



NURSING PAPERS ***PERSPECTIVES EN NURSING***

Measuring Patient Coping

Codes and Coping

A Nursing Tribute to Northrop Frye

Longitudinal Follow-up of Prematurely Born Children:
PredischARGE Outcomes of
Hospital Stimulation Programme

Longitudinal Follow-up of Prematurely Born Children:
Outcomes of Home Stimulation Programme to Age Four

Summer/Été 1984

Vol. 16, No. 2



EDITOR / RÉDACTRICE EN CHEF

MOYRA ALLEN, Ph.D. (Stanford), *Professor, School of Nursing, McGill University (Retired)*

ISSUE EDITOR / RÉDACTRICE DU PRÉSENT NUMÉRO

KATHLEEN KING, M.S.N. (Yale), *Professor, Faculty of Nursing, University of Toronto*

REVIEW BOARD / COMITÉ DE LECTURE

EVELYN ADAM, M.N. (U.C.L.A.), *Professeur titulaire, Faculté des sciences infirmières, Université de Montréal*

JOAN ANDERSON, Ph.D. (British Columbia), *Associate Professor, School of Nursing, University of British Columbia*

SHARON OGDEN BURKE, Ph.D. (Toronto), *Associate Professor, School of Nursing, Queen's University*

NANCY COCHRANE, Ph.D. (Toronto), *Director of Nursing Research, Hospital for Sick Children, and Associate Professor, Faculty of Nursing, University of Toronto*

BEVERLEE ANNE COX, Ph.D. (Simon Fraser), *Professor, Faculty of Nursing, University of Western Ontario*

LESLEY F. DEGNER, M.A. (Washington), *Associate Professor, School of Nursing, University of Manitoba*

GEORGETTE DESJEAN, Ph.D. (Wayne State), *Professeur agrégé, Faculté des sciences infirmières, Université de Montréal*

PEGGY-ANNE FIELD, Ph.D. (Alberta), *Professor, Faculty of Nursing, University of Alberta*

HELEN GLASS, Ed.D. (Columbia), *Professor and Coordinator, Graduate Program in Nursing, School of Nursing, University of Manitoba*

JUNE F. KIKUCHI, Ph.D. (Pittsburgh), *Associate Professor, University of Alberta; Clinical Nurse Researcher, University of Alberta Hospitals*

PATRICIA MCKEEVER, M.Sc. (A.) (McGill), *Assistant Professor, Faculty of Nursing, University of Toronto*

MARGARET F. MUNRO, Ph.D. (Michigan), *Associate Dean, Faculty of Nursing, University of Calgary*

CLAIRE PAQUETTE, M.A. (Washington), M.Ps. (Ottawa), *Professeur agrégé, Faculté des sciences infirmières, Université de Montréal*

THÉRÈSE RAINVILLE, D.Ed. (Counselling) (McGill), *Professeur agrégé, Faculté des sciences infirmières, Université de Montréal*

JUDITH A. RITCHIE, Ph.D. (Pittsburgh), *Associate Professor, School of Nursing, Dalhousie University*

CAROLYN ROBERTS, Ph.D. (Wayne State), *Associate Professor, College of Nursing, Arizona State University*

FLORENCE E. STEWART, M.Sc.N. (Western Ontario), *Assistant Professor, Faculty of Nursing, University of Western Ontario*

S. JOY WINKLER, Ph.D. (Wayne State), *Associate Professor, School of Nursing, University of British Columbia*

EDITORIAL REPRESENTATIVES

REPRÉSENTANTES DE LA RÉDACTION

MARJORIE WALLINGTON, *Lakehead University*
 FERNANDE HÉBERT, *Université Laval*
 ROSE KINASH, *University of Saskatchewan*
 ALBERTA CASEY, *University of Ottawa*
 RUBY DEWLING, *Memorial University of Newfoundland*
 DONNA FOLEY, *University of Windsor*
 JO-ANN FOX, *MacMaster University*
 JANE G. WILSON, *University of Toronto*
 DONELDA ELLIS, *University of British Columbia*
 ELLEN MacFARLANE, *St. Francis Xavier University*
 JOYCE MacQUEEN, *Laurentian University*
 CAROLYN B. ATTRIDGE, *University of Victoria*
 IRENE NORDWICH, *University of Manitoba*
 JULIENNE PROVOST, *Université de Montréal*
 ANNETTE O'CONNOR, *Queen's University*
 MARGARET MUNRO, *University of Calgary*
 BARBARA DOWNE-WAMBOLDT, *Dalhousie University*
 DOROTHY WASSON, *University of New Brunswick*
 JEANNETTE DOUCET, *Université de Moncton*
 JENNIECE LARSEN, *University of Alberta*
 McGill University
 JUDY MITTON, *Ryerson Polytechnical Institute*
 LORI HALLER, *University of Western Ontario*
 LUCILLE THIFAUT, *Managing Editor/Adjointe à la rédaction*

NURSING PAPERS/PERSPECTIVES EN NURSING is published quarterly by the School of Nursing, McGill University, 3506 University Street, Montreal, Quebec, H3A 2A7. The present issue is jointly sponsored by the Faculty of Nursing, University of Toronto. Letters regarding subscriptions, changes of address and other business matters should be sent to the Managing Editor, *Nursing Papers*, McGill University.

SUBSCRIPTION RATES: Institutions (including hospitals, schools, libraries and agencies): \$22/one year; \$40/two years. Individual subscriptions: \$16/one year; \$30/two years. Please add \$5 per year for overseas airmail service.

ADVERTISEMENTS: Full page display ad \$300; half page display ad \$175.

BACK ISSUES: are available at \$6 per copy or \$24/year. Xerox copies of articles are available at 25¢ per page or a minimum of \$3.00 per article.

To ensure prompt service when you write to us about your subscription, please include the address label from your *Nursing Papers* mailing envelope.

NURSING PAPERS/PERSPECTIVES EN NURSING est une publication trimestrielle de l'École des sciences infirmières de l'université McGill, 3506, rue University, Montréal, Québec, H3A 2A7. Le présent numéro est réalisé conjointement avec la Faculté des sciences infirmières de l'université de Toronto. Toute correspondance relative aux abonnements, à un changement d'adresse ou à d'autres questions doit être adressée à l'adjointe administrative à la rédaction, *Perspectives en nursing*, Université McGill.

ABONNEMENTS: Institutions (ce qui comprend les hôpitaux, les écoles, les bibliothèques et les agences): 22\$ pour une année; 40\$ pour deux ans. Abonnements individuels: 16\$ pour une année; 30\$ pour deux ans. Veuillez compter 5\$ de plus par année pour les envois par avion outremer.

ANNONCES: 300\$ la page; 175\$ la demi-page.

ANCIENS NUMÉROS: 6\$ le numéro ou 24\$ par année. On peut se procurer des photocopies d'articles pour 25¢ la page ou 3,00\$ minimum par article.

Pour accélérer le service dans toute correspondance relative à votre abonnement, veuillez inclure l'étiquette de l'enveloppe dans laquelle vous sont envoyées les *Perspectives en nursing*.

