INTERPERSONAL COMMUNICATION BEHAVIOR OF PEDIATRIC NURSES

by

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To my good
friend, Agnes Bard,
with great
appreciation
and all good
wishes,
Jane Fowler
1986

This Thesis for the M.S. degree by

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Interpersonal Communication Behavior of Pediatric Nurses. Thesis directed by Associate Professor Opal H. White and Assistant Professor Margaret A. Berry

The problem of this study was to determine if nurses' communication behavior could be measured according to four postulated levels of communication; and if the distribution of the use of these levels indicated that there were reactive nurse communicators and restrictive nurse communicators.

The method of study was descriptive-survey with non-participant observation and the use of a personal inventory form the techniques of data collection.

A random sample of nurses on a pediatric unit were observed as they gave direct nursing care. The guide for observation of communication behavior was developed by Roy E. Buehler and Jo F. Richmond and consisted of four primary levels of communication (Biochemical, Motor gesture, Speech, and Technology), and their categories.

The findings of the study indicated that: (1) the Interpersonal Communication Behavioral Analysis described by Buehler and Richmond could be used to observe, and record communication behavior of nurses in the pediatric nursing situation; (2) the four levels of communication were independent units; (3) the nurses in the sample could be described as restrictive communicators because of their infrequent use of certain communication behaviors;

(4) the sample seldom used body contact when communicating with the children and played infrequently with them; (5) on the average the nurses communicated with children only 51 per cent of the time they were with them, giving nursing care.

Recommendations were made that studies be conducted to examine factors involved in the nurses infrequent use of certain communication behavior, and that consideration be given to adapting the Interpersonal Communication Behavior Analysis for use as an evaluation tool of nurse effectiveness, in selection of personnel, and as a teaching tool in the therapeutic use of one's self.

This abstract of about 250 words is approved as to form and content. I recommend its publication.

Signed Opal H. White
Instructor in charge of thesis

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CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS

Nursing was seen by some individuals as being an interpersonal process. This process involves how the nurse communicates with patients, and how she receives and responds to communication of patients. There has been a growing trend in the nursing profession which recognizes the importance of the nurse's communication behavior. This trend was reflected in the literature dealing with the use of the self in therapeutic nurse-patient relationships.

There has been an emphasis in the literature concerned with therapeutic nurse-patient relationships on the nurse's ability to understand herself, and thereby, to be more effective in communicating with patients. Some attention has been given to how nurses communicate. This was reflected in the literature which was concerned with non-verbal, as well as verbal communication. The emphasis, however, has tended to center on the verbal communication of patients and nurses. Much attention has been given to such concepts as rapport, empathy, acceptance, support, and trust. Sometimes it has been difficult to ascertain just how the nurse communicates such feelings and attitudes. Unless the behaviors through which feelings and attitudes are communicated are specified, the nurse must depend upon her intutitive sense rather than upon scientifically verified knowledge.

It was felt that observation of just how nurses communicate may reveal what interpersonal communication behaviors are involved in successful and unsuccessful communication with patients.

I. THE PROBLEM

Statement of the problem. The problem of this study was to determine if nurses' communication behavior could be measured according to four postulated levels of communication;[1] and if the distribution of the use of these levels indicated that there were reactive nurse communicators and restrictive nurse communicators.

Need for the study. The need for this study was based on the assumption that a description of nurses' communication behavior would add to the body of knowledge concerned with interpersonal processes in nursing. The usual description of interpersonal communication in the literature was a division of communication into verbal and non-verbal behavior. Non-verbal communication, however, includes a wide range of behaviors which, for the sake of scientific and professional preciseness needs to be broken down into more practical units. Such a breakdown was suggested by Buehler and Richmond. They have developed an interpersonal communication behavior

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[1] Jo F. Richmond and Roy E. Buehler, "Interpersonal Communication: A Theoretical Formulation," The Journal of Communication, 12:5, March, 1963.

analysis method in which four primary levels of communication behavior were used.[2] These include; biochemical, motor gesture, speech, and technology.

This study has focused on determining if nurses' communication behavior could be measured according to these four levels of communication behavior; and if the differential use of these four levels of communication by nurses could be described in terms of reactive communicators and restrictive communicators.

Purposes of the study. The purposes of this study were to:

(1) Determine whether the interpersonal communication behavior of nurses could be observed, measured, and recorded in terms of the four postulated levels of communication.

(2) Determine if two major types of communicators could be identified.

(3) Add to the body of knowledge concerning nurses' interpersonal communication behavior.

(4) Find cues indicating the value of further studies to investigate if reactive communicators are more effective in attaining goals in nurse-patient relationships (including physical care).

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[2] Ibid.

Scope and limitations. This study included observations of communication behavior of professional nurses on a pediatric unit. The nurses were observed as they gave direct care to children. Children were used because it was assumed they would provide a wider variety of communication behaviors to which the nurses could respond.

Limitations of this study include: the size of the sample; the wide age range of children cared for by the nurses in the sample; the range of nursing activities observed; and the fact that only one observer collected data for the study.

There were ten nurses in the sample, and this was about one-third of the nurses on the pediatric unit. Children of various ages were cared for by the nurses in the sample. The policy regarding admission age of children to the pediatric unit where the study was conducted is as follows: children ages eighteen months through fourteen years are admitted to the unit. This age is, however, highly flexible for children who have previously been patients at the medical center. The decision as to which unit such a child would be admitted is dependent on the child's need to be cared for by the staff that has cared for him in the past. There was no attempt in this study to compare possible differences in the communication behavior of nurses as they cared for children of different age levels.

No conscious attempt was made to always observe the nurses in the same types of nursing situations,

however, because they allowed the investigator an opportunity to plan periods of observation, such activities as giving medications and taking vital signs (blood pressure, temperature, pulse, and respiration) were used. This study did not attempt to analyze the possible differences observed in communication behavior of nurses in various types of nursing situations.

A final limitation of this study might have been that only one investigator collected observations. It was not, therefore, possible to check inter-observer reliability, however, preparation for observation did allow the investigator to validate the constancy of her observations.

Assumptions. In this study the following assumptions were made:

(1) Interpersonal communication may be defined as transactions between and among people.

(2) These transactions may be observed as behavior.

(3) These interpersonal communication behaviors occur on four primary levels.

Hypotheses. The hypotheses of the study were:

(1) Nurses' communication behavior can be differentiated into four primary levels of communication behavior; biochemical, motor gesture, speech and technology.

(2) Nurses' differential use of the four primary levels of communication may be described in terms of reactive communicators and restrictive communicators.

II. DEFINITION OF TERMS

Interpersonal communication behavior. All behavior involved in human-with-human transactional processes.

Transactional process. "Open biological systems in circular, participative, reciprocal and functional relations, both intra-organically and inter-organically."[3]

Nurse. A registered professional nurse.

Nursing situation. The length of time between the nurse reaching the child, giving care, and leaving him. Spontaneous interpersonal interactions were seen as nursing situations, as well as such nursing activities as giving medications, taking vital signs, helping with personal hygiene.

Levels of communication.[4]

The following are brief definitions of the four primary levels of communication. See Appendix C for complete definitions of the levels and their categories.

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[3] Roy E. Buehler and Jo F. Richmond, "Interpersonal Communication Therapy," (unpublished paper, Salem, Oregon, December, 1963), p. 6.

[4] Richmond and Buehler, "Interpersonal Communication: A Theoretical Formulation," op. cit., p. 5.

I. Biochemical--behavior which can be considered, by direct observation, to be either body contact with another person or affect.

II. Motor gesture--movement of the organism as a whole or any muscular or skeletal part.

III. Speech--any oral utterance which is classified as language or a language substitute.

IV. Technology--active use of any instrument which is culturally defined as a communication tool.

Reactive communicators. Subjects whose communication behavior is distributed among all four levels without primary emphasis on any one level.

Restrictive communicators. Subjects whose total communicative acts tend toward concentration mainly on a single level of communication.

III. INTRODUCTION TO METHODOLOGY

The descriptive survey was the method used for this study of communication behavior of nurses as they cared for children. Non-participant observation and the use of a personal inventory form were the techniques for data collection. The communication categories used for observation were described by Buehler and Richmond.[5]

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[5] Ibid.

IV. SUMMARY

This chapter has included an introduction to the problem. A primary assumption underlying this study was that the practice of nursing involves the utilization of interpersonal communication processes. A description of the communication behavior of nurses as they care for children, thus, should add to professional knowledge. It was pointed out in this chapter that the approach to the observation of communication utilized in this study was more inclusive than an approach which considers only verbal and non-verbal behavior.

CHAPTER II

REVIEW OF THE LITERATURE

Lee O. Thayer indicated the complexity of reviewing the literature concerned with communication when he said:

> Even a cursory examination of the communication 'literature' will reveal an almost infinite variety of problems and topics dealt with under the rubric of 'communication.' Surely it must be obvious that a single concept cannot usefully cover phenomena of such diverse nature as 'a communication' (what goes on between the 'black boxes' in a computor), 'a communication' (what the female partridge does during a mating season), 'a communication' (an attempt to modify attitudes), 'a communication' (the process of 'information' storage and retrieval), and on and on. These are but random, and are not extreme, examples. In the last six years of the literature, I count more than 25 conceptually different referents for this term![1]

The investigator realized the necessity of indicating the specific frame of reference underlying this study on communication behavior of pediatric nurses, and to limit the review of literature to that frame of reference. The frame of reference of this study was the Interpersonal Communication Analysis developed by Buehler and Richmond.[2] Some references on such communication behaviors as body

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[1] Lee O. Thayer, "On Theory-Building In Communication: Some Conceptual Problems," The Journal of Communication, 13:219, December, 1963.

[2] Roy E. Buehler and Jo F. Richmond, "Interpersonal Communication Behavior Analysis: A Research Method," The Journal of Communication, 13:146-155, September, 1963.

contact and motor gesture which are necessary for normal human development and life will be reviewed in this chapter. Much of the nursing literature on interpersonal communication dealt with verbal aspects of communication. A brief review of the nursing literature which included the importance of nonverbal behavior will be made.

Interpersonal Communication Analysis. Two of the constructs on which the Interpersonal Communication Analysis was based were: (1) "the biological basis for communication as a process necessary for biosocial survival and maturation,"[3] and, levels of communication. Buehler and Richmond described communication as a process necessary for the integration of the human organism, both intra-organically and inter-organically, when they said:

> We emphasize communication as a process because it is a common denominator in human behavior. Its forms vary from culture to culture, but its function is the same among all humans. Recent developments among the biological and social sciences suggest that many systems involved in the human organism and in human behavior are functionally related through transactional processes and these processes may be defined as communication processes. In this sense communication functions to integrate these various smaller systems into the whole organism and the organism into its environment.[4]

Grinker has elaborated on the human sub-systems which are inter-dependent on each other as they function

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[3] Ibid., p. 146.

[4] Jo F. Richmond and Roy E. Buehler, "Interpersonal Communication: A Theoretical Formulation," The Journal of Communication, 12:4, March, 1962.

internally and with the environment:

> Let us assume that the human organism at some time comprises an undifferentiated functional system in transaction with its environment. Out of these are differentiated many small systems which remain under the potential dominance of the whole, but which are linked with each other in a circular process of transaction just as the total organism is related to its environment, society and culture. Each system serves as the environment of the other.[5]

Grinker has written about five systems which comprise human behavior, they are: 1) the enzymatic system including the hormones; 2) the organ system; 3) the nervous system; 4) the psychological system; and 5) the sociocultural system.[6] Grinker has said, "The living boundaries between these systems are ill-defined, variable and dependent upon the transactions occuring at any particular time and place."[7]

Buehler and Richmond saw the concept of levels as being useful in identifying major differences among communication behavior and in studying the cumulative changes within any system.[8] They have pointed out that the human sub-systems when functionally related contribute toward integration of the whole organism, but that the parts have developed differently and, therefore, represent different degrees of complexity.[9]

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[5]Roy R. Grinker, "The Interpersonal Organization," Toward A Unified Theory of Human Behavior, ed. Roy R. Grinker (New York: Basic Books, 1956), p. 4.

