as well as the ability to analyze the relevance of its various aspects.

For example, technological advances in dental materials have resulted in the availability of a wide assortment of products and procedures that improve the appearance of the teeth. Questions from consumers about tooth bonding, bleaching, and stain-removing toothpastes are parts of the whole known as cosmetic dentistry. As a consumer advocate, the field independent dental hygienist must recognize the common concern for improved appearance underlying the various questions. Furthermore, he or she must select the relevant aspects of background knowledge and restructure them to apply to the question in a way that is meaningful to the patient.

The field dependent dental hygienist, who tends to view situations globally, may be less able to analyze or to see part-whole relationships within situations. He or she is more likely to accept the question at face

value and, therefore, may fail to provide consumers with the breadth of understanding that a more analytical response would engender.

Compared to a field dependent dental hygienist, the field independent dental hygienist is better able to analyze ambiguous situations and provide alternative strategies that benefit the consumer. For example, fear of dental treatment is a problem which affects approximately 35 million Americans (American Dental Association, 1986). Fear may cause certain individuals to postpone or refuse procedures that benefit oral health. Although many persons identify fear of pain as the primary dental-related fear, others may be unable to voice specific fears. The field independent dental hygienist, through careful questioning, is able to disembled the cause of an individual's reluctance to undergo certain procedures. He or she may then be able to suggest alternative strategies to meet treatment goals.

Maintaining Initial Position in Conflict Situations

Upon occasion, the dental hygienist may find it necessary to represent the consumer's interests in the face of opposition from other health care providers. An example is the support of legislation to prevent the legalization of reduced educational standards for

dental hygienists, advocated by certain segments of organized dentistry.

If conflict arises, a field independent dental hygienist will be more likely to adhere to an initial position than the field dependent dental hygienist. He or she will be more likely to identify the relevant arguments, to resist distraction by extraneous elements, and to possess a sense of separate identity. A sense of separate identity allows a person to feel secure about his or her knowledge of the situation.

Although a field dependent dental hygienist may possess as strong a sense of ethics as the field independent hygienist, the field dependent individual may elect to accept the prevailing situation. Therefore, he or she may not oppose a group opinion or office philosophy. Consensus may be easier for the field dependent person because he or she is less able to analyze the problem and to identify an alternate course of action.

Health Promoter-Educator

In the role of health promoter-educator, the dental hygienist will address attitudes and behaviors of individuals and groups which affect oral health. Although the traditional function of the hygienist as oral health educator has been the prevention of tooth

decay and periodontal disease, there is a trend to expand the focus to other lifestyle factors.

The health promoter-educator follows the dental hygiene model of assessment, planning, implementation, and evaluation. The health promoter-educator role requires both field independent and field dependent characteristics.

Effect of Structure

The assessment phase of a health promotion endeavor requires the systematic gathering of data from a variety of sources, such as medical-dental histories and interviews. Both a field dependent and a field independent dental hygienist may adequately gather data. The use of a structured format while obtaining the data may appeal to a field dependent hygienist, who displays a need for externally provided structure.

For example, a dental hygienist presenting a program on the oral effects of tobacco use to a small group of adult males in a mental health facility may utilize an interview format. The interview questions relate to the subjects' attitudes and knowledge about oral cancer warning signs. Compared to a field independent dental hygienist, the field dependent hygienist may be less likely to continue the line of questioning or to phrase a question in alternate ways. The field independent dental hygienist, on the other

hand, will be more likely to spontaneously structure the information as the interview proceeds.

Analytical Skills

Background knowledge, particularly in the biological sciences, is important for the health promoter-educator to possess. The specific information of a dental health program is identified from the undifferentiated body of background knowledge. When discussing a biopsy of the lip for suspected cancer, the health promoter-educator must include concepts from anatomy and physiology, the practice of oral surgery, and insurance procedures. The field dependent health promoter-educator will excel in the disembedding and analysis of pertinent facts and concepts from the scientific background.

Refusal to Accept a Situation as Given

An implication of health promotion is voluntary behavior change on the part of the person at whom the program is directed (Burt & Eklund, 1992). The health promoter-educator attempts to persuade the target individuals to make personal lifestyle choices to enhance oral health. Underlying the art of persuasion is the tendency not to accept the situation as given. For example, the field independent health promoter does not accept the fact that people will indiscriminately continue to smoke or chew tobacco. Therefore, the

health promoter-educator attempts to structure information in a way that contains psychological meaning for the individual. When there is psychological meaning, there is the likelihood of behavioral change.

Interpersonal Competencies

If the manner of a field independent dental hygienist is viewed as abrasive or condescending, he or she may inadvertently promote the continuance of the undesirable behavior, in spite of highly developed analytical abilities. A field dependent dental hygienist, with less well-defined self-nonsel self boundaries and a tendency to accept the situation as given, may be better able to promote behavioral change on the part of patients. Acceptance of the situation as given may be interpreted to mean that the hygienist accepts the validity of a person's statements. If the recipient of an oral health program views the health promoter as accepting and tactful, he or she may respond more to the health promoter's personality than to scientific expertise. Persuasion, to be effective, must be tempered with qualities such as warmth and understanding.