Dépôt légal — 1er trimestre 1974.

Bibliothèque Nationale du Québec.

© McGill University, School of Nursing, 1984.

CONTENTS — TABLE DES MATIÈRES

2 Foreword / Avant-propos

3 Measuring Patient Coping

Résumé: Evaluation de la façon de composer (coping) du patient

Jane Graydon

13 Codes and Coping: A Nursing Tribute to Northrop Frye

Résumé: Codes et façons de composer: un hommage à Northrop Frye

Rebecca Hagey

30 Longitudinal Follow-up of Prematurely Born Children: Predischage Outcomes of Hospital Stimulation Programme

Résumé: Suivi longitudinal d'enfants prématurés: résultats du programme de stimulation à la sortie de l'hôpital

Jacqueline Chapman

49 Longitudinal Follow-up of Prematurely Born Children: Outcomes of Home Stimulation Programme to Age Four — a Preliminary Analysis

Résumé: Suivi longitudinal d'enfants prématurés: résultats du programme de stimulation à la maison jusqu'à l'âge de quatre ans — analyse préliminaire

Jacqueline Chapman

66 Information for Authors

67 Renseignements à l'intention des auteurs

FOREWORD

This is the second of two collections of papers by members of the Faculty of Nursing of the University of Toronto on the theme "Coping with and adaptation to health-related issues." In her introduction to the first collection (*Nursing Papers*, Spring 1984), Dean Jones commented on the importance the Faculty attributes to this aspect of the work of nursing. She also pointed out the variety of health-care situations and the "range of human responses to health problems" encompassed by the papers. The present collection shows a similar variety and range.

The very range of human responses generates a range of approaches to the giving of care; the latter may generate controversy. Discussion of controversial subjects is an evidence of vitality and it is hoped this issue may contribute to and encourage such discussion.

Kathleen King
Professor

AVANT-PROPOS

Voici le deuxième recueil d'articles écrits par des membres de la faculté des sciences infirmières de l'université de Toronto, et portant sur le thème "comment composer avec les problèmes liés à la santé et comment s'y adapter." Dans son introduction au premier recueil (*Perspectives en nursing*, printemps 1984), la doyenne, Phyllis Jones, soulignait l'importance que la faculté attachait à cet aspect des sciences infirmières. Elle attirait également notre attention sur la diversité des situations propres aux soins de la santé et sur "l'éventail des réactions humaines devant les problèmes de santé", contenus dans les articles. Le présent recueil reflète une diversité et un éventail comparables.

Cet éventail des réactions humaines fait nécessairement appel à un éventail d'approches en regard des soins, ce qui risque de susciter des controverses. Le débat de sujets controversés est une preuve de vitalité et il faut espérer que les articles du présent numéro pourront susciter et encourager un tel débat.

Kathleen King
Professeur

MEASURING PATIENT COPING

Jane E. Graydon

When faced with a threatening event an individual will utilize various strategies in an attempt to cope with it and lessen its emotional impact. Most people find hospitalization a very threatening experience and although many patients cope effectively with this experience, some do not. For the individual who has difficulty coping, both the course of his illness and the subsequent quality of his life may be adversely affected (Mechanic, 1977). Identifying patients who are having difficulty coping should, therefore, be a concern of the nurse. If a nurse could measure the extent to which patients were coping she would be able to identify those patients who were having difficulty coping and, thus, in particular need of her attention. There is, however, no generally accepted, valid way to measure patient coping. Without such a measure nurses are unable to identify, with any certainty, which patients are having difficulty coping. The present study was, therefore, undertaken to assess whether one particular method of measuring patient coping provides a valid measure.

Coping has been defined in different ways by different authors. It has been defined by Lazarus and his associates as the efforts, both action-oriented and intrapsychic, which an individual makes to manage environmental and internal demands which tax or exceed his resources (Lazarus & Launier, 1978). Although different problems require different solutions Lazarus and Launier (1978) identify four modes or forms of coping. These are direct action such as fight or flight; information seeking; intrapsychic in which attention deployment, defensive thought processes or wish-fulfilling fantasies are used to neutralize the threat or achieve the desired goal; and inhibition of action which involves refraining from actions which are impulsive or which might be dangerous or embarrassing. Lazarus (1968, 1974) makes no distinction between the merits of the various coping responses. Any of the coping modes may be used by the individual either to alter a stressful person-environment relationship or to control his emotional response to the situation (Lazarus & Launier, 1978).

Jane E. Graydon, R.N., Ph.D., is associate professor, Faculty of Nursing, University of Toronto.
--

The author gratefully acknowledges Dr. Jean E. Johnson for her guidance with this study.

Unlike Lazarus, Weisman and Worden (1976-77) differentiate between coping and defending. According to them, coping involves the individual taking active measures which result in mastery, control or resolution of an identified problem and, as a consequence, relief of distress. The use of defence mechanisms, they believe, results in the individual's distress being relieved because of avoidance or denial of the problem, not its resolution (Weisman & Worden, 1976-77). Coping is seen as involving a conscious problem-solving process which is undertaken in response to a problem which has been identified as such by the individual. They believe that the individual faced with an identified problem responds with a coping strategy. The coping strategy employed either does or does not lead to a resolution of the problem. If the problem is resolved the individual will have coped effectively with it (Weisman & Worden, 1976-77).

According to this definition of coping, individuals should be able to identify the problems they are facing, the coping strategies they have used and the extent to which the problems have been resolved. This is an attractive definition for nurses as it should be relatively easy for the nurse to obtain this information from patients. It is the validity of this method of measuring coping which was assessed in this study.

A number of factors may influence an individual's coping. An individual's coping may be influenced by the events occurring in his life such as the problems and concerns he is having to deal with and the emotions he is experiencing (Lazarus, 1974). Having many concerns is thought to strain the individual's coping ability, resulting in less effective coping. The intensity and quality of the emotions an individual experiences is also believed to be directly related to the effectiveness of his coping (Lazarus, 1968, 1974). In addition, for a person who is ill, the seriousness of his illness is thought to affect his coping. Being highly concerned, having a serious illness and having high emotional distress have all been associated with less effective coping.

The present study examined the criterion-related validity of the coping scores obtained by a nurse following the procedure Weisman and Worden used to assess coping. Weisman and Worden interviewed patients concerning their problems, the strategies they had used, and the extent of resolution of the problems. The purpose of the present study was to determine if a nurse measuring coping in this way would obtain a valid measure of patient coping.

The validity of an instrument indicates the extent to which the instrument measures what it was intended to measure (Magnusson, 1976). To determine the validity of the coping scores obtained by the nurse, an assessment was made of the extent to which these scores

related to factors which are associated with coping. The size of the correlations provided a direct measure of the extent of the validity (Nunnally, 1978). The amount of concern experienced by the patient, the seriousness of the patient's illness, and the emotional distress of the patient were the criterion measures used to assess the validity of the coping scores.

SAMPLE

The data for this study were collected during a six-week period in a 750-bed general hospital situated in the downtown area of a large metropolitan city. The study sample consisted of 20 patients, 10 medical and 10 surgical. When interviewed the patients had been in the hospital between three and seven days and the surgical patients were at least three days postsurgery.