[6]Ibid.

[7]Ibid.

[8]Buehler and Richmond, op. cit., p. 147.

[9]Ibid.

Interpersonal communication was seen by Buehler and Richmond as having a developmental function in human life. Transactional processes which are necessary for the maintainence of fetal and neonate life are extended into the whole life of humans. Mother-fetal transactional processes were seen as being biochemical. Motor gesture transactions are combined with biochemical transactions in the young infant, these processes form the bases for the development of symbolic processes in later life.[10]

Studies by Frank, Harlow, Blauvelt, Mead, and Birdwhistell point out the necessity for such communication behaviors as body contact and motor gesture. These studies will be reviewed in this chapter. However, the work by Buehler and Richmond though based on findings of the above authors, offers a theoretical framework and research method that is not limited to one or two types of communication behavior. They have said:

> Its [Interpersonal Communication Analysis] uniqueness lies in the fact that any observable behavior occurring between two or more persons can be ordered to a categorical system representing biosocial processes and the behavioral differences can then be analyzed in terms of levels. It provides, therefore, a molar rather than a molecular analysis of an individual's selective and adaptive interpersonal communication behavior.[11]

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[10] Richmond and Buehler, op. cit., pp. 5-7.

[11] Ibid., p. 148.

Body Contact. Frank has seen the skin as a highly complex and versatile communication organ which has an immense range of functional operations and a wide repetory of response. The author indicated that these functions of the skin could only be understood by assuming a more richly endowed sensory-nervous system than the warm-cold, pain-pressure categories.[12] Frank has said:

> . . . probably the sympathetic innervation of the sweat glands and capillaries is conductive to the viscera and perhaps to other organ systems. Insofar as capillary dilation and constriction by cold or warmth either initiate or accelerate alterations in the circulation of the blood, tactile stimulation--especially rhythmic caressing--may prove a major component of the homeostatic process. A person in fear or pain may recover his physiological equilbrium though tactual contacts with a sympathetic person.[13]

Frank has written that tactile sensitivity appears early in fetal life. The fetus adjusts to tactile sensations in the uterus, i.e., the mother's heart beat and his own heart beat. Then at birth the newborn experiences sensations of pressure and constriction. The infant responds to his mother's nuzzling and patting by fingering her body. The body contact between mother and infant soothes him and provides him with warmth. Frank indicated the necessity of tactile experience through body contact when he said:

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[12] Lawrence K. Frank, "Tactile Communication," Explorations in Communication, eds. Edmund Carpenter and Marshall McLuhan (Boston: Beacon Press, 1960), pp. 5-6.

[13] Ibid., p. 9.

> Deprivation of such experiences may comprise the infant's future learning, particularly of speech and indeed, of all symbolic systems, including more mature tactile communication. If severely limited in these experiences he must wait until his capacities for visual and auditory communication are developed with others. Such a child may become unusually dependent upon the authority of his parents and overly obediant to their pronouncements; he will lack the experience of prior communication, and he may find the sudden jump not only difficult but conducive to unhealthy relationships.[14]

Studies by Harlow have supported the necessity of body contact in the normal development of monkeys. Early studies by Harlow indicated that contact with a soft inanimate terry-cloth "mother" would enable normal development,[15] but follow-up studies indicated that monkeys raised with terry-cloth "mothers" were socially and sexually maladjusted.[16] Monkeys, as well as humans, have to learn through transactional processes with members of their species, many behaviors necessary for survival.

Motor gesture. Observations by Blauvelt of mother goat and kid behavior indicated the importance of motor gesture behavior and body contact. She described the many necessary and specific movements that the kid and mother go through in establishing a feeding pattern. The pair

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[14] Ibid., p. 9.

[15] Harry F. Harlow, "Love in Infant Monkeys," Scientific American, 200:68-74, June, 1959.

[16] Harry F. Harlow and Margaret K. Harlow, "Social Deprivation in Monkeys," Scientific American, 207:137-146, November, 1962.

move in harmony with one another, each setting up behavioral cues requiring the response of the other. If for some reason, this orientation process is interrupted, the infant may starve. Body contact as well as motor gesture behaviors are necessary.[17] Blauvelt has also observed the behavior of human mothers with their infants. She has said, "Just as our animals do, the human mother sends her baby cues and signals long before he can respond, but to which he will later respond."[18]

Schneirla in an evaluative statement of Blauvelt's work, pointed out the indications of the reciprocal nature of mother-infant transactions. He said:

> In addition to the specific physiological factors of obvious survival value, there is an encompassing set of interrelationships developing progressively from its beginning in the normal parturitive situation. This is the process depending upon stimulative interchange between mother and young, which rather soon . . . expands and elaborates into what we may call a psychological bond. The later form of attachment is a perceptual one, but it has its basis in the physiological processes centering around early stimulative interchange which holds the pair together.
> . . . the social bond between mother and young may be considered physiological initially and at basis, and the parturitive relationship the springboard from which the participants are launched into a more complex, higher level situation. In mammals what develops is a 'psychosocial' relationship . . . The process is still a reciprocal stimulative one . . .[19]

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[17]Helen Blauvelt, "Dynamics of the Mother-Newborn Relationship in Goats," Group Processes, ed. Bertram Schaffner (New York: The Josiah Macy Foundation, 1954), pp. 221-258.

[18]Helen Blauvelt, "Maternal-Neonate Relationship," Group Processes, ed. Bertram Schaffner (New York: The Josiah Macy Foundation, 1956), p. 128.

[19]Blauvelt, "Dynamics of the Mother-Newborn

Mead saw the recognition and response to gestures as being the basis of social interaction, and he saw the development of speech as an out-growth of earlier motor gesture communication.[20]

Birdwhistell reported on a study of the kinesic communication behavior of a group of adolescents. Kinesic behavior was defined by Birdwhistell as the visual aspects of body movement,[21] this definition was comparable to Buehler and Richmond's use of the term motor gesture. Birdwhistell found that the boy who was seen by his peers as the leader of the group, said very little. In spite of his infrequent vocalization, he was seen as a good conversationalist. "Kinesiological analysis of this boy revealed that he was a 'good listener.' His responses were seldom meta-incongruent, he steered the conversation with face and head movements, and he seldom engaged in leg and foot 'jiggling' which generally conveys a meaning of restlessness, malaise, or negation."[22]

Nursing literature on non-verbal communication. Much of the nursing literature which dealt with therapeutic nurse-patient relationships focused on the use of

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Relationship in Goats," op. cit., p. 228.

[20]George H. Mead, Mind, Self and Society (Chicago: The University of Chicago Press, 1934), pp. 42-82.

[21]Ray L. Birdwhistell, "Kinesics and Communication," Explorations in Communication, eds. Edmund Carpenter and Marshall McLuhan (Boston: Beacon Press, 1960), p. 54.

[22]Ibid., p. 63.

verbal behavior. There was emphasis on the nurses awareness of her own feelings and the effect of her behavior on the patient, but a primary goal implied in the literature was helping the patient to verbalize his feelings. Some authors point out the importance of communication behaviors other than speech.

Brown and Fowler saw nursing as a "process of verbal and non-verbal interaction directed toward the healthful status of the recipient within an institution, an agency or the community."[23] These authors defined non-verbal communication as " . . . the attitudes, feelings, and thoughts that we convey either intentionally or unintentionally through such media as our posture, gestures, facial expression, vocal tone and inflections."[24]

Shalit, in her article, "The Silent Language,"[25] quoted the definition of that phrase from Hall's book of the same name. Hall stated, "In addition to what we say with our verbal language we are constantly communicating our real feelings in our silent language--the language of behavior."[26]

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[23] Martha M. Brown and Grace R. Fowler, Psychodynamic Nursing: A Biosocial Orientation (Philadelphia: W.B. Saunders Company), 1961, p. 5.

[24] Ibid., p. 88.

[25] Pearl R. Shalit, "The Silent Language," Journal of Psychiatric Nursing, 2:296-297, May-June, 1964.

[26] Edward T. Hall, The Silent Language (New York: Fawcett World Library, 1959), p. 10.

Shalit asked, "How much interpersonal communication is on this level?" In answer to her question she said:

> Verbal expression, like the iceberg, may be the piece which is visible above the sea. The greatest part is hidden under the surface. Verbalization is only a small part of the individual's total reaction to his environment. Often the nonverbal reactions, the language of behavior, body movements, gestures, facial expression, etc. are definitely more communicating than the spoken word. Interaction between two human beings, . . . depends on understanding the sum total of all forms of communication.[27]

The importance of observing nonverbal communication was pointed out in separate articles by Ball and Badgely. Ball was interested in the observation of nonverbal behavior in an effort to gain understanding of the meaning behind the behavior;[28] and, Badgeley was interested in learning the needs of children through their nonverbal behavior.[29]

Greenhill saw body contact as a communication behavior which could be used to facilitate verbal communication. He stated:

> Physical contact seems to act as a powerful catalyst in communication. Nurses, in practicing their manual skills, have a legitimate reason to 'lay on' hands and can put this feature to use in attaining their goals. We have encouraged nurses, therefore, not to dichotomize interviewing and manual skills but to use them simultaneously. Sometimes, in fact, the

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[27]Shalit, op. cit.

[28]Geraldine Ball, "Speaking Without Words," American Journal of Nursing, 60:692-693, May, 1960.

[29]Elizabeth W. Badgeley, "Making Friends With Children," American Journal of Nursing, 57:1558-1560, December, 1957.

> nurses main purpose in rubbing a patient's back may be to strenghten the verbal interaction between she and the patient.[30]

Summary. The review of literature in this chapter dealt with the theoretical bases for the development of the Interpersonal Communication Analysis;[31] and with some studies which support the importance of such communication behaviors as body contact and motor gesture. Communication behavior was seen as a transactional process on and among various levels of communication.

This chapter included a review of some nursing literature which recognized the importance of communication behavior other than verbal behavior. This literature tended to emphasize the importance of observing and understanding the patient's nonverbal behavior, rather than the nurse's use of various communication behaviors in transactional processes with patients.

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[30] Maurice H. Greenhill, "Interviewing With A Purpose," American Journal of Nursing, 56:1261, October, 1956.

[31] Buehler and Richmond, op. cit.

CHAPTER III

METHODOLOGY

This study was designed to determine if nurses' communication behavior could be measured according to the four levels of communication described by Buehler and Richmond,[1] and to determine if the differential use of these levels of communication could be descriptive of reactive communicators and restrictive communicators.

I. METHOD OF STUDY

In relation to the need and use of descriptive studies, Good and Scates have said:

> . . . one must always be concerned with structure and with properties, whether he is dealing with materials and forces of physical and biological science or with groups and dynamics of social science. Description tells us what we reckon with. . . . we all have a general need for knowing what the world is like, simply in order to live in it, to try to understand it, to make adjustments to reality, to carry on our daily work.[2]

Good and Scates have defined descriptive studies as those which "purport to present facts concerning the nature and status of anything--a group of persons, a number of objects, a set of conditions, a class of events,

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[1] Jo F. Richmond and Roy E. Buehler, "Interpersonal Communication: A Theoretical Formulation," The Journal of Communication, 12:5, March, 1963.