If the dental hygienist collaborates with other professionals in health promotion endeavors, the interpersonal skills, at which the field dependent

person excels, may determine the overall success or failure of the effort. In any group working toward a common goal, compromise may become necessary. An aloof manner or unyielding position in a conflict situation will hinder the group effort and isolate the field independent person from colleagues. A group member should employ tact, be an active listener, and avoid directing hostility at other members with whom he or she disagrees.

Summary

Chapter III has provided an analysis of the six roles of the dental hygienist to determine whether each role indicates a field independent and/or a field dependent approach. Although most of the roles may be enhanced by field dependent characteristics, the essential requirements of each role indicate a strong field independent approach. In particular, the role requirements call for the analytical ability associated with field independence. Analytical ability includes the ability to restructure a situation or to place structure if it is lacking, to see part-whole relationships, and to disembed relevant entities from a background field.

Field dependent characteristics of value in each role are primarily interpersonal competencies, which aid the dental hygienist in getting along with others.

Specific competencies include reduced self-nonsel boundaries, paying attention to social cues, and acceptance of a field or situation as given. Although the field dependent competencies are generally secondary to the field independent competencies in the execution of the tasks of each role, a lack of field dependent skills may seriously compromise the dental hygienist's effectiveness in the execution of the role.

CHAPTER IV

IMPLICATIONS, SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Chapter III provided an analysis of the field dependent and field independent aspects of the six roles of the dental hygienist. In relation to the analysis, there are a number of implications for dental hygiene education. This chapter will present the implications and recommendations for further study.

Implications

1. Dental hygiene preparatory programs will continue to accept applicants who occupy various positions on the FD-FI continuum. There are several reasons for this. First, dental hygiene programs do not presently include measures of FD-FI in their determination of qualified applicant status. Although applicant status is unknown, it is reasonable to assume that prospective students vary in their degree of field dependence or field independence. Second, the validity of FD-FI as a predictor of success in dental hygiene has not been established. Therefore, the likelihood that measures of FD-FI are utilized in most dental hygiene programs is remote. Finally, the small size of current dental hygiene applicant pools in most parts of

the U.S. may preclude the imposition of additional nonacademic requirements.

2. Within the six roles, the majority of the requisite skills are field independent in nature. In particular, analytic ability is a requirement of each of the roles. Therefore, the field independent dental hygiene student will possess an advantage in dental hygiene preparatory programs which emphasize the competencies of the six roles.

3. A dental hygiene student who occupies a mobile position on the FD-FI continuum will possess a greater advantage in the role-related dental hygiene education than a field independent student. This is because a mobile individual has access to qualities at each extreme of the continuum. He or she may possess the analytical ability associated with field independence as well as certain interpersonal competencies associated with field dependence. Therefore, the mobile individual will be better equipped to perform whatever competencies the roles require.

4. Education will not significantly alter an individual's degree of field dependence or field independence. However, efforts to strengthen specific behaviors that promote mobility on the FD-FI continuum are desirable.

5. Within a group of dental hygiene students, there will be individual differences in the degree to which the field independent and field dependent characteristics, required by each of the six roles, are present. Therefore, models and strategies to encourage the competencies either of field dependence or field independence should become an integral part of a dental hygiene instructor's teaching repertoire.

Joyce (1986) has compiled descriptions of educational models from the information-processing, personal, social, and behavioral systems families. Furthermore, he has identified the skills associated with each family of models. Joyce has advocated an approach, described for conceptual systems theory, which allows instructors to match a particular model to students' present skill level and lead them to the next desired level.

Models from the social family will benefit highly field independent students, who may need to develop interpersonal competencies. The Schaftel Role Playing model encourages students to focus on and express the feelings of others in a group situation. The Thelen Group Investigation model promotes academic inquiry in a social learning atmosphere. Skills from other domains, such as problem solving, may be developed in addition to the interpersonal competencies.

Models from the information-processing family may benefit field dependent students. Most dental hygiene programs rely heavily upon lecture and reading to impart information. Models are needed which provide structure to large amounts of unstructured material in the basic sciences, such as anatomy and physiology, and the dental hygiene sciences. Two models which enable teachers and students to structure academic material are Ausubel's Advance Organizer model and the Memory model. In addition, the Memory model teaches students to structure information on their own (Joyce, 1986).

6. Dental hygiene instructors must become familiar with the FD-FI construct and its manifestations in the perceptual, intellectual, and personality aspects of individuals' lives. There is an abundance of literature available on the topic of FD-FI in postsecondary education.

7. In academic course work, dental hygiene educators should strive to provide structure for field dependent students. This is because field independent students are able to utilize whatever degree of structure is present. If a structured format to academic material will enhance the conceptual understanding of dental hygiene subject matter, it should be provided whenever possible.