INSTRUMENTS

Concern. The amount of concern experienced by the patients was identified from their responses to the statements on the Inventory of the Current Concerns (ICC) developed by Weisman and Worden in 1977. The ICC was developed for use with cancer patients but has been used with both cancer and cardiac patients by McCorkle and Benoliel (1982). McCorkle and Benoliel report an average internal consistency reliability for the ICC of .94 and a test-retest reliability of .63 on interviews a month apart. The ICC is a list of 72 statements which might be true for anyone who is ill. The statements cover seven areas of possible concern; health, religion, work-finance, family, existential concerns, friends, and self-appraisal. For each statement the patients were asked to indicate on a three-point scale the extent to which it had been true for them. To obtain a score for the amount of concern experienced, the procedure developed by Weisman and Worden was followed. Each "true" response on the ICC was assigned a value of 2 and each "somewhat true" response a value of 1. The patient's score was then expressed as a percentage of the total score possible on the ICC and this figure was used as the measure of the amount of concern experienced by the patient.

Coping. The measure of coping was obtained by the nurse interviewing patients concerning the resolution of their problems. The extent to which their identified problems were resolved was used as the measure of coping. To obtain this measure, the procedure used by Weisman and Worden (1976-77) was followed to identify the problem, the coping strategies used, and to obtain the measure of coping. For each concern identified on the ICC the patients were asked how this had been a problem for them in order both to determine if it had

been a problem and to clearly identify the nature of the problem. For each problem identified the patient was asked "What did you do (or are you doing) about it?" in order to learn the coping strategies used.

To learn the extent to which the strategies that had been used resulted in a resolution of the problem the patients were asked "How did it work (or is it working) out?" The answers to this question were categorized according to one of four resolution categories. The resolution scores for all problems identified by one patient were averaged to give a coping score. A high coping score indicated good coping and a low score indicated poor coping.

A second measure of patient coping was obtained by having the patients self-rate how well they were coping. The patients were asked two questions regarding their coping, one concerning coping with the hospitalization and the other concerning coping with their illness. For each of these questions they were asked to rate themselves on a four-point scale which ranged from "very well" to "very poorly."

Emotional distress. The Profile of Mood States (POMS) was used to measure the patient's level of emotional distress. This tool consists of a list of 65 adjectives which measure the moods of tension, anger, vigour, fatigue, depression, and confusion. The patients were asked to indicate how they had been feeling during the preceding few days by rating each adjective on a five-point scale which ranged from "not at all" to "extremely." McNair, Lorr and Droppleman (1981) reported that the mood scales had concurrent validity as a result of finding significant correlations between them and a number of other measures. Internal consistency reliabilities for the mood scales have been reported as ranging from .84 to .95 (McNair et al., 1981).

Seriousness of illness. The relative placement of the patient's medical diagnosis on the list of diseases developed by Wyler, Masuda and Holmes (1968) was used as the measure of the seriousness of the patient's illness. This list ranks 126 different diseases according to their relative seriousness. Seriousness of illness could have been measured either by an objective measure such as provided by this ranking of diseases or by a more subjective measure such as the patients' assessment of their symptoms. The objective measure was thought to provide a more accurate measure of the concept seriousness of illness and was, therefore, used in this study. Wyler et al. (1968) developed the list of diseases by having 117 physicians and 141 non-physicians rank 126 diseases according to their relative seriousness. The mean rank order correlation between the physician and non-physician groups was highly significant ($Rho = .95$) and so the rankings of the two groups were combined, giving one rank order of diseases (Wyler et al., 1968).

PROCEDURE

Patients who met the sample criteria and who were available to be interviewed were approached by the investigator who explained to them the nature of the study and asked if they were willing to participate in it. If they were, the data collection procedure always followed the same sequence. The subjects were given the ICC to complete. This was followed by a taped interview concerning their problems and their coping. Finally the subjects were given a questionnaire to complete which included the POMS and the questions about their coping.

RESULTS

Sample. The subjects were all English speaking and their ages ranged from 21 to 62 years of age, with a mean of 37 years. There were 11 males and 9 females in the sample; 11 of them were married, 6 were single and 3 were divorced. There was no difference between the medical and surgical patients with respect to age, sex or marital status. Eighteen of the patients had been hospitalized previously. The sample consisted of patients with a variety of medical diagnoses in order to have some variability in the criterion to measure the seriousness of the patient's illness. The medical group included patients with diabetes (5), hypertension (1), hyperthyroidism (1), lymphangitis (1), nephritis (1), and pneumonia (1). The surgical group included patients who had had the following surgeries: abdominal hysterectomy (2), appendectomy (2), cholecystectomy (1), corrective jaw surgery (1), inguinal herniorrhaphy (2), and mastectomy (2).

When interviewed the surgical patients had been in the hospital longer than the medical patients. The medical patients were interviewed 3 to 6 days after admission to the hospital, mean of 4 days; the surgical patients were interviewed 3 to 7 days after admission, mean of 5.3 days. Analysis using a t-test for independent samples revealed that this difference was significant ($t(18)=2.41, p<.05$). Although the surgical patients were interviewed 3 to 5 days after their surgery, mean 3.9 days, most of them had spent a period of time in the hospital prior to the surgery and this accounted for them having been in the hospital longer than the medical patients when interviewed. The number of days that they had been in the hospital prior to their surgery ranged from 0 days, for one patient who was admitted with acute appendicitis and taken directly to surgery, to 3 days, with a mean of 1.4 days.

There was no difference between the medical and surgical patients with respect to any of the variables measured in the study. There was no difference in either their coping, the amount of their concern or the amount of their emotional distress when their scores for these were compared using t-tests for independent samples, or the seriousness of their illness when these scores were compared using the Mann Whitney U test.

Neither the amount of emotional distress the patients experienced, the extent of their coping, nor the seriousness of their illness was related to the length of time they had been in the hospital when interviewed. There was, however, a relationship between the number of days they had been in the hospital and the amount of concern they experienced ($r(19) = -.61, p < .01$). Those who had been in the hospital a longer time were less concerned than those who had been in the hospital a shorter time.

Coping. The coping scores obtained by the nurse ranged from 1.29 to 3.5 with a mean of 2.48, median of 2.35, and standard deviation of .66. Although 4 patients had a score of 2.0 the distribution of the scores was fairly even, with 13 of the 20 patients receiving coping scores between 2.0 and 3.0 inclusive. There was only slight skewness of the distribution (.16). The reliability of these scores was determined by having a random sample of four interviews (20% of the total sample) analyzed independently by another rater. The extent of resolution of the 17 problems identified by these patients was compared. There was 71% agreement between the resolution scores obtained by the investigator and those obtained by the independent rater.

The coping strategies the patients used to deal with their problems were categorized according to the list of 15 coping strategies developed by Weisman and Worden (1976-77). However, some of the strategies utilized by the patients were difficult to categorize. As a result of the difficulties encountered, no analysis of the coping strategies was carried out.