[2] Carter V. Good and Douglas E. Scates, Methods of Research (New York: Appleton-Century-Crofts, Inc., 1954), p. 256.

a system of thought, or any kind of phenomena which one may wish to study.[3] Hillway has said, "The survey, or descriptive study is a process for learning pertinent and precise information about an existing situation."[4]

Good and Scates indicate that almost all research might be considered, in a broad sense, to be descriptive. But they point out that this takes away the distinctive meaning of the term descriptive study. "It seems better to restrict the term to those studies which are concerned with general nature and standing . . ."[5]

The descriptive survey was selected as the method for this study because the study was concerned with learning more about an existing situation. Although the study was concerned with determining if the communication behavior of nurses could be classified into two groups of communicators, the first purpose of the study was to observe, measure, and record just how a group of nurses communicate.

II. TECHNIQUES OF DATA COLLECTION

Observation

Descriptive studies are not limited to any one

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[3] Ibid., p. 259.

[4] Tyrus Hillway, Introduction to Research (Boston: Houghton Mifflin, Co.), 1956, p. 197.

[5] Good and Scates, op. cit., p. 259.

method of data collection. They may employ such methods as interviews, questionnaires, systematic direct observation, analysis of community records, and participant observation.[6] Observation was one of the techniques used in this study because the investigator was interested in the overt behavior of individuals. Brown stated that, "If the investigator is interested in the overt behavior of individuals, he may use observation, as it is the most direct means of studying subjects."[7] Good elaborated on observation as a direct means of studying individuals:

> Observation, as a general rule, is concerned neither with what a respondant places on paper nor with what he says in an interview, but deals with the overt behavior of persons in appropriate situations, sometimes under conditions of normal living and at other times with some special set of factors operating. In a questionnaire or interview, the respondant may tell you what he thinks he does, but human beings are not generally accurate or reliable observers of themselves. Only direct observation of overt behavior can reveal what the subject actually does.[8]

Non-participant observation was the type of direct observation utilized in this study. Good indicated that the non-participant observer should take a position where his presence is not disturbing to the subjects.[9] The

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[6] Claire Selltiz, et al., Research Methods in Social Relations (New York: Holt, Rinehart and Winston, 1963), p. 66.

[7] Amy Frances Brown, Research in Nursing (Philadelphia: W. B. Saunders Co., 1958), p. 191.

[8] Carter V. Good, Introduction to Education (New York: Appleton-Century-Crofts, 1963), p. 302.

[9] Ibid., p. 308.

effect of the non-participant observer on subjects will be discussed later in relation to limitations of the observation technique and preparation of subjects for the study.

Characteristics of observation. Good and Scates have identified six characteristics of observation:

1. The observation is specific centered upon carefully defined things to be observed.
2. Observation is carried out in a systematic manner. The length of observation periods, the intervals between them, and the number have been carefully planned.
3. The observation is quantitative, usually with a tally of the number of instances a certain type of behavior occurs, sometimes with a record of the total duration of the particular conduct during the period of observation.
4. A record of the observation is made immediately, or as promptly as possible.
5. The observer has had sufficient training to make it possible to produce valid results.
6. The results of systematic observation of behavior can be checked by comparing the results of different observers or by repeating the study.[10]

The first five characteristics of observation were met in this study and will become evident in the section dealing with observation plan, guide, and recording. The sixth characteristic was not met in this study, since there was only one observer, however, preparation for observation allowed the investigator to validate the constancy of her observations.

Limitations of observation. Rummel has written about the limitations of observation. These limitations will be discussed in relation to this study. The first

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[10] Good and Scates, op. cit., pp. 648-649.

is, "The possibility of persons, knowing they are being observed, deliberately trying to create favorable or unfavorable impressions on the observer."[11] It was recognized by the investigator that her presence as an observer was possibly introducing another variable into the observational setting. One source has pointed out that people seem to get used to the observer if the behavior of the observer convinces the group members that they are no threat.[12] One way of decreasing the possibility of group members feeling threatened by the observer is to provide adequate preparation of the sample members.[13] Therefore, an orientation period was spent with some members of the population, and a brief explanation was given to each member the first time she was observed. Permission to observe a nurse as she carried out her activities was always sought. It was felt that at least one member of the nurse population felt threatened and/or annoyed by the behavior of the observer.

A second limitation of the observational technique is that sometimes the spontaneous occurrence of an event cannot be predicted so the observer can be present to

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[11] J. Francis Rummel, An Introduction to Research Procedures in Education (New York: Harper & Brothers, Publisher, 1958), p. 74.

[12] Selltiz, et al., op. cit., p. 234.

[13] Ibid., p. 233.

observe it.[14] This was found to be true in this study and there was therefore, a lot of time consumed in waiting for events. This limitation was solved to some extent by more careful planning for observation time.

A third limitation discussed by Rummel was that "Some occurrences may be reported by subjects through interviews or correspondence which would rarely, if ever, be accessible to direct observation, such as the various private and personal events of peoples lives."[15] This limitation was not present in this study because the study was concerned with observable communication behavior of nurses in a pediatric setting, and not with aspects of the private lives of the nurses.

Personal inventory form

The personal inventory form appears in Appendix A. The purpose of this form was to gain some information about such characteristics of the nurses in the sample as, age, educational background, past experience in nursing, and preference of areas of nursing. Each nurse in the sample completed the form.

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[14] Rummel, op. cit.

[15] Ibid.

III. COLLECTION OF DATA

Source of data. The study took place on a twenty-six bed unit of a university medical center hospital in the Rocky Mountain area. A letter asking permission to conduct the study was sent to the Director of Nursing Service of the hospital, (see Appendix B). A conference was held with the director to explain the purpose of the study and to discuss the feasibility of conducting the study in the hospital. Verbal permission was granted by the Director, and was obtained from the supervisor and head nurse on the pediatric unit.

The physical setting of the unit is laid out along a central hall. There are rooms, both single and ward for the pediatric patients, a treatment room, linen closets, and kitchen off the hall. In the center of the hall to one side, there is a very small nurses station. The unit is entered through double doors at one end of the hall, at the opposite end of the hall, there is a large playroom. The playroom is well equipped with toys, and the children are able to select most toys from a large toy chest and low shelves. The room has small chairs around low tables for children, and there are rocking chairs and straight back chairs for adults. A television set is mounted on a high shelf in one corner and is visible from any place in the room.

At the time of the study the staff on the unit was composed of professional nurses, nursing attendants,

and two individuals who acted as play directors. The teacher worked during the day and assumed the role of playing with children and supervising volunteer workers because the position of play director was vacant at the time of the study. The male attendant worked during the evening and spent his time playing with groups of children. According to the job description for the male attendant on the pediatric unit, he was to provide male influence through personal contact with the children. He was expected to play with the children and set realistic limits for them. The qualifications for this position included special interest and aptitude in working with children and the ability to set and enforce consistent limits with children in a manner acceptable to them. Nursing students of the collegiate nursing program at the medical center spend the major part of an eight week experience in pediatric nursing on the unit.

The pediatric unit has certain policies that are indictive of flexible, permissive attitudes. Visiting hours for parents are from 10:00 A.M. to 7:00 P.M. During the day, children who are physically able, are dressed in their own or hospital clothes, rather than in gowns and robes. Children are not restricted to their rooms, but rather, have freedom to play in other childrens' rooms, in the hall, and in the play room.

Observation plan, guide, and recording. The investigator originally planned to observe all the nurses on the unit where the study was conducted, it was however, decided that a random sample would be more realistic because of the number of nurses and only one observer. An enumerative study of every member of a group or population is often not feasible or even necessary. The typical survey involves the selection of a sample or cross-section of the whole, for the purpose of minute observation.[16] There was a policy on the pediatric unit of rotation of shifts and rotation of nursing assignments. The investigator could observe nurses on both the day and evening shifts, and each nurse had the same opportunity of being in the sample. Ten nurses were included in the sample and at least four observations were made of each nurse. Although no conscious attempt was made to always observe the nurses in the same types of nursing situations, such activities as taking vital signs and giving medications were frequently observed because they allowed the investigator to plan periods of observation. Other situations occurred, such as, helping a child bathe, making a child's bed, spontaneous interactions, and play situations, and were included in the study.

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[16] Hillway, op. cit., p. 17.

The guide used for observation was the Interpersonal Communication Analysis.[17] This guide appears in Appendix C. Buehler and Richmond reported on a pilot study in which they determined that communication behavior could be classified and measured according to their four primary levels of communication. Their pilot study involved the observation of two groups; one was a group of hospitalized psychiatric patients who had been described by the hospital staff as being able to relate actively to others, and the other group was composed of female students at Hillcrest School of Oregon, the students ranged in age from fifteen to eighteen years and were without psychotic or other seriously distorted behavior. The Spearman Rank Correlation Coefficient was used to measure the significance of observer agreement as to the distribution of acts for each subject among the levels of communication and their categories. Correlation between observers was found to be significant at the 5 per cent level of confidence.[18] This high level of confidence led the investigator of this study to select the categorical system for observing communication behavior.

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[17] Roy E. Buehler and Jo F. Richmond, "Interpersonal Communication Behavior Analysis: A Research Method," The Journal of Communication, 13:146-155, September, 1963.

[18] Roy E. Buehler and Jo F. Richmond, "Interpersonal Communication Analysis: A Pilot Study," (Research Project #6, Sponsored by the Oregon Board of Control, Salem, Oregon, December, 1963).

An addition was made to the examples of technological activities under Level IV (See Appendix C). The use of crayons, coloring books, and other toys was seen as the technological tools of children and of adults playing with children.

The possibility of using various types of apparatus for recording was explored. Sellitz, Jahoda, Deutsch, and Cook said:

> There is no best method of recording observations, although some procedures yield certain kinds of data that others cannot. The simplest and most economical device that will yield the required data is the one to use.[19]

Consequently the only equipment used in addition to the observation sheet was a clipboard with a stopwatch mounted on the clip.

Preparation for observation

In preparation for observation, the investigator first became familiar with the four primary levels of communication and their eight behavioral categories, memorizing the activities identified with each category. The investigator then used a film to check the consistency of her observations. This was done by starting the film (which showed a nurse caring for a patient in an emergency room) in the same place and repeating observations. Approximately six hours were spent in this type of preparation. Brown has said, "In training oneself or

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[19]Sellitz, et. al., op. cit., p. 229.

others to observe, it should be remembered that perception improves with practice. There must be recognition readiness before skillful observation occurs."[20]

The next step in preparation for observation was a three-week period of preliminary observations in the setting of the study. Observations were made of nurses as they gave direct nursing care to children. This period of observation provided the investigator with additional experience in using the communication categories, and also pointed out the necessity for being more precise in recording the total length of a nursing situation. Data collected during this period were not included in the final study, since the purpose of this period of observation was to gain more experience with the tool of data collection.

Preparation of nurses

After permission was granted to conduct the study, the investigator met one morning during report to explain her presence on the ward and ask the cooperation of the nurses. The investigator also met with the afternoon staff for the same purpose. At these times the personal inventory form was distributed to the nurses present. Not all nurses eventually included in the sample were present at these orientation meetings, therefore, a brief explanation was always made to a nurse the first time

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[20] Brown, op. cit., p. 192.

she was observed, and her permission to observe her obtained. There were never any direct refusals of permission to observe, one nurse seemed to avoid the investigator, but there was no way to validate this impression.