8. If FD-FI constitutes an important aspect of the six roles, then dental hygiene students should be tested for their degree of field dependence or field independence. The tests for FD-FI display adequate validity and reliability and are easy to administer (Blackman & Goldstein, 1982; Melancon & Thompson, 1989). Testing may be performed as part of the application process or during the initial weeks of the academic program. The former option has the advantage of allowing students to be counseled prior to entrance into the program.

Results of the tests of FD-FI should not become entrance requirements. The results may be used to counsel entering students, in the same way that results of standardized tests of academic ability are used to advise students of the probability of success in a specific program of study. Along with other information, the test results may also be used to diagnose specific student problems related to the requirements of the six roles. If the characteristics of the FD-FI continuum constitute a substantial factor in the successful execution of the six roles, then students should be advised accordingly.

9. If the field independent approach to learning constitutes a more adaptable way of functioning, as Kogan (1977) has suggested, then FD-FI cannot be

considered a completely value-free construct. If a strongly field dependent dental hygiene student is likely to be unable to perform the roles, which require well-developed analytical abilities, this fact may carry the same negative connotations as that of low academic ability. Dental hygiene educators must consider the ethical implications of encouraging a highly field dependent student to enter the dental hygiene profession.

10. Incorporation of the curriculum related to the six roles will place an additional burden on many dental hygiene programs, which currently possess academically rigorous programs of study and high numbers of credit hours. There will be a need to restructure current curricular offerings, with elimination of dental hygiene functions which are obsolete or incompatible with the philosophy of the six roles. A lengthening of the educational period may be indicated. A baccalaureate degree for entry into the dental hygiene profession is a resolution of the American Dental Hygienists' Association since 1986 (Walsh et al., 1988).

11. If dental hygienists wish to advance the profession, then individual dental hygienists must pursue lifelong learning. Successful lifelong learning is more apt to occur when students learn in their

preferred mode. If a person knows his or her degree of field dependence or field independence, that person is better equipped to select learning approaches which are compatible with his or her position on the FD-FI continuum.

Summary

The six roles of the dental hygienist have been examined in relation to the field dependence-field independence construct. Field dependence-field independence is an appropriate vehicle by which to examine the six roles. This is because the construct has been widely researched, has many relevant educational applications, and is evident in numerous areas of an individual's life. Field dependence-field independence may be applied to other aspects of the six roles. These aspects have not been addressed in this paper. Within each role, however, the analysis examined several requirements which are believed to constitute the essence of the role.

Applications of FD-FI have relevance for health occupations education. The final chapter has outlined relevant implications for education in a specific occupation, dental hygiene.

Recommendations

Further study of the relationship of the FD-FI construct to the dental hygiene profession is

warranted. Several areas offer the opportunity for future research:

1. Academic ability is a requirement for admission to, and success in, dental hygiene preparatory programs. Current admissions criteria for most dental hygiene preparatory programs include high school or college GPA, high school class rank, and composite scores on the ACT or SAT examinations. One or more of the above-stated measures may be correlated with results of tests of field dependence-field independence, such as the Embedded Figures Test.

2. Research may be conducted to examine the relationship between the degree of students' field dependence or field independence and success on standardized dental hygiene licensure examinations. Specifically, studies may correlate scores on tests such as the Group Embedded Figures Test with scores on the Dental Hygiene National Board Examination.

3. Witkin, Moore, and Oltman et al. (1977) have noted that students tend to select and continue in careers which are consistent with their degree of field dependence or field independence. Studies may be conducted which correlate the level of stated career satisfaction, the number of years of employment in dental hygiene, and the graduate dental hygienist's degree of field dependence or field independence.

4. The results of previous research, as well as the analysis provided by this paper, indicate that there is a relationship between field dependence and success in the dental hygiene profession. Studies are needed which will ascertain the degree of field dependence or field independence of dental hygienists who have achieved success in the various aspects of the dental hygiene profession.

5. Individual classes of dental hygiene students should be tested for their degree of field dependence or field independence. Knowledge of FD-FI and its relationship to the six roles will enable dental hygienists to better recognize their individual positions on the FD-FI continuum. Therefore, they will be able to select the roles and employment settings which complement their degree of field dependence or field independence.

The selection of, and preparation for, an appropriate career represents an increasingly costly undertaking for individuals. Research which will aid in the achievement of career success is continually in demand.

Conclusions

When viewed from the context of the six roles, dental hygiene is a profession which will require individuals with a considerable degree of field

independence. The analytical approach of field independence is a primary requirement in the majority of the roles.

The characteristics of field dependence, particularly in the interpersonal competencies, enhance the performance of each role. However, a profession is more than interpersonal skills. All professions require a high degree of ability to analyze, make judgments, and solve problems. The above-stated abilities come from the field independent end of the bipolar continuum. Through the appropriate use of educational models and strategies, dental hygiene educators should attempt to enhance the interpersonal skills associated with field dependence without compromising the analytical skills of field independence. An ideal dental hygienist, performing the six roles, would occupy a mobile, rather than a fixed, position on the continuum.

Incorporation of the six roles into dental hygiene education is a step in the direction of professional advancement. Utilization of the FD-FI construct to examine the roles and to identify appropriate teaching models and strategies is a logical starting point.

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