Concern. The scores for the amount of concern experienced by the subjects ranged from 2.08 to 45.83 with a mean of 20.87, median of 20.14, and standard deviation of 14.45. The distribution of the scores was fairly even with only slight skewness (.24) in a positive direction. The correlation between the coping scores obtained by the nurse and the concern scores was significant and negative ($r(18) = -.56, p < .01$) indicating that the more concerned the patients were, the poorer their coping (Table 1).

Table 1
Correlations Between Coping Scores
and Criterion Measures

	Amount of concern	Seriousness of illness ^a	Emotional distress
Coping	— .56**	.02	— .53*
Amount of concern		— .25	.42
Seriousness of illness ^a			.19

^a Data available for only 18 subjects

* $p < .05$

** $p < .01$

Seriousness of illness. The list of diseases developed by Wyler et al. (1968) ranks diseases and does not include surgical procedures. The surgical patients were, therefore, ranked according to the diseases which necessitated the surgery. The diagnoses of two of the patients were not on the list and thus a measure of the seriousness of illness was obtained for only 18 patients. The illnesses of the 18 patients ranged in seriousness from rank 34 to rank 125 with a median score of 81. As can be seen in Table 1, no relationship was found between the coping scores and the seriousness of the patients' illness ($Rho = .02$).

Emotional distress. The patients' scores for emotional distress ranged from —15 indicating high vigour and no distress to 86 indicating high emotional distress, with a mean of 28.40, median of 21.00 and standard deviation of 32.91. The distress scores were fairly evenly distributed along the range of —13 to 86 with only slight skewness (.26) in a positive direction. There was a significant negative correlation between the coping scores obtained by the nurse and the scores for emotional distress ($r(18) = -.53$, $p < .05$), indicating that the higher the patients' emotional distress, the poorer their coping (Table 1).

Self-rating of coping. Although the patients rated the extent to which they were coping with the hospitalization and with their illness on four-point scales, there was little variance in their responses. Of the 20 patients, 18 indicated that they were coping either "well" or "very well" with both the hospitalization and their illness. Only two patients indicated that they were coping poorly with either the hospitalization or their illness and no one indicated that they were coping poorly with both.

The coping scores obtained by the nurse were compared with the patients' self-ratings of their coping. There were significant correlations between the coping scores obtained by the nurse and the patients' self-ratings of their coping with both the hospitalization ($Rho(18) = .63, p < .01$), and their illness ($Rho(18) = .81, p < .01$).

DISCUSSION

Significant correlations were found between the coping scores obtained by a nurse interviewing hospitalized patients concerning their problems and the resolution of these problems and two of the three criterion measures used to assess the validity of these scores. Both the amount of concern and the amount of emotional distress experienced by the patients were significantly correlated with the coping scores. Thus this method of measuring coping possibly provided a valid measure of coping outcome. However, no relationship was found between the coping scores and the third criterion measure, the seriousness of the patient's illness. The fact that no relationship was found between these measures raises some questions concerning the validity of the coping scores.

There are three possible reasons for the lack of relationship between the seriousness of the patient's illness and the coping scores: either no relationship exists between these two concepts, in which case seriousness of illness was not an appropriate criterion measure, or the coping scores were not valid and did not measure coping, or the seriousness of illness scores used in the study did not measure the seriousness of the patient's illness.

Although it is possible that no relationship exists between the seriousness of a patient's illness and his coping, Weisman and Worden (1976-77) in a study of patients newly diagnosed with cancer found that such a relationship did exist. They found that those patients who were more seriously ill as a result of having a more advanced stage of the disease and more symptoms had poorer coping than those who were less seriously ill. The reason this relationship was not found in the present study may, therefore, be due to the way either coping or the seriousness of the patient's illness was measured. However, the expected correlations were found between the coping scores and two of the three criterion measures used in the study. This suggests that the lack of relationship between the coping scores and the seriousness of the patient's illness was not due to the way coping was measured but rather to the way seriousness of illness was measured.

The seriousness of the patient's illness was measured by the relative placement of the patient's medical diagnosis on the list of diseases developed by Wyler et al. (1968). Patient coping may not be influenced,

however, by an objective assessment of the seriousness of the medical diagnosis, such as provided by this list, but rather by the patient's subjective appraisal of his illness. According to Lazarus (1974), individuals who are presented with identical situations may each appraise the situation somewhat differently. Even slight differences in their cognitive appraisals will result in the individuals' experiencing different emotional reactions and attempting quite different solutions in their efforts to cope with the situation (Lazarus, 1974).

In this study five patients all had the same diagnosis, diabetes. They were, however, being affected quite differently by the illness and this undoubtedly influenced their appraisals of their illness. This suggests that the patients' own assessment of the seriousness of their illness should be measured in future studies.

The results of this study are inconclusive. While the study indicated that the coping scores obtained by the nurse interviewing patients concerning their problems and the resolution of these problems were possibly valid measures of patient coping, significant correlations were found between the coping scores and only two of the three criterion measures. Additional research should, therefore, be carried out to further substantiate the validity of this method of measuring coping before it is adopted and utilized in nursing research and practice.

REFERENCES

- Lazarus, R. S. Emotions and adaptation: Conceptual and empirical relations. In W. J. Arnold (Ed.), *Nebraska Symposium on Motivation* (pp. 175-270). Lincoln: University of Nebraska Press, 1968.
- Lazarus, R. S. Cognitive and coping processes in emotion. In B. Weiner (Ed.), *Cognitive views of human motivation* (pp. 21-32). New York: Academic Press, 1974.
- Lazarus, R. S., & Launier, R. Stress-related transactions between person and environment. In L. A. Pervin & M. Lewis (Eds.), *Perspectives in interactional psychology* (pp. 287-327). New York: Plenum Press, 1978.
- Magnusson, D. *Test theory*. Reading, Mass.: Addison-Wesley, 1976.
- McCorkle, R., & Benoliel, J. Q. Symptom distress, current concerns and mood disturbance after diagnosis of life-threatening disease. *Social Science and Medicine*, 1982, 17, 431-438.
- McNair, D. M., Lorr, M., & Droppleman, L. F. *Profile of mood states*. San Diego, Calif.: Educational and Industrial Testing Service, 1981.
- Mechanic, D. Illness behavior, social adaptation, and the management of illness. *Journal of Nervous and Mental Disease*, 1977, 165, 79-87.
- Nunnally, J. C. *Psychometric theory* (2nd ed.). New York: McGraw-Hill, 1978.
- Weisman, A. D., & Worden, J. W. The existential plight in cancer: Significance of the first 100 days. *International Journal of Psychiatry in Medicine*, 1976-77, 7, 1-15.
- Weisman, A. D., & Worden, J. W. *Instructions for scoring the Inventory of Current Concerns*. Unpublished manuscript, 1977.
- Wyler, A. R., Masuda, M., & Holmes, T. H. Seriousness of illness Rating Scale. *Journal of Psychosomatic Research*, 1968, 11, 363-374.