Actual observation

The actual observation and recording of communication behavior of nurses in the sample occurred in the following manner: the nurse was observed from the time she reached a child until she left him. Only communication behavior directed toward the child was recorded. That is, communication behavior directed toward other staff members or parents; and acts (e.g., extremity movements, head movements, smiling, grimacing) directed toward objects rather than people, were ignored by the observer. The observer stood in a position where she could see all physical movements of the subject. Five second intervals were used in recording behavior. An act falling into one of the eight categories was recorded once during the five second interval, if the act (e.g., smiling, nodding head, talking, etc.) continued into the next interval, it was of course recorded. The observer made a note of the time the nurse reached the child and when she left him, thereby having a record of the total length of time of the nursing situation with a specific child. The acts were recorded by writing down the first letter of the behavioral category into which the act

fell, e.g., A, B, E, H, P, O, V, and T. Data collection was carried on from July through November, 1964.

IV. PLAN FOR ANALYSIS OF DATA

A description of some characteristics of the nurses in the sample, such as, age, educational background, areas of experience, length of experience, and preferences in areas of nursing, will be presented.

The data will first be analyzed to determine if each individual in the sample was constant in her communication behavior, and if the individuals in the sample were from the same population.

A major purpose of the analysis of data will be to determine if there are differences in use, by the sample, of the primary levels of communication and their categories. This analysis will be referred to as analysis of per cent activities.

Another major purpose of the analysis and interpretation of data will be to determine if the nurses' (in the sample) behavior can be described in terms of reactive and restrictive communicators. A discussion of the findings of this study in relation to the sample as reactive and/or restrictive communicators will be included in Chapter IV.

The final section of Chapter IV will be devoted to an analysis of the per cent communication time for the

nurses in the sample. Per cent communication time refers to the amount of time actually spent in communicating with a child during a nursing situation.

V. SUMMARY

The method selected for this study was the descriptive survey. Non-participant observation and the use of a personal inventory form were the techniques for data collection. The communication behavior categories used for observation were described by Buehler and Richmond.[21] Permission to conduct the study was granted by the Director of Nursing Service of the hospital, and by the supervisor and head nurse of the pediatric unit. The nurses in the sample were randomly selected and were observed as they gave direct nursing care to children. Plans for analysis of the data include a description of some characteristics of the nurses in the sample; a statistical analysis of the per cent activities and per cent communication time for the sample; and a description of the sample in terms of reactive and/or restrictive communicators.

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[21] Buehler and Richmond, op. cit.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

The problem of this study was to determine if nurses' communication behavior could be measured according to four primary levels of communication;[1] and if the distribution of the use of these levels indicated that there are reactive nurse communicators and restrictive nurse communicators.

The four primary levels of communication as described by Buehler and Richmond include: Level I (Biochemical), the two categories of Level I are, Affect (A) and Body contact (B); Level II (Motor gesture), the three categories of Level II are, Extremities (E), Head (H), and Posture (P); Level III (Speech), the two categories of Level III are, Oral (O) and Verbal (V); and Level IV (Technology). Definitions of the four primary levels of communication and their categories appear in Appendix C.

This chapter includes the presentation and analysis of the data collected for this study. The data were collected by means of non-participant observation and a personal inventory form. A sample of ten nurses was observed as they gave direct nursing care to children.

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[1] Jo F. Richmond and Roy E. Buehler, "Interpersonal Communication: A Theoretical Formulation," The Journal of Communication, 12:3-10, March, 1963, p. 5.

As the raw data were first examined it became apparent that they fell into two major sections; the variety of behavioral activities used by the nurses in the sample, and the amount of time the nurses spent communicating with a child during nursing situations with that child.

The raw data for the behavioral activities of the nurses in the sample were converted into percentages to provide a means of comparing and analyzing the distribution of communication behavior of the individuals as well as the total sample for each communication level and category, (See Appendix D). The raw data were converted to percentages by dividing the number of activities a nurse engaged in with a specific child by the total number of different communication activities observed for a given nursing situation. In the remainder of the study the converted data for behavioral activities will be referred to as per cent activities, and these data will be analyzed and discussed in this chapter.

The raw data for the amount of time nurses communicated with a child to whom they gave care also required conversion to per cent values because it was found that nurses did not communicate with the child the total length of time in the nursing situations, e.g., during a nursing situation lasting three minutes a nurse might communicate with the child for two minutes (or 66.66 per cent of the time). The converted data for the amount of time nurses

were actually communicating with children will be referred to as per cent communication time and will be analyzed and discussed in this chapter.

I. CHARACTERISTICS OF THE NURSES

The information used in describing the sample was obtained from the personal inventory form completed by each nurse. A discussion of some characteristics of the nurses in the sample and reference to appropriate tables will follow.

Age, education, present position, and time in present position. Information for each nurse in the sample concerning age, educational background, present position, and time in present position is summarized in Table I. A quick perusal of the table shows that the nine nurses who entered their ages on the form ranged in age from twenty-one years to thirty-three years, with a mean age of 23.77 years. Six nurses were observed to fall below the group mean. All ten nurses completed the section on educational background, and it was found that six nurses were graduates of diploma schools of nursing, three were graduates of a collegiate school of nursing, and one was a graduate of a nursing program in a foreign country. Each nurse in the sample listed her present position as staff nurse, and one nurse added a notation of team leader. The length of time the nurses had been employed in their present positions ranged from two weeks

TABLE I

TABLE OF AGE, EDUCATION, PRESENT POSITION, AND TIME IN PRESENT POSITION OF NURSES IN SAMPLE AS OBTAINED FROM PERSONAL INVENTORY FORM

Nurse	Age	Education	Present Position	Time in Present Position
1	23	diploma	staff nurse	18 months
2	23	degree	staff nurse team leader	4 months
3	21	diploma	staff nurse	10 months
4	24	diploma	staff nurse	18 months
5	21	diploma	staff nurse	9 months
6	25	degree	staff nurse	2 months
7	33	diploma	staff nurse	12 months
8	22	diploma	staff nurse	9 months
9	?	foreign school	staff nurse	2 weeks
10	22	degree	staff nurse	2 months

to eighteen months, with a mean of 8.45 months. Again, six nurses were observed to be above the group mean.

Length of experience, areas of experience, time in each area, and previous positions. The range of the length of experience for the sample was from two months to ten years, and the mean length of experience for the group was 41.7 months, with three nurses above the group mean. As can be seen in Table II six nurses had had experiences in areas of nursing other than pediatric nursing. These areas included: medical-surgical nursing,

TABLE II

TABLE OF LENGTH OF EXPERIENCE, AREAS OF EXPERIENCE, TIME IN EACH AREA, AND PREVIOUS POSITIONS

Nurse	Length of Experience	Areas of Experience	Time in Each Area	Previous Positions
1	18 months	Pediatric Nursing	18 months	None
2	11 months	Adult Medical-Surgical Nursing	7 months	Team Leader
		Pediatric Nursing	4 months	
3	12 months	Pediatric Nursing	10 months	None
4	4 years	Premature Nursery Nursing	30 months	Staff Nurse
		Pediatric Nursing	18 months	Head Nurse (premature nursery)
5	9 months	Pediatric Nursing	9 months	None
6	2 months	Pediatric Nursing	2 months	None
7	14 years (9 of which were part-time)	Psychiatric Nursing	6 months	Ass't Nursing
		Teaching	2 years	Arts Instr'r
		Supervisor	12 months	Night Sup'r
		Office Nursing	11 years (part-time)	Office Nurse
		Pediatric Nursing	12 months	
8	2 years	Surgical Isolation	9 months	Staff Nurse
		Camp Nurse	2 months	
		Pediatric Nursing	9 months	
9	10 years	Medical-Surgical Nursing	3 years	Staff Nurse
		Obstetrical Nursing	12 months	Charge Nurse
		Pediatric Nursing	6 years	
10	5 months	Intensive Care Unit	3 months	Staff Nurse
		Pediatric Nursing	2 months	

premature nursery nursing, psychiatric nursing, camp nursing, office nursing, obstetrical nursing and intensive care unit nursing. Five nurses had help positions other than staff nurse and these included head nurse, instructor in nursing arts, supervisor, and team leader. The information concerning experience, area, time and previous positions is tabulated in Table II.

Areas of nursing in order of preference. The question on the personal inventory form dealing with preference in areas of nursing asked the subjects to list in order of preference the three areas of nursing they enjoyed most. Nine nurses listed their preferences in order, one nurse made a note on the form that the areas of nursing she had listed were not in preferential order. As can be seen in Table III, pediatric nursing was ranked first by eight nurses of nine nurses who listed their preference. Surgical nursing and teaching were each ranked first by one nurse. The two nurses who had not ranked pediatric nursing as their first choice did rank it as their second choice, thus pediatric nursing was ranked first or second by all nurses in the sample. Although there was a scattering of preferences for the second choice, surgical nursing was second choice for four nurses.

From the foregoing discussion of the characteristics of the nurses in the sample, it can be seen that the

TABLE III

TABLE OF AREAS OF NURSING IN ORDER OF PREFERENCE

Nurse	Areas of Nursing in Order of Preference
1.	1. Pediatric Nursing 2. General Surgical Nursing 3. --
2.	1. Pediatric Nursing 2. Surgical Nursing 3. Medical Nursing
3.	1. Pediatric Nursing 2. Psychiatric Nursing 3. Emergency Room Nursing
4.	1. Pediatric Nursing 2. Premature Nursery Nursing 3. Adolescent Nursing
5.	1. Pediatric Nursing 2. General Surgical Nursing 3. Obstetrical Nursing
6.	1. Pediatric Nursing 2. Surgical Nursing 3. Medical Nursing
7.	1. Teaching 2. Pediatric Nursing 3. Obstetrical Nursing
8.	1. Surgical Nursing 2. Pediatric Nursing 3. Maternity Nursing
9.	1. Pediatric Nursing 2. Medical-Surgical Nursing 3. Obstetrical Nursing (subject said these are not in preferential order)
10.	1. Pediatric Nursing 2. Public Health Nursing 3. Intensive Care Nursing

typical nurse in this sample was twenty-four years old and was a graduate of a diploma school of nursing. Her present position was staff nurse and she had been in that position about eight months. The typical nurse in the sample had had two years or less experience in nursing and this experience could have been in almost any area of nursing. She was working in the area of nursing that was her first choice, and if she were not working in pediatric nursing, she would probably be working as a surgical nurse.

II. ANALYSIS OF PER CENT ACTIVITIES

The first measure in the analysis of per cent activities was to analyze the area of the behavioral activity curve of each nurse for constancy of behavior using the z test.[2] The behavioral curve of each nurse was composed of the observations of her communication activities in the several nursing situations. It was possible by the use of the z test to plot where under a nurse's behavioral curve each observed activity fell. Any observed activity which fell outside the boundary of 95 per cent of the area of the nurse's distribution curve was dropped as atypical because of the statistical probability of its not normally appearing in the behavior pattern of the individual. The communication categories

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[2]See Appendix E for formula.

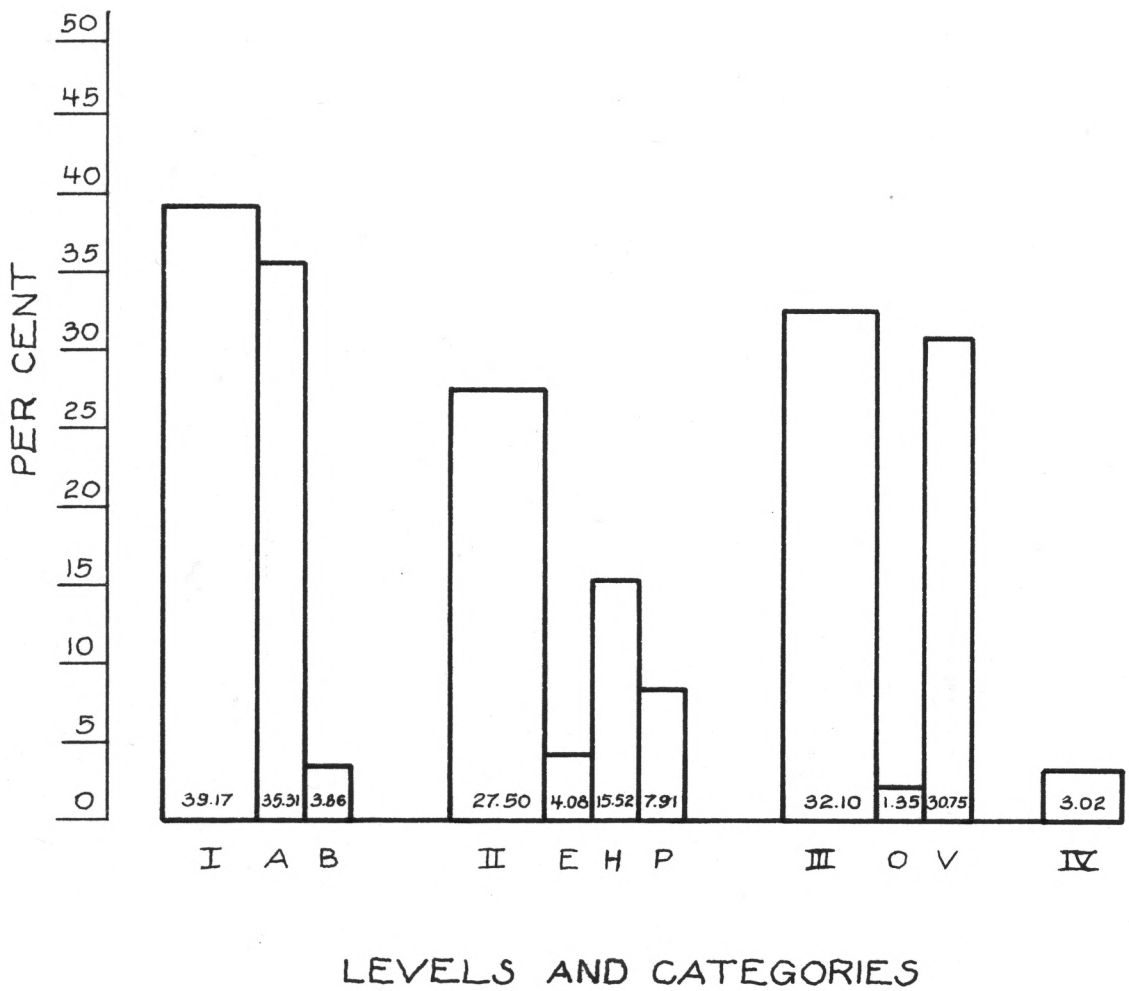
which were used infrequently by all members of the sample, however, could not realistically be eliminated because of such low frequencies occurring within them. This was the case for categories Body contact (Level I), Extremities and Posture (Level II), and Level IV (Technology), see Figure 1. After analyzing all the nurses' behavioral curves, one nurse was found, after six observations in different nursing situations, to show a behavior pattern not constant enough to allow all her activities to fall within 95 per cent of her own distribution curve. An additional observation of a nursing situation was made and it was found that 50 per cent of her communication activities were within her normal curve. The investigator, therefore, was statistically obligated to include this nurse in the sample.

Following the completion of the z analysis of constancy of communication behavior of the other nurses in the sample, it was found that the percentage data indicated that in those levels and their categories used frequently by the sample, individual nurses were statistically constant in their communication patterns in at least four observations made of nursing situations.

After constancy of communication behavior for each nurse was ascertained, it was necessary to determine if statistically the ten nurses were a random sample of the total population of professional nurses on the pediatric unit where this study was conducted. By

FIGURE 1.

GROUP MEANS FOR PER CENT ACTIVITIES
USING COMMUNICATION LEVELS
AND THEIR CATEGORIES



application of the z test[3] to the group data composed of the means of the ten nurses within a level of communication and its categories, it was possible to determine that all means fell within 95 per cent of the area under the group curve. The z scores demonstrated that the ten nurses in the sample were from the same population.

Analysis of data for levels of communication. The first hypothesis of the study stated: nurses' communication behavior can be differentiated into four primary levels of communication behavior; Biochemical (Level I), Motor gesture (Level II), Speech (Level III), and Technology (Level IV). The testing of this hypothesis was achieved through analyzing the data for the levels of communication to determine if the variation of group per cent activity means was greater between the levels than the variation within any given level. Utilizing the mean scores of the sample, F-analysis for variance was applied to the data. F-analysis involves the comparison of two or more means for variation and the application of a test of significance to determine the extent of differences between the calculated variances.[4]

The F score for the comparison of the four levels of communication was 47.05 and was significant at greater

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[3] See Appendix E for formula.

[4] Hervert Arkin and Raymond R. Colton, Tables for Statisticians (New York: Barnes & Noble, Incorporated, 1957), p. 14.

than the 1 per cent level of confidence, (See Table IV).[5] The F score indicates that there is less than one chance in one hundred that the differences observed between the group means for all levels of communication was accidental, but rather it was due to the activity observed between the levels.

While an analysis for variance does indicate that a significant difference between group means can occur, it does not indicate where it occurs. It is apparent in Figure 1 that the nurses in the sample used Level IV (Technology) less frequently than any other level. For this reason, Level IV was statistically eliminated and a variation analysis was determined for the other three levels, (See Table V). The F score obtained from this analysis was 6.13 and was also significant.[6] This second F-analysis indicated that Level IV (Technology) alone was not responsible for the significant difference between the group means of the levels of communication.

Reference to Figure 1 indicates that the Motor gesture level (II) was used less frequently than either the Biochemical (I) or Speech (III) levels. For this reason, Level II (Motor gesture) was dropped and a t-test was applied to the remaining data. The t-test was selected because it allows for not only a more rapid

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[5] df: K = 3; N = 30.

[6] df: K = 2; N = 27.

TABLE IV

SUMMARY TABLE OF THE ANALYSIS OF VARIANCE FOR THE LEVELS OF COMMUNICATION BEHAVIOR

Source of Variation	Sum of Squares	df	Variance
Between	21264.01	3	7603.70
Within	1547.11	30	51.57
Total	22811.12	33	

F = 47.05

Levels of significance
.05 = 2.92
.01 = 4.51

TABLE V

SUMMARY TABLE OF THE ANALYSIS OF VARIANCE FOR LEVELS I, II, AND III

Source of Variation	Sum of Squares	df	Variance
Between	694.07	2	347.03
Within	1527.19	27	56.56
Total	2221.26	29	

F = 6.13

Levels of significance
.05 = 5.49
.01 = 3.35

statistical analysis but it is limited to comparing two means. With the existing eighteen degrees of freedom, the t score of 2.56 was found to be significant at the 5 per cent level of confidence[7] indicating that the difference between group means for Levels I (Biochemical) and II (Speech) are within acceptable limits of confidence. Inasmuch as the results of this analysis are less statistically significant than the previous analyses, it can be pointed out that the group tended to use the Biochemical and Speech levels with more similar frequencies than any other levels.

The foregoing statistical analysis of the frequencies of the use of the four levels of communication by the nurses in this sample has demonstrated that the primary levels of communication postulated by Buehler and Richmond[8] are used as independent units. The first stated hypothesis of this study was accepted.

Analysis of data for categories. After the acceptance of the first hypothesis it necessarily followed that a subsequent analysis of the data was indicated. Such an analysis would determine if there existed statistically significant differences between the use of categories within any level as demonstrated by the nurses in the sample. For those primary levels with

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[7] Levels of confidence: 5% = 2.10; 1% = 2.88.

[8] Richmond and Buehler, op. cit.

more than two categories an F-analysis was done, while the t-test was applied to those levels with only two categories.

As graphically shown in Figure 1, page 44, there is a large difference in the use of categories Affect and Body contact within Level I (Biochemical) by the nurses. Body contact, as a means of communicating with children, was used by this group only 3.86 per cent of the time. Affect was one of the communication behaviors most frequently used by the sample. The t-score for the comparison of the categories of Level I was significant at the 1 per cent level of confidence, as shown in Table VI. The infrequent use of Body contact by this sample as a communication behavior is of interest in view of recent research which has suggested that such behavior is essential to normal bio-social development of children.[9]

Level II (Motor gesture) has three categories of communication behavior; Extremities, Head, and Posture. The F-analysis was applied to test the differences in the use by the sample of the categories of this level. A summary appears in Table VII. The F-score was

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[9] John Bowlby, "Child Care and the Growth of Love," Human Development, eds. M. L. Haimowitz and N. R. Haimowitz (New York: Thomas Y. Crowell Company, 1960), pp. 155-166; Harry Harlow and R. A. Zimmerman, "Affectional Responses in the Infant Monkey," Science, 130: 3373, August 21, 1959; Lawrence K. Frank, "Tactile Communication," Explorations in Communication, eds. Edmund Carpenter and Marshall McLuhan (Boston: Beacon Press, 1960), pp. 4-11.

TABLE VI

TABLE OF VARIANCE FOR CATEGORIES OF LEVELS I, II, AND III USING THE *t*-TEST

Primary Level	Sub-Categories	*t*-value	*df*	5% Level of Significance	1% Level of Significance
I	Affect - Body contact	13.77	18	2.10	2.88
II	Extremities - posture	1.99	18	2.10	2.88
III	Oral - Verbal	13.99	17	2.11	2.90

TABLE VII

SUMMARY TABLE OF THE ANALYSIS OF VARIANCE OF THE CATEGORIES (EXTREMITIES, HEAD, AND POSTURE) OF LEVEL II

Source of Variation	Sum of Squares	*df*	Variance
Between	677.53	2	338.76
Within	860.59	27	31.87
Total	1538.12	29	

F = 10.65

Levels of significance
.05 = 3.35
.01 = 5.49

significant at the 1 per cent level of confidence indicating a statistical difference in the use of the categories of the Motor gesture level of communication by the sample. Examination of the group means of the categories of Level II (See Figure 1, page 44) indicated that the category, Head was used more frequently than either of categories, Extremities and Posture. Category, Head, therefore, was dropped from the comparison and a t-test was done on the mean differences of the other two categories. The results of this test can be seen in Table VI. The t value of 1.99 was not statistically significant indicating that category, Head, was used preferentially over other categories of Level II (Motor gesture).

Figure 1 (page 44) indicates that the nurses in the sample appeared to have a great preference in the use of the category, Verbal over the category, Oral (Level III). The analysis of the categories of Level III indeed revealed that such was the case. A t-value of 13.99 (See Table VI) was obtained and was significant at greater than the 1 per cent level of confidence. Such significance indicated that the differences observed in the use of Oral and Verbal behavior by the sample, is a real difference rather than being due to chance behavior.

The analysis of the data for the categories of communication behavior comprising the primary levels of communication, has further substantiated

the acceptance of the first hypothesis of the study, and has also indicated the preferential use of categories within given levels.

Analysis of use of categories between different levels. During the collection of data there appeared to be a tendency for the nurses in the sample to use categories of different levels concurrently in their communication behavior. For example, several nurses used communication behavior categorized under category Affect (Level I) and category Verbal (Level III) at the same time. Another example was the use of Head (Level II) in conjunction with Verbal (Level III).