RÉSUMÉ

Evaluation de la façon de composer (coping) du patient

Cette étude a porté sur la validité des notes obtenues suite à l'utilisation de la technique proposée par Weisman et Worden pour mesurer la façon de composer des patients. Cette étude avait pour objectif de vérifier si une infirmière chargée de mesurer la façon de composer des patients selon cette méthode obtiendrait des résultats valides. La validité des résultats a été déterminée par la qualité de la relation qui existe entre les notes elles-mêmes et trois autres critères: le degré d'inquiétude du patient, la gravité de sa maladie et son degré de détresse affective. L'échantillon se composait de 20 patients: 10 soumis à des soins médicaux et 10 soumis à un traitement chirurgical. Les raisons de leur hospitalisation étaient diverses. Des corrélations significatives ont été obtenues entre les notes de *coping* établies par l'infirmière et le degré d'inquiétude et de détresse affective des patients. Aucun lien n'a pu être établi entre les notes de *coping* et la gravité de la maladie des sujets. Par conséquent, les résultats de cette étude démontrent que la valeur de cette méthode analytique sur la façon de composer n'est pas concluante.

NURSING RESEARCH: A BASE FOR PRACTICE

The Proceedings of the 9th National Nursing Research Conference held in Montreal on October 12, 13 and 14, 1983 are now available at \$30 per copy or \$25 for 25 or more copies (over 575 pages).

Nursing Papers subscribers are invited to place their order with the Managing Editor, *Nursing Papers*.

LA RECHERCHE INFIRMIÈRE AU SERVICE DE LA PRATIQUE

Les Actes du 9e Colloque national de recherche en sciences infirmières tenu à Montréal les 12, 13 et 14 octobre 1983 sont maintenant disponibles à 30\$ l'exemplaire ou 25\$ pour 25 exemplaires ou plus (plus de 575 pages).

Les abonnés de *Perspectives en nursing* sont invités à adresser leur commande à l'adjointe administrative à la rédaction de *Perspectives en nursing*.

CODES AND COPING: A NURSING TRIBUTE TO NORTHROP FRYE

Rebecca Hagey

In this essay I will outline features of Northrop Frye's (1982) work *The Great Code: The Bible and Literature* which are of vital interest to nurses and nursing. It is my belief that nursing as a healing art is ever involved in drama, live performance with real-life actors. Images in combination bring forth birth and death, comedy and tragedy, suffering and sorrow, comfort and joy, and are all conceived and interpreted from within one's heritage or tradition. What Frye does in *The Great Code* is elaborate and illuminate the Western tradition upon which Judeo-Christian society and culture, and healing, adapting, and coping, are based. He brings to consciousness what for most of us remains in the unconscious, hidden, realms of our behaviour, our body language and our speech acts. He exposes the vehicles of meaning we use in the production of our art of nursing. Each practitioner has in common with Shakespeare, Milton, Dante, Blake, etc. (admittedly, along with all our ancestors and everyone alive today) that the reality he creates and participates in, draws from the images of our heritage. Frye shows how the poignant and significant images appearing in literature down through the ages of Western culture are coded (i.e., have their blueprint) in the Bible.

Drawing from Frye, I will advocate a basis for interpretation, one of the fundamental arts in nursing: attending to the actual images that people express in what nurses call coping, to the structure of the meaning implicit in situations and experience (insofar as that is possible) that is, to the codes or symbolic logic of the images, and to the potential transformations or reformulations embodied in the social and political context, which is usually referenced in the images, and which nurses and patients are a part of.

It may be useful to recall here that when Frye began his career in literary criticism, the field was not well developed. There was no agreed nomenclature, there were no ground rules for what constituted the science and art of the discipline. In his polemical introduction to *Anatomy of Criticism*, Frye (1957) makes some distinguishing remarks

Rebecca Hagey, R.N., Ph.D., is associate professor, Faculty of Nursing, University of Toronto.
--

regarding the development of the discipline of literary criticism which have relevance, I believe, for the development of nursing: "There is a place for classification in criticism, as in any other discipline which is more important than an elegant accomplishment of some Mandarin caste. The strong emotional repugnance felt by many critics toward any form of schematization in poetics is again the result of a failure to distinguish criticism as a body of knowledge from the direct experience of literature, where every act is unique, and classification has no place" (p. 29).

I have expressed my own repugnance at the tendency for the schematization inherent in nursing diagnoses (one of the current attempts to establish a discipline with its own nomenclature and discourse) to violate the direct experience of caring for patients (Hagey & McDonough, 1984). So I am here attempting to begin to outline what I believe to be relevant to nursing. In the critique of nursing diagnoses referred to above I tentatively called interpretation, translation, reconstruction of meaning and symbolic action elements of nursing. For the purposes of this paper, I will be referring only to interpretation. I believe interpretation to be a more modest and humanistic approach to the development of discourse in nursing than that of diagnosis, and more compatible with the phenomenon of caring.

Frye has given me the insight that each endeavour in an art is rooted in the Judeo-Christian tradition of the LOGOS or WORD. Frye (1982) points out that in literature, Goethe's Faust divides the Logos into reason and *praxis* or creative act (Note 1). I view nursing (since much of it involves dramatic performance which unfolds in time) as being like the generation of narrative, i.e., a creative putting together of images in action, but not excluding reason and knowledge. The patients receiving nursing services are "readers" of this narrative, which for them, is not just the output of a single nurse but an entire dramatic whole, transcending multiple subscripts. The community of patients and their families and friends form an audience. They find themselves in plays in which they thought they were supposed to be the central characters. A process of communication ensues in which nurses, in turn, interpret the symbols in the environment of characters and audience and behave symbolically to make meaning.

Frye is attempting to outline his field, which he says is a sub-set of cultural history-making needing delimiting from psychology on the one hand, and anthropology in the extended sense on the other. I am attempting to delimit the critical discipline of nursing, which draws from psychology, anthropology and a host of other fields such as

sociology, physiology, socio-linguistics and the therapies of medicine, pharmacy, nutrition and so on. In *The Critical Path*, Frye (1971) sets out a vision of what must be done to develop his field:

Criticism must develop a sense of history within literature to complement the historical criticism that relates literature to its non-literary historical background. Similarly, it must develop its own form of historical overview, on the basis of what is inside literature rather than outside it. Instead of fitting literature into a prefabricated scheme of history, the critic should see literature as a coherent structure, historically conditioned but shaping its own history, responding to, but not determined in its form, by an external historical process. The total body of literature can be studied through its larger structural principles, which I have just described as conventions, genres, and recurring image-groups or archetypes. (p. 24)

I am certainly not the first to suggest that nursing ought to look within itself, to ascertain its own historical overview, to evaluate what is really inside of nursing (Schlotfeldt, 1971; Stevens, 1979). I am responding here to the challenge of contributing to the development of the larger structural principles in what has yet to become the critical discipline of nursing. Again, taking from Frye, I believe it is this critical discipline of nursing which should rightly be thought of as a science. But the *praxis* — reasoned, creative caring, i.e., attending to meaning for the people we serve, — should be conceived of as art.

The production of nursing care is no less the production of images than is the creation of literature. The concretists may say in opposition to this view that nursing is not just dealing with images. It utilizes hardware, harsh medicine, observational tools and management techniques, all of which are real and consequential, in addition to being images. It uses crucial diagnostic categories which must be treated concretely and denotatively. They must be plugged into the appropriate treatment in the same way, say, a cardiac monitor must be plugged into some concrete electrical source.

I would look at it more holistically. All of the concrete paraphernalia and hard facts considered to be the tools of nursing, are laden with images. Furthermore, images are utilized in organized ways which are culturally constituted according to convention. It is the archetypes of cultural meaning and values, so invisible to nurses, which demand the presence or absence of concrete paraphernalia and facts

and which encode the behaviours of each of the actors in the live dramas we participate in. (See Goodenough (1971) for the concept of DNA-like codes in culture and language).

Frye (1982) makes a similar argument in the introduction to *The Great Code*. He suggests, I think, that Biblical scholars and practitioners of Christianity whose primary concern is historical fact and theological consensus, to the exclusion of the significant coded imagery and dramatic structure of the Bible (which has been a formidable resource for generation upon generation) have been misled. They have missed great opportunities for literary insight and understanding of our cultural heritage and the power of particular works of art. I turn now to highlight selections from *The Great Code* which may lead to interpretive insight on the part of nurses regarding the settings we work in and the dramas we are party to. All references to Frye's work are to this 1982 publication, except where otherwise stated.

CONSIDERATIONS ON THE NATURE OF 'LANGAGE'

Taking from Vico, Frye outlines three phases of 'langage', the French idea of the basis for mutual intelligibility in human language development, which have changed from those he set down in *The Anatomy of Criticism*; hieroglyphic, hieratic and demotic. He elaborates upon the three types as being primarily metaphoric, metonymic (in a specific sense) and descriptive, respectively. As to chronology, one sees much metaphoric or poetic writing in the Bible. Here, subject is not separate from object and words have magical powers. When something sacrosanct is said or read on a sacred occasion, words are used as a powerful force (Frye, p. 6). I believe such sacrosanct contexts have not disappeared with advancement of technology. There are many instances in health care settings where words carry a magic — either positive, soothing and healing or despicable and unspeakably devastating — such as when someone is receiving diagnosis or prognosis, or coming to, from unconsciousness or shock. It behooves nursing to investigate the magical power of words and the rituals they are part of. Furthermore, there are many segments of today's world where altered states of consciousness constitute important ways of coping and the ritual use of words and related symbols has been well documented. The medical anthropology literature is replete with examples of this in nonwestern cultures as well as those influenced by Christianity. (Lambek, 1981, and Hagey, 1980, respectively.)

The hieratic or second phase of 'langage' development is exemplified in Plato, where subject and object show separation, where a dialectic emerges, where a separate form of reality (thought) exists

alongside experience (Frye, p. 8). Also, in this phase allegory gains prominence, where there is a metaphorical paralleling twined in with the conceptual prose. Syllogistic reasoning is evident, where conclusions are already contained in the premises; "I think, therefore I am" was distinctive of this phase. Frye points out that this type of language formulation is useful in maintaining authority. It is my observation that much explanation to patients in medical settings is coded in this phase of '*langage*': "Your kidneys seem to want to shut down." "It will heal when it's good and ready to." "You've been under a great deal of stress." (Note 2)

Each of these statements makes use of a sort of personification of causality where the effect is syllogistically related to the culprit with whom the professional has limited personal knowledge, and therefore limited influential ability. What is interesting in the implied relations of such statements is the partial separation of I from thou. There is no signal that nurse and patient are divided and opposed as subject and object. Rather, what may be opposed is one aspect of the patient to another, e.g. his kidneys to his body. Such explanations, frowned on in scientific circles as childish and inaccurate, are perhaps deliberate attempts on the part of practitioners to be of some authority and yet, not to be too distant.

The demotic, or descriptive, third phase of '*langage*' according to Frye appears in English literature with Francis Bacon and John Locke. Subject and object are clearly separated. Frye says, "Hence this approach treats language as primarily descriptive of an objective natural order. The ideal to be achieved by words is framed on the model of truth by correspondence. A verbal structure is set up beside what it describes, and is called 'true' if it seems to provide a satisfactory correspondence to it" (p. 13). It is to this model of parallel accuracy between the description of the observer and what is observed that schools of nursing aspire. Here the nurse and the patient are completely separated as subject and object. The nurse is the one to diagnose objectively clinical entities observed in the patient. The crusade in the nursing diagnosis movement is to be able to produce a descriptive set of nomenclatures which accurately represent the realities any clinician might encounter, from constipation to poor coping strategies. (See the list of nursing diagnoses used at the University of Toronto, Faculty of Nursing, developed by Jones and Jakob, 1982.)

Frye points out that this third phase is now being superseded since Einstein has shown that matter ("the great bastion of the objectivity of the world") is an illusion of energy (p. 14), and "we seem now to be confronted once again with an energy common to subject and object which can be expressed verbally, only through some form of

metaphor" (p. 15). Already, nurses are joining linguistic philosophers in studying the implications of the metaphoric basis of language expression which may bring forth the new fourth phase. (See, for example, my study, 1984, on metaphors surrounding diabetes where I use the framework of Lakoff and Johnson, 1980, who hold that language, indeed our entire conceptual system, is metaphorically constructed.)

MYTH AS THE ORGANIZING PRINCIPLE OF CULTURAL MEANING

For Frye the word myth does not have the popular connotation of falsehood. It means for him "first of all, mythos, plot, narrative, or in general the sequential ordering of words" (p. 31). There is a secondary sense too in which he uses the term: "It means being charged with special seriousness or importance. Sacred stories illustrate a specific social concern" (p. 33); thirdly, "A myth takes its place in mythology [as] an interconnected group of myths" (p. 33). Chronologically, Frye sees myths as evolving in pre-discursive phases of society and "what follows is that mythical structures continue to give shape to the metaphors and rhetoric of later types of structure" (p. 35). So, for example, the Exodus myth in the Bible which narrates the deliverance of Israel from Egypt was used by American Negroes to appeal to Christians in the cause of overriding slavery. Frye quotes the well-known southern spiritual as evidence:

Go down, Moses,
Way down in Egypt land
Tell old Pharaoh
Let my people go. (p. 49)

Frye suggests that mythology "is a powerful instrument of social authority and coercion, and is accordingly used as such . . . Marxism makes a similar appeal today as a unifying instrument of authority" (p. 51). For Frye, Marxist ideology is founded on the Exodus myth. The Bible itself is a set of myths whose overall structure is deliverance.

It therefore provides underlying (structural) meaning to so many specialities in health care: the medical model, the problem solving approach, the helping process, self-help and self-care; all are constructs intended to effect "deliverance" in the sense of coming through, perhaps even prevailing or surviving. Any useful comparison of these models would not be complete without consideration of their mythic origins. Leaving aside that immense undertaking, I will only note the contrast of the word "deliverance" with the word "delivery" which is used in the literature of the health professions as denoting action of the persons trading a service — bringing it to a client, thus taking the credit for any "deliverance" which may result.