A useful statistical test in comparing expected results according to some hypothesis about the population, is the chi square analysis.[10] Chi square analysis allows one to test for the significance of the divergence of observed frequencies and theoretical frequencies.[11]

In the chi square analysis of categories Affect (Level I) and Verbal (Level III), the level of probability at which the relationship could be expected to occur was found to lie between 5 and 10 per cent, (See Table VIII). The computed chi square value was 2.75, the value of the 5 per cent level of probability for

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[10] John C. Townsend, Introduction to Experimental Method (New York: McGraw-Hill Book Company, Inc., 1953), p. 157.

[11] Ibid.

TABLE VIII

TABLE OF COMPARISON OF THE USE OF THE CATEGORIES OF DIFFERENT LEVELS

Sub-categories	chi-square value	df	5% Level of Probability	10% Level of Probability
Affect - Verbal	2.75	1	3.84	2.70
Head - Verbal	0.48	1	3.84	2.70

one degree of freedom was 3.84 and the 10 per cent level was 2.70. Thus, 90 per cent of the time, the relationship between the use of Affect in conjunction with verbal behavior can be expected.

Analysis of the use of categories Head (Level II) and Verbal (Level III) by the chi square method revealed no statistically significant relationship, (See Table VIII). The computed value of chi square was 0.48 and thus the simultaneous use of Head and Verbal behavior occur by chance alone.

III. REACTIVE AND RESTRICTIVE COMMUNICATORS

The second hypothesis was that nurses' differential use of the four primary levels of communication may be described in terms of reactive communicators and restrictive communicators. Reactive communicators were described as subjects whose communication behavior is distributed among all four levels without primary emphasis on any one level. Restrictive communicators were described as

subjects whose total communicative acts tend toward concentration mainly on one level.

The sample's infrequent use of Level IV (Technology) eliminated the possibility of their being described as reactive communicators. It can be noted in Appendix F that only four nurses in the sample used Level IV, and the use of this level by the four nurses made up a very small part of their communication repertoire. For the purposes of this study, toys were seen as technological tools for children, (See Appendix C). The pediatric nurses in the sample did not often use toys in playing (communicating) with children. It is of course possible to play with children without the use of toys or other technological tools. Games requiring the use of Body contact (e.g., piggy-back rides, tag, Red Rover); Motor gesture (e.g., Peek-a-boo, charades); and Oral behavior (e.g., imitation of sounds and humming by the very young child), are popular with most children. The behaviors necessary for such games, were however, infrequently used (See Figure 1, page 44) by the nurses. The observations made of the nurses in the sample indicated that this group of pediatric nurses played with the children infrequently.

The environmental setting of the pediatric unit where the study was conducted was described in the chapter on Methodology, (See page 26). The children on the unit were not restricted to their beds or rooms unless their

physical conditions required it. They had use of the playroom and were frequently found playing in the main hall. Liberal visiting hours were the policy on the unit, and many parents seemed to stay with their children during the hours of 10:00 A.M. and 7:00 P.M. These policies were indicative of a cheerful, relaxed, permissive, and flexible hospital environment. The investigator frequently found the nursing students mentioned in the chapter on Methodology playing with the children, but seldom found the nurses engaged in such activity. Why, then, did the nurses in the sample play infrequently with the children? Several possible answers were proposed:

(1) The presence of the investigator may have inhibited potential spontaneity of the nurses.

(2) The presence on the unit of individuals assuming the role of play directors may have encouraged nurses to leave this means of communication to them.

(3) The playroom may have been seen as the proper place for playing with children and if nurses were not in that area, they may have felt it was inappropriate to engage in such behavior.

(4) The individual nurses in the sample may have had attitudes about their role as professional nurses which inhibited their ability to play with children.

(5) As part of their clinical practice in pediatric nursing, student nurses were assigned to play therapy with children in the playroom. The presence of the student

nurses may have encouraged the professional nurses to leave play with children to the nursing students.

The importance of play for children has been pointed out by Blake and Wright who said, "Play is not just idling away time; it is the child's business and an important mode of non-verbal communication."[12] The authors go on to say that play helps the child in his developmental process in many ways, e.g., to acquire motor skills and dexterity, to test reality, to develop sensory and space perception, to express feelings through actions, and to develop skills in interpersonal situations.[13]

Although the group means for per cent activities were fairly evenly distributed among Levels I (Biochemical), II (Motor gesture), and III (Speech), (See Figure 1), the sample more frequently selected certain categories for use. The group mean for the Biochemical (Level I) level of communication was 39.17 per cent, but of this total for Level I, only 3.86 per cent was Body contact, while 35.31 per cent was Affect. In the Motor gesture (Level II) level of communication, the combined percentages of categories Extremities (4.08 per cent) and Posture (7.91 per cent) were less than the mean for

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[12] Florence G. Blake and F. Howell Wright, Essentials of Pediatric Nursing (Philadelphia: J. B. Lippincott, Company, 1963), p. 428.

[13] Ibid.

category Head (15.52 per cent). Thus, the group used behaviors classified under Head more frequently than those in the other two categories of Level II. In the Speech (Level III) level of communication, Oral behavior accounted for 1.35 per cent of the total for Level III, and Verbal behavior accounted for 30.75 per cent.

The analysis of the categorical data indicated that the communication pattern of the sample most frequently used was Affect (Level I), Head (Level II), and Verbal (Level III).

The infrequent use of Body contact by the nurses was another area of particular interest to the investigator. As was pointed out earlier in this chapter and in the chapter on Review of the Literature, body contact is a communication behavior essential to normal development of children. Blake and Wright indicate that cuddling ill and frightened children is an important nursing measure.[14]

The investigator observed a situation in which the use of Body contact seemed to be the essential nursing measure. One of the nurses in the sample attempted to give a crying child his medications. The four year old boy was calling for his mother and was very upset. The nurse used every communication behavior possible except body contact in an effort to calm and comfort the child.

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[14] Ibid., pp. 15-16.

After some time and no success in comforting him, she turned to the ward teacher and asked her help. Immediately the teacher picked up the child, sat down, held him next to her and rocked him. Within seconds the child's crying lessened and the teacher then engaged him in play activities.

Why did the nurses in the sample use Body contact so infrequently? Some of the possible answers to this question are the same as those suggested for the sample's infrequent play activities with children:

(1) The presence of the investigator may have inhibited potential spontaneity of the nurses.

(2) The individual's assuming the role of play directors may have encouraged the nurses to leave this means of communicating to them.

(3) Since the parents of a good number of the children are with them during the day, the nurses may assume that the childrens' need for body contact is met through them.

(4) The individuals within the sample may have attitudes about their role as professional nurses which inhibit their use of body contact.

As was pointed out in Chapter I, nursing is seen by some as an interpersonal process. This view is supported by the literature dealing with therapeutic nurse-patient relationships and communication behavior. An accepted principle in therapeutic relationships,

is being aware of cues in the other person's behavior and responding appropriately to these cues. This requires the ability to adapt one's own communication behavior to the level of communication behavior used by the other individual. This is particularly important in communicating with children, who, depending on their developmental age, have differing communication behaviors, skills, and needs. Although observation of communication behavior of children was outside the scope of this study, it has been pointed out from other studies that children have a need for body contact; that motor gesture behavior precedes verbal behavior; that oral sounds precede verbal behavior; and that play is necessary for the healthy development of a child. The nurses of this sample did not demonstrate the ability to adapt their communication behavior so that it would be appropriate for the developmental level of communication behavior of the children for whom they cared.

IV. ANALYSIS OF PER CENT COMMUNICATION TIME

The mean communication time of an individual nurse equals an average of the amount of time a nurse was actually communicating with the child to whom she was giving direct nursing care in nursing situations in which she was observed. The z-test was applied to the mean communication time for each nurse to determine if there was constancy in communication time. The z-score for

each nurse fell within 95 per cent of her individual curve, indicating that the observations were within a normal range of expected behavior.

Figure 2, page 61, represents a graphic illustration of the ascending rank order of the mean communication time for the individuals within the sample. It will be noted that mean communication time for the individuals in the sample ranged from 25.50 to 83.50 per cent, and the group mean equaled 51 per cent. Six nurses individual means were observed to fall below the group mean.

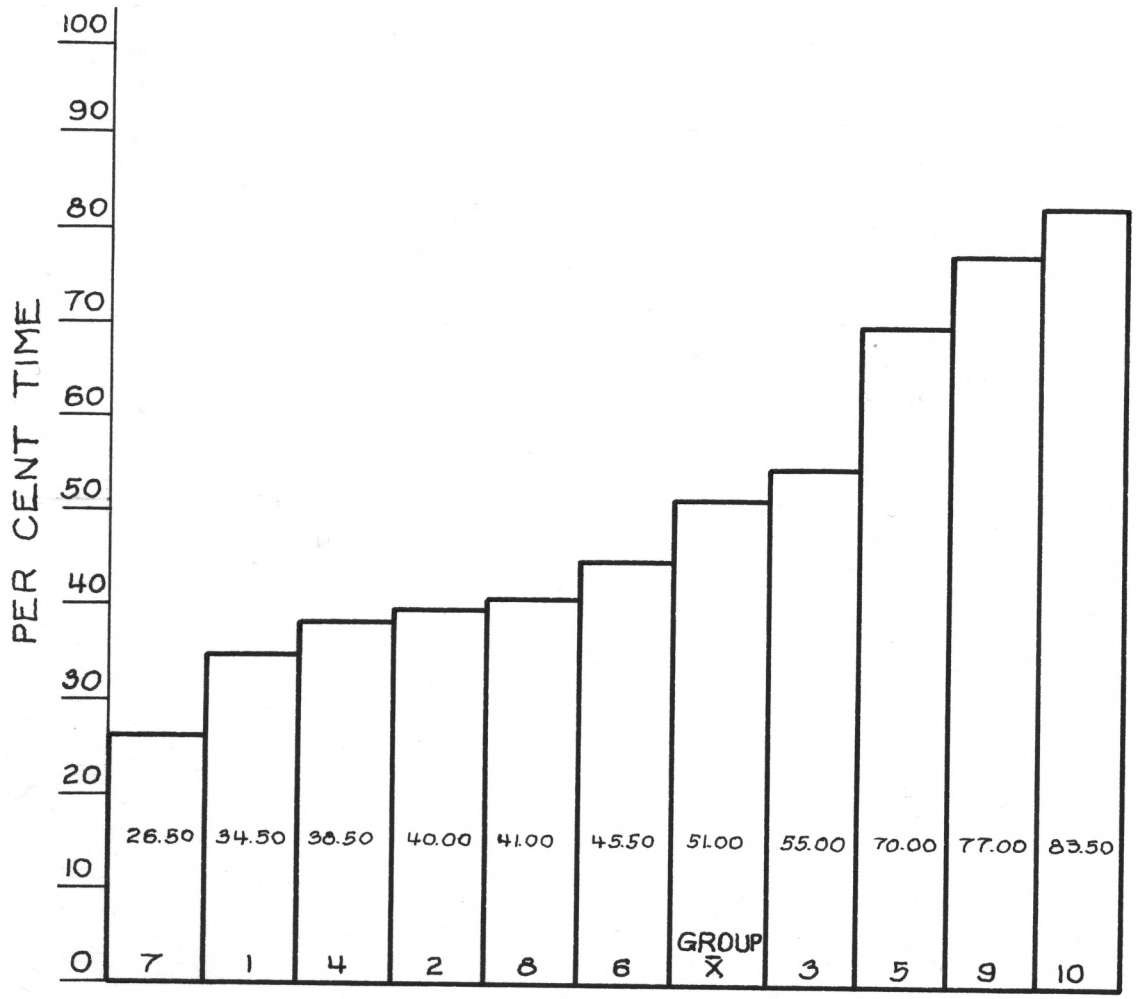
As the data were being analyzed, it seemed possible that nurses whose individual means for the levels of communication (per cent activities) were above the group mean, individual means for per cent communication time would also be found to fall above the group mean. The chi square analysis was applied to the data to see if such a possible relationship was indeed a dependent one. The computed chi square score was 4.87, and with three degrees of freedom, did not fall within the level of significance acceptable in this study.