METAPHORS AS VEHICLES OF MEANING CONSTRUCTION

Frye claims that "metaphor is, not an incidental ornament of Biblical language, but one of its controlling modes of thought" (p. 54). He even argues that "spiritually" (pneumatikos) in the Bible, continually means metaphorically; that Christianity as an experience can not rely on metaphoric expression (p. 56). Frye argues that myth and metaphors are the true literal basis of narrative of the Bible whose purpose by its own account is revelation to effect deliverance. Many codes for our belief and behaviour and for drama in literature are contained in the Biblical metaphors and the myths which organize them.

Let me give you an example of Biblical metaphors structuring the meaning of drama in a health care setting. A prominent medical centre in a major Canadian city conducted an assessment program for patients with chronic health problems and nurses were actively involved. The assumption was that this population of patients was "out there coping" one way or another and it would be prudent to conduct research to develop an appropriate taxonomy which could be used to describe the problems they have and evolve some sort of assessment tool which could be used to evaluate and measure the efficacy and cost of the services used to maintain them. For this research then, the patient informant had to be verbally competent. The case I am about to present involves a patient who was eliminated from the study as "verbally incompetent." However no eliminations were made until after each patient had been admitted to the hospital and had undergone a complete physical assessment.

The patient in question was an elderly woman. It was never ascertained why she agreed to cooperate in the study or what she had hoped to get out of it. The following is an account (in paraphrase) of her reactions after the admission procedure, told to rationalize why she was classified as verbally incompetent:

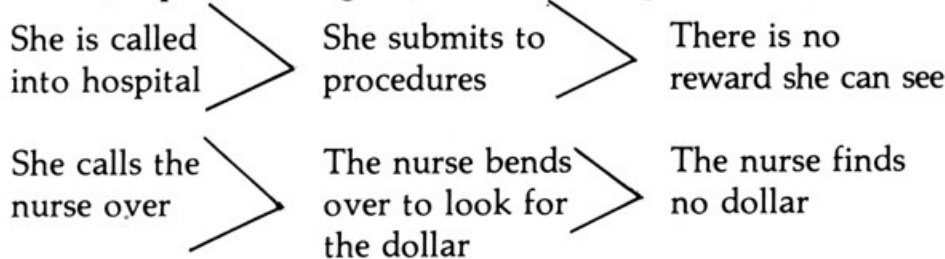
She was in a large open ward and even the other patients recognized that she was "out to lunch." She was sitting off by herself in her chair and she would call over nurses who entered, and direct them to pick a dollar up off the floor. When they got over there they found there was no dollar on the floor.

Remember that this woman had agreed to be in a study interested in finding out about how people cope with their chronic health problems. Note that the woman would be classified by a linguist as verbally competent. Her grammar was acceptable, her vocabulary was adequate. Note that the real reason, i.e., "she was out to lunch" was a category taken from folk culture, that is, it was said to be validated by

the other patients. If we attempt to understand rather than dismiss the drama displayed by this woman, we shall see a bit of Biblical logic, an old cultural code. The dramatic expression of this woman in my opinion is the manifestation of her vitality, her aliveness, her will for social communion. When it ceases she will be culturally dead and physical death will follow. Disaffection from one's culture is a main cause of death. (See for example, Turnbull's, 1961, *Forest People* for an account of how cultural breakdown leads to doom for entire populations.)

The analysis of the drama described above illuminates three principles: (a) dramatic communication is a mirroring of images, (b) dramatic sequences always reveal power hierarchies and political relationships, and (c) dramatic forms have their precursors or blueprints or codes to give them significance.

To illustrate the first principle, that dramatic communication is a mirroring of images, it can be seen that this woman gave some of herself by submitting to examination and admission to hospital (she did not come to hospital because she was ill) and she had reason to be disappointed, as there was no apparent reward as might have been expected for her participation. The drama that she expresses duplicates a structure, a parallel image of what she had gone through:



To examine the second principle, that dramatic sequences reveal hierarchies and political relationships, it can be seen that the dramatic display is a way for this woman to duplicate or have equivalent power of those who called her into the hospital. Practitioners interested in reality orientation might have hypothesized that this client had a drastic feeling of lack of power leading her to resort to such an appeal. It is ironic that her appeal itself was the very clue precipitating the decision that she was not a valid source of information about problems people have in chronic illness — such as feelings of powerlessness.

To illustrate the third principle, that dramatic forms are coded in culture, I will reference a Biblical code which has a similar structure. Frye points out that the Bible's "approach to victim figures tends to be ironic only" (p. 181) in that it avoids the Greek conception of the larger-than-life hero. (This approach encodes my perception above of irony in this woman's case.) Frye suggests that the underlying mythic

structure for such themes can be found with the following figures: "in Cain's bewilderment at the non-acceptance of his (so far) bloodless sacrifice; in Ishmael's near-starvation with his mother in the desert, and his father's lament: 'O that Ishmael might live before thee!' (Genesis 17:18); in Esau's bitter cry when he discovers how callously he has been cheated: 'Bless me, even me also, O my father' (Genesis 27:34)" (p. 181).

Taking the latter example, it becomes plausible to consider that this woman may have been feeling betrayal even as Esau did when Isaac blessed Jacob instead of him. Parallel to the structure above, the story of Esau narrates as follows:

Isaac calls Esau	>	Esau submits to the task of hunting and preparing venison in order to receive his father's blessing	>	Upon return, there is no blessing, (as it has already been given to Jacob)
------------------	---	--	---	---

Hence, the dramatic expression by the woman who was admitted for assessment of her chronic illness, is parallel to that of the Biblical account of Esau, although some might discount it because the woman played the part of Isaac in calling the nurses over to get a dollar. The neo-Freudian structuralist, Jacques Lacan, would not discount this. He would argue, I believe, that, indeed, it is through such interchangeability of roles in dramatic structures that family patterns are reduplicated one generation after another. Further, it is his contention that the kinship paradigm is one of the central most important meaning codes in all of culture, to which most other meaning structures are linked (Lacan, Note 3). That is, it does matter whether the woman in the example above had any siblings, the betrayal she felt in her chronic illness and the powerlessness it has caused her, are akin to the jealousy and anger felt by Esau when Jacob got his father's blessing but he did not and when, furthermore, he had to live as a slave unto Jacob. To put it another way, the chronic illness stands in relationship to this woman (metaphorically) as Jacob stood to Esau. It is depriving her of her birthright (to live a normal, healthy, long life) and she is a servant to her illness, if not a slave.

Another example (this one almost too obvious to be stated) of metaphor actively structuring reality in health care settings, is the notion of hell which Frye says is "a hopelessly mixed metaphor meaning (a) the human life created by human evil, (b) the world of eternal death which is the abyss or deep of nothingness, (c) a world of externally applied torture going on endlessly in time. This last aspect proved to be a very powerful political lever: as a friend of mine once remarked, good news will not sell in a mass market until it is perverted into bad news" (pp. 73-74).