V. SUMMARY

The first section of this chapter dealt with a description of such characteristics of the nurses in the sample as, age, educational background, length of experience in nursing, past experience in nursing, and preference of areas of nursing. The nurses in the sample were

FIGURE 2.

MEAN COMMUNICATION TIME FOR
NURSES IN SAMPLE
EXPRESSED IN PER CENTAGES



SUBJECT

relatively young and the majority had had no more than two years experience. Over one half of the nurses were graduates of diploma schools of nursing. Eight nurses ranked pediatric nursing as their first preference in areas of nursing.

The second section was devoted to an analysis of the per cent communication activities for the group. Constancy of communication behavior for each nurse was found through use of the z test. It was also found that the ten nurses in the sample were from the same population. The analysis of data for the per cent activities for the levels of communication revealed statistically significant differences in the use of the four primary levels of communication by the nurses, and the first hypothesis of the study was, therefore, accepted. Further substantiation for the acceptance of the first hypothesis occurred through the analysis of the categories of the levels of communication.

The nurses in the sample were found to be restrictive communicators because they almost totally selected against the use of Level IV (Technology), and categories, Body contact (Level I), and Oral (Level III). Categories, Extremities and Posture (Level II) were not greatly used either. Restrictive communicators were seen as those subjects whose total communicative acts tend toward concentration mainly on a single level of communication.

The communicative acts of the sample were mainly concentrated on two levels (Biochemical and Verbal), rather than being distributed among all four levels, thus, the second hypothesis was accepted. The communication pattern established by the group included the frequent use of categories, Affect (Level I), Head (Level II), and Verbal (Level III).

The fourth section discussed the mean communication for individuals within the sample and the sample as a whole. Although the range of per cent communication times was wide, over one-half of the nurses fell below the group mean of 51 per cent. Thus, the nurses in the sample were communicating with the children to whom they gave nursing care only 49 per cent of the time.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

I. SUMMARY

The problem of this study was to determine if nurses' communication behavior could be measured according to the four postulated levels of communication and their eight categories as described by Buehler and Richmond; and, to determine if the distribution of the use of these levels indicated that there were reactive communicators and restrictive communicators.

The purposes of the study were to: (1) determine whether the interpersonal communication behavior of a sample of nurses could be observed, measured, and recorded in terms of the four primary levels of communication; (2) determine if two major types of communicators could be identified; (3) add to the body of knowledge concerning nurses' interpersonal communication behavior; and, (4) find cues indicating the value of other studies to investigate whether reactive communicators are more effective in attaining goals in nurse-patient relationships.

The review of literature focused on the frame of reference from which Buehler and Richmond developed their theory of interpersonal communication behavior. The primary levels of communication described by Buehler and

Richmond were seen as having a developmental function in human life. Studies by Blauvelt, Harlow, Frank, and Mead were reviewed. These studies indicate the reciprocal nature of interpersonal transactions and the need for various communication behaviors between mother and offspring to insure healthy development.

The study was conducted in a pediatric unit of a university medical center. Ten professional nurses were observed as they gave direct nursing care to children. The interpersonal communication behavior of each nurse was observed and recorded using the four primary levels of communication and their categories.

The data indicated that there were differences in the use of the communication levels and categories by the sample, and thus the first hypothesis of the study was accepted. It was found that the nurses in the sample seldom use Level IV (Technology), and categories, Affect and Oral, and therefore, the group was described as restrictive communicators, substantiating the acceptance of the second hypothesis. The sample showed a communication pattern in which there was frequent use of categories, Affect (Biochemical level), Head (Motor gesture level), and Verbal (Speech level). There was concurrent use of Verbal behavior in conjunction with Affect. Communication behaviors categorized as Body contact and Oral were seen as being particulary important in communicating with children, but these behaviors were

used infrequently by the sample. Nurses communicated with children only 49 per cent of the time they were with them in nursing situations.

The nurses in the sample were a relatively young group of nurses who had had a wide range of experience in various areas of nursing, even though the length of their experiences was short. They were working in the area of nursing that was their preference. The nurses used a communication pattern that included the frequent use of categories, Affect, Head, and Verbal. They infrequently used Body contact, Oral behavior, and Technology.

II. CONCLUSIONS

The conclusions as a result of the findings of this study are as follows:

(1) The Interpersonal Communication Behavioral Analysis[1] described by Buehler and Richmond could be used to observe and record communication behavior of nurses in this pediatric nursing situation.

(2) There were statistically significant differences in the frequencies with which the nurses used the four primary levels of communication.

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[1] Roy E. Buehler and Jo F. Richmond, "Interpersonal Communication Behavior: A Research Method," The Journal of Communication, 13:146-155, September, 1963.

(3) As a group this sample of pediatric nurses can be described as restrictive communicators because of their infrequent use of Level IV (Technology), and categories, Body contact (Level I), Extremities and Posture (Level II), and Oral (Level III).

(4) The samples' infrequent use of Level IV, and categories, Body contact, Extremities and Posture, and Oral, indicated that the nurses played infrequently with children.

(5) Body contact was seen as an important communication behavior in the normal development of children and was used very infrequently.

(6) The nurses did not adapt their communication behavior to the levels of communication behavior used by the children they cared for.

(7) On the average the nurses in this sample communicated with the children they cared for only 51 per cent of the time.

III. RECOMMENDATIONS

It is recommended that:

(1) A Study be conducted to determine the effectiveness of reactive and restrictive communicators in obtaining goals of nursing care.

(2) A study be conducted to determine the influence of various types of personnel (e.g., play directors, nursing students, and volunteer workers),

on the pediatric nurse's image of her role in playing with children.

(3) Consideration be given to adapting the Interpersonal Communication Behavior Analysis for use as an evaluation tool of nurse effectiveness; in selection of personnel; and as a teaching tool in the therapeutic use of oneself.

(4) A study be conducted to determine the factors involved in infrequent use of body contact as a communication behavior of pediatric nurses.

(5) A study to determine if there are differences in the communication behavior of professional nurses as compared to supervised nursing students.

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APPENDIX A

Personal Inventory Form

I am a graduate student in the Psychiatric-Mental Health Nursing program at the University of Colorado. As part of the requirements for a Master's Degree I am writing a thesis. My thesis is concerned with observing registered nurses as they care for children. All registered nurses on this ward are being asked to fill out this form. Your cooperation will be greatly appreciated. The information you supply will be confidential.

Janice A. Ward

1. Name _____ 2. Age _____

3. Education (please circle appropriate letter)

   a. Diploma school

   b. Collegiate school (pre-service baccalaureate)

   c. Graduate nurse program (B.S. after being R.N.)

   d. Post-graduate (includes Master's degree)

4. Years experience in nursing _____

5. Please list the various areas of nursing (e.g., pediatrics, surgery, etc.) experience you have had and how long you worked in each area.

6. What is your position (staff nurse, head nurse, etc.) on this ward and how long have you had this position?

   _____

7. What positions have you held before (in this or other hospitals or agencies)?

8. Please list in order of your preference, the three areas of nursing you enjoy most.

   a. _____

   b. _____

   c. _____

APPENDIX B

Letter Requesting Permission

Date

Name of Director of Nursing Service
Name of Hospital
City

Dear (Name of Director):

I am a graduate student in nursing at the University of Colorado and am enrolled in the Psychiatric-Mental Health Nursing program. As a part of the requirements for receiving a Master's degree I am writing a thesis.

The problem with which my thesis is concerned is observing how registered nurses relate to children. I am interested in seeing what differences there are in how nurses communicate with children.

The method of data collection is observation of nurses as they care for children. I also want the nurses in the sample to fill out a personal inventory form.

May I have your permission to collect data for this study on the pediatric unit at (Name of Hospital)?

I will be making an appointment with you in the near future to further discuss my plans for this study.

Thank you.

Yours very truly,

(Miss) Janice A. Ward

APPENDIX C

Definitions of Primary Levels of Communication and the Categories

Definitions Primary Levels of Communication and Their Categories[1]

LEVEL	CATEGORIES	CODE	DEFINITIONS
I. Biochemical			
	Affect	A.	Any observable action that is autonomic and/or directed toward the self. Examples: tears flowing; sneezing; frowning; smiling; blinking; tic movements; rubbing hands or fingers over parts of one's own body; raising, lowering or fluttering eyelids; moistening lips; wiping eyes; blowing nose; coughing; rapid breathing. Laughter and forms of crying such as wailing, blubbering, sobbing, are classified as affect because they are spontaneous (autonomic) behaviors of which sound is a by-product. Resting positions, such as hands lying clasped on one's lap, or arms folded, or legs resting in a crossed position are not defined as movement.
	Body Contact	B.	Touch with any part of the subject's body, any part of the other subject's body. The criteria of touching is a momentary or a continous touching. Thus, one subject may touch the other's hand, the subject's finger or hand may continue touching the other subject's hand, arm, face or other part of the body.
II. Motor Gesture			Defined as movement on the part of the organism as a whole or any of

[1]Roy E. Buehler and Jo F. Richmond, "Interpersonal Communication Analysis: A Pilot Study," (Research Project #6, Sponsered by the Oregon Board of Control, Salem, Oregon, Dec., 1963), pp. 2-3.

LEVEL	CATEGORIES	CODE	DEFINITIONS
			its skeletal or muscular parts. Motor gesture is divided into three subcategories.
	Extremities	E.	Any movement of the body extremities, such as waving the arm; pointing with fingers; shrugging shoulders; movement of legs or feet which do not involve walking; use of ex. to illustrate.
II. Motor Gesture			
	Head	H.	Gross movements of the head, including nodding, shaking, or turning, tilting. Also directional shifts of the eyes.
	Posture	P.	Shift in the position of the torso, such as walking; running; changes from sitting, standing or lying positions; shifting weight and balance of the body from any position; leaning; propping actions; continuous rocking.
III. Speech			Any vocal sound which is classified as language or language substitutes.
	Oral Utterance	O.	Oral sound without verbal form such as grunts, groands, humming, whistling, etc.
	Verbal Utterance	V.	Oral sound in verbal form, such as exclamations such as "Oh," or "Ah," speaking with

LEVEL	CATEGORIES	CODE	DEFINITIONS
			one or two words; talking over an extended time without interruption.
IV.	Technology	T.	Active use of any instrument defined in the immediate culture as a communication tool. Writing; reading; drawing; telephoning; doodling; coloring in coloring book, playing with toys; etc. If more than one tech. instrument is used, record for each instrument used, e.g., reading and writing in the same time interval. Simply handling a pencil or a book or magazine without using it as a communication tool is scored as E.

APPENDIX D

Raw Data Converted to Percentages for Individual Nurses for Levels of Communication and Their Categories

Raw Data Converted to Percentages for Observations of Individual Nurses for Level I

Nurse	Affect X	Affect S.D.	Body contact X	Body contact S.D.	Total Level I X	Total Level I S.D.
1	50.00	10.10	-	2.14	50.00	7.90
	50.00		-		50.00	
	42.11		-		42.11	
	47.06		-		47.06	
	25.89		4.29		31.25	
2	28.57	5.10	-		same as affect	same as affect
	34.78					
	40.00			-		
	31.25					
	40.00					
3	37.50	5.80	-	10.90	37.50	7.10
	26.24		2.94		29.41	
	22.22		-		22.22	
	29.17		-		29.17	
	25.00		31.25		56.25	
	35.28		11.43		45.71	
	30.43		19.56		49.99	
4	25.00	4.00	-	2.58	25.00	5.10
	35.71		-		35.71	
	33.33		6.66		40.00	
	33.33		-		33.33	
	35.45		1.68		36.13	
	30.53		6.32		36.85	
5	29.41	2.22	-	0.31	29.41	3.10
	34.78		1.45		36.23	
	30.30		-		30.30	
	33.33		2.78		36.11	
	33.33		-		33.33	
	30.00		-		30.00	
6	24.07	7.50	24.07	8.90	48.15	7.20
	42.86		-		42.86	
	31.25		6.00		31.25	
	40.00		-		46.00	
	32.35		2.94		35.29	
7	50.00	14.70	-	4.10	50.00	12.50
	50.00		-		50.00	
	66.66		-		66.66	
	66.66		-		66.66	
	33.33		11.11		44.44	
	34.40		0.80		35.20	
8	31.50	4.00	2.34	0.13	34.37	3.13
	38.10		-		38.10	
	33.33		-		33.33	
	40.00		-		40.00	

Raw Data Converted to Percentages for Observations of Individual Nurses for Level I (Continued)

Nurse	Affect X	Affect S.D.	Body contact X	Body contact S.D.	Total Level I X	Total Level I S.D.
	27.27	2.48	-	2.33	27.27	4.40
9	29.41		5.88		35.29	
	35.30		-		35.30	
	26.31		5.26		31.57	
	36.36		-		36.36	
	40.00		-		40.00	
	22.68	1.07	21.68	8.00	44.33	8.95
10	24.00		20.00		44.00	
	23.08		3.85		26.93	
	21.43		9.52		30.95	

Raw Data Converted to Percentages for Observations of Individual Nurses for Level II

Nurse	Extremities X	Extremities S.D.	Head X	Head S.D.	Posture X	Posture S.D.	Total Level II X	Total Level II S.D.
	-	2.50	-	6.20	-	2.50	-	10.20
1	-		-		-		-	
	-		15.79		-		15.79	
	6.25		5.88		-		5.88	
			16.96		6.25		29.46	
	-	4.60	25.71	13.30	14.28	5.70	40.00	8.20
2	4.35		30.43		-		34.78	
	-		40.00		-		40.00	
	12.50		6.25		12.50		31.25	
	-		-		-			
	12.50	7.35	-	7.20	12.50	6.05	25.00	9.35
3	2.94		14.70		17.63		35.28	
	-		33.33		-		33.33	
	20.83		20.83		4.16		45.82	
	-		18.75		-		18.75	
	-		22.86		5.71		28.57	
	13.04		15.22		6.52		38.78	
	-	2.69	-	4.70	-	2.96	-	5.40
4	-		14.29		7.14		21.43	
	-		20.00		-		20.00	
	-		21.21		6.06		27.27	
	0.84		16.81		5.04		22.69	
	7.37		10.53		11.58		29.48	
	5.88	2.69	29.41	4.00	-	5.80	35.29	5.50
5	1.45		20.29		11.59		33.33	
	8.33		27.27		18.18		45.45	
	4.76		22.22		2.77		33.33	
	-		28.57		-		33.33	
	-		30.00		10.00		40.00	
	-	3.70	9.26	5.50	12.96	5.40	22.22	9.50
6	-		14.28		-		14.28	
	3.75		22.50		12.50		38.75	
	10.00		10.00		-		20.00	
	-		17.65		-		17.65	
	-	4.30	12.50	10.30	-	4.60	12.50	10.70
7	12.50		-		12.50		25.00	
	-		-		-		-	
	-		-		-		-	
	7.40		7.40		11.11		25.92	
	2.40		31.20		3.20		36.80	
	3.12	7.70	6.25	2.33	25.00	9.30	34.37	8.70
8	-		4.76		14.28		19.04	
	14.28		-		23.81		38.09	
	20.00		-		5.00		25.00	

Raw Data Converted to Percentages for Observations of Individual Nurses for Level II (Continued)

Nurse	Extremities X	Extremities S.D.	Head X	Head S.D.	Posture X	Posture S.D.	Total Level II X	Total Level II S.D.
	-	1.84	27.27	3.10	18.18	4.10	45.45	8.30
9	1.96		21.57		11.76		35.29	
	-		23.52		5.88		29.40	
	5.26		26.31		10.52		42.09	
	-		27.27		9.09		36.36	
	-		20.00		10.00		30.00	
	6.18	3.40	21.65	2.65	4.12	7.15	31.95	7.10
10	4.00		20.00		16.00		40.00	
	11.58		15.38		19.23		46.15	
	9.52		19.05		19.05		47.62	

Raw Data Converted to Percentages for Observations of Individual Nurses for Level III

Nurse	Oral X	Oral S.D.	Verbal X	Verbal S.D.	Total Level III X	Total Level III S.D.
1	-	0.41	50.00	10.85	50.00	10.45
	-		50.00		50.00	
	-		42.10		42.10	
	-		47.06		47.06	
	0.89		24.11		25.00	
2	-		31.43		31.43	
	-		30.43		30.43	
	-		20.00		20.00	
	6.25		31.25		37.50	
	20.00		40.00		60.00	
3	-	3.90	37.50	5.30	37.50	8.16
	2.94		32.35		35.28	
	11.11		33.33		44.44	
	-		25.00		25.00	
	-		25.00		25.00	
	-		25.71		25.71	
	4.35		10.89		15.24	
4	-	1.21	75.00	6.50	75.00	4.50
	-		42.86		42.86	
	-		40.00		40.00	
	-		39.39		39.39	
	2.52		38.65		41.17	
	3.16		30.53		33.69	
5	-	0.17	35.29	3.95	35.29	3.80
	1.45		27.54		28.98	
	-		24.24		24.24	
	-		30.55		30.55	
	-		33.33		33.33	
	-		30.00		30.00	
6	-	0.73	29.09	10.10	29.09	10.20
	-		42.86		42.86	
	1.25		28.75		30.00	
	2.00		32.00		34.00	
	-		14.70		14.70	
7	-	-	37.50	4.40	same	same
	-		25.00		as	as
	-		33.33		verbal	verbal
	-		33.33			
	-		29.63			
	-		28.00			
8	3.12	1.74	28.12	5.60	31.25	7.70
	4.72		38.10		42.86	
	-		28.57		28.57	
	-		25.00		25.00	

Raw Data Converted to Percentages for Observations of Individual Nurses for Level III (Continued)

Nurse	Oral X	Oral S.D.	Verbal X	Verbal S.D.	Total Level III X	Total Level III S.D.
	-	2.35	27.27	5.40	27.27	4.80
9	-		29.41		29.41	
	5.88		29.40		35.28	
	5.26		15.80		21.06	
	-		27.27		27.27	
	-		30.00		30.00	
	3.09	1.45	20.62	3.03	23.71	4.60
10	-		16.00		16.00	
	3.85		23.08		26.93	
	-		21.43		21.43	

Raw Data Converted to Percentages for Observations of Individual Nurses for Level IV and Communication Time

Nurse	Technology X	Technology S.D.	Communication Time X
	-	5.70	26.66
1	-		18.48
	-		60.00
	-		46.66
	14.29		54.00
	-	-	48.33
2	-		70.00
	-		16.66
	-		60.00
	-		50.00
	-	-	23.33
3	-		93.84
	-		53.33
	-		82.22
	-		90.00
	-		92.30
	-		50.00
	-	-	21.66
4	-		35.83
	-		46.66
	-		55.00
	-		17.31
	-		54.33
	-	0.53	71.11
5	1.45		52.91
	-		85.00
	-		75.55
	-		60.00
	-		75.00
	-	12.90	31.33
6	-		16.66
	-		40.77
	-		67.14
	32.35		72.22
	-	-	31.66
7	-		30.00
	-		13.33
	-		9.44
	-		34.81
	-		41.05
	-	4.30	13.33
8	-		9.62
	-		83.33
	10.00		57.77

Raw Data Converted to Percentages for Observations of Individual Nurses for Level IV and Communication Time (Continued)

Nurse	Technology X	Technology S.D.	Communication Time X
	-	1.96	85.00
9	-		88.23
	-		69.00
	5.26		55.55
	-		66.66
	-		66.66
	-	-	91.66
10	-		66.66
	-		100.00
	-		75.00
	-		

APPENDIX E

Formulas for the *z* Test

Formulas for the z test

The formula for the analysis of the area of the behavioral activity curve of each nurse was:

$$z = \frac{\bar{X} - I}{\sigma}$$

where:

$\bar{X}$ = average of observed item scores

I = each individual item

σ = nurse's standard deviation

The formula to determine if nurses in the sample were from the same population:

$$z = \frac{\bar{X}_g - \bar{X}_i}{\sigma_g}$$

where:

$\bar{X}_g$ = group mean

$\bar{X}_i$ = individual mean

σ_g = standard deviation for group

APPENDIX F

Means of Individual Nurses in Rank Order

Means of Individual Nurses in Rank Order

Rank	Subject	I A	Subject	I B	Subject	I Total
1	7	50.70	10	13.75	7	52.16
2	1	43.00	3	10.33	3	44.40
3	8	35.67	6	6.60	1	44.08
4	2	34.92	4	2.80	6	40.71
5	4	34.45	7	1.87	10	36.55
6	6	34.10	9	1.47	4	36.53
7	3	34.07	1	1.07	8	36.45
8	9	32.08	8	.78	2	34.92
9	5	31.86	5	.70	9	33.55
10	10	22.80	2	-	5	32.56
Group		35.31		3.86		39.17

Rank	Subject	II E	Subject	II H	Subject	II P	Subject	II Total
1	8	9.35	5	26.29	8	17.02	10	41.43
2	3	8.51	9	24.91	10	14.60	5	36.79
3	10	7.81	2	20.48	9	11.23	9	36.63
4	7	3.72	10	19.02	3	8.24	3	29.44
5	5	3.40	4	18.07	5	7.09	2	29.20
6	2	3.37	6	14.74	2	5.36	8	29.12
7	6	2.75	3	12.69	6	5.09	4	22.84
8	1	1.25	7	8.52	7	4.67	6	22.58
9	9	.49	1	7.73	4	4.56	7	16.70
10	4	.21	8	2.75	1	1.25	1	10.23
Group		4.08		15.52		7.91		27.50

Means of Individual Nurses in Rank Order

Rank	Subject	III o	Subject	III v	Subject	III Total
1	2	5.25	1	42.65	1	42.83
2	8	1.97	4	40.22	4	40.85
3	10	1.73	7	31.13	2	35.87
4	3	1.45	2	30.62	8	31.91
5	9	1.41	5	30.16	7	31.13
6	6	.65	8	29.94	5	30.43
7	4	.63	6	29.48	6	30.13
8	5	.24	9	28.34	9	29.75
9	1	.18	3	24.70	3	26.15
10	7	-	10	20.28	10	22.01
Group		1.35		30.75		32.10

Rank	Subject	IV Total	Subject	Comm. Time
1	6	6.47	10	83.35
2	1	2.86	9	77.22
3	8	2.50	5	69.92
4	5	.24	3	55.21
5			6	45.62
6			8	40.92
7			2	40.00
8			4	38.70
9			1	34.30
10			7	26.71
Group		3.02		51.20