Correspondingly: (a) every practitioner can identify the turmoil of blame confided by patients who associate their plight with human evil, in themselves, in others or both; (b) each of us has known patients who have experienced a sort of eternal death, an empty suffering; (c) all of us can recognize, as well, the image of risk we inject into our explanations to motivate patients toward compliance or adherence with regimens. Like mass market advertising, effective health teaching is really embedded in some ideology which implies risk in not changing behaviours or not learning some healthy technique. (See Hagey & Buller, 1983, for a contrast of the Christian notion of hell with the Ojibway idea of out-of-balance and Hagey, 1984, for a comparison of Ojibway and professional risk ideologies.)

TYPOLOGY AS FORM IN EVOLVING MEANING CATEGORIES

I have already indicated the view of constant "structures" prevailing through the ages in myth and metaphor as put forth by Frye. Here I am going to qualify that, because he also implies there is a change and change occurs in a particular way which provides for increments of significance being added to the cultural legacy. Each symbol changes when an antitype of it emerges. Frye argues that the New Testament is filled with antitypes of symbols in the Old Testament, for example, the Christian baptism is the antitype of the flood of Noah (p. 79). In both cases water serves as a propitious sort of purge and implies certain responsibilities, so the structure is similar but the emergent form is different.

Frye sees typology as a kind of compelling rhetoric analogous to that of causality (p. 81). Both follow a retrospective procedure which is reversed to a forward-looking direction. Whereas causality relates to the past and is "based on reason, observation and knowledge, . . . typology relates to the future and is . . . related primarily to faith, hope and vision" (p. 82). Causality (especially descriptive phase) tends to be in the same time plane whereas typology can transcend time. Frye argues that it is the typological structuring of Biblical myth that makes it diachronic and in a sense repeatable (pp. 83-84).

An example can illustrate. The fashion trend in North America in the 1960s to long hair, even in men, could be seen as a new form of spiritual strength, making reference to Samson (Judges 13-16). Today the fad has shifted to a long wisp of hair making visible contrast to an otherwise short haircut. With this cultural backdrop, cancer victims who lose their hair as a result of chemotherapy, have to contend with old meaning codes. Their own weakness and dismay can be seen as typologically similar to that felt by Samson after he let down his guard to Delilah, who had his head shaved; whereupon he lost his strength and was taken prisoner by the Philistines who put out his eyes (Judges 16: 17-21). The

anxiety confided by these patients about their hair growing back is not just some preoccupation with vanity and cosmetics but rather is a manifestation of their battle with cancer. Often their concern is that the chemotherapy treatment itself can betray them (just as Delilah betrayed Samson, although at first she represented something positive after the cruel killing of his wife and son at the hands of the Philistines).

This new antitype of symbolic form forced on patients by their chemotherapy is celebrated by today's punk rockers with their shaven heads (but with some hair growth shown) and their purple markings mimicking radiation technology in cancer treatment. Susan Sontag (1979) elaborates upon the metaphors surrounding such cancer imagery: "so charged with the fantasy of inescapable fatality — a vehicle for the large insufficiencies of this culture, for our shallow attitude toward death, for our anxieties about feeling, for our reckless improvident responses to our inability to construct an advanced industrial society which properly regulates consumption and for our justified fears of the increasingly violent course of history" (pp. 84-85). In this example, the antitype and type both symbolize relations with an invasive enemy, cancer and the Philistines respectively, yet the antitype claims added associations reflecting the times and compelling metaphoric relations it references.

PHASES OF REVELATION

There are certain Biblical themes that keep repeating themselves in our culture and it may be useful for nurses to reflect on the origins and archetypes of meaning which pervade and invade our discipline. The seven phases of revelation Frye discusses are creation, revolution, law, wisdom, prophecy, gospel and apocalypse. Each holds significant blueprints for illuminating the conceptions and affective ordeals in the process of deliverance, which in part constitutes the Western cultural repertoire for coping behaviours and the facilitation of adaptation. For lack of space I will make reference only to the first phase.

In the creation myth there is the importance of the WORD. Frye points out, "The forms of life are spoken into existence" (p. 106), and comments "Genesis presents the Creation as a sudden coming into being of a world through articulate speech (another aspect of logos), conscious perception, light and stability (p. 108). "The metaphor underlying beginning" Frye says, "is not really birth at all, it is rather the moment of waking from sleep when one world disappears and another comes into being" (p. 108). I contrast the cultural implication of this with those of another tradition, for example, Ojibway. By comparison, Judeo-Christians inherited an inordinate bias toward cognitive articulation, verbal performance, awakening through receiving information. The teacher, preacher and Rabbi are cast in a different mythical mold from Nanabush, the "teacher" figure in Ojibway culture, who is a trickster and bumbler.

I have participated in Ojibway health educational workshops in which the spiritual leader in essence becomes Nanabush and plays a lot of tricks and struggles with staying in balance. Health problems are presented as problems of imbalance and the individual is left to decide how balance can be restored. So, for example, instead of saying obesity is *the* major factor in Type II Diabetes, he says, "Thin or fat can get diabetes, maybe more often somebody could get it if they are overweight." This "imprecision" is very disturbing to health professionals who are often resource people committed to the WORD, to *accurate health information*. Even when informed of the cultural context of the workshops, these professionals often have a hard time containing themselves, as they are to save the bodies of the Natives from ignorance in the same way the missionaries of old were there to save their souls from sin, through spreading the Word.

The codes reviewed in each phase of Biblical revelation provide basic meaning constructs for secular life today. Frye constantly emphasizes the interchange between sacred and secular knowledge, that is, hidden roots of today's cultural conceptions in the sacred past.

READING THE COPING PROCESS

There are several principles I wish to discuss in relation to caring for people, taken from Frye's basic question which I understand to be: How does one read, interpret and make sense of the Bible? By an admittedly remote analogy, I am asking: How does the nurse "read," interpret and make sense of coping processes in Western culture? I have found useful some of Frye's concerns which are outlined briefly here.

1. *Non-literal interpretation is appropriate.* Frye makes an appeal for the Bible to be read non-literally as a sort of mythic poetry. He claims (p. 174) myth and metaphor are not the basis for rationality, strictly defined (Note 4). I find this appeal relevant for interpretation in nursing. An instance is seen in the following example.

An elderly woman was admitted to the hospital with a severe respiratory infection approximately one week after she had been placed in a nursing home. Although she had fever which diminished her lucidity, in her encounters with her, the student working on her case, found her rational and oriented. However, despite her difficult laboured breathing, this woman would call out to the nurses as they passed her room: "Open the door, please open the door." One by one the nurses would enter the room and admonish her with abrupt tones "Your door, here, is open," "Can't you see? Look, the door is open."

In this case the nurses, uneducated about meaning and how it structures our language and expression, made literal, denotative reference to the door of the room, which already being open led them to discount the woman's concern. Yet, the concept of door can serve a multitude of metaphors and can even operate mythically as it allows for passage, transformation, narrative shifts and so on. The student in her care and concern for this woman indeed found a gold mine of "meaning." The door in this case led back to the patient's daughter's home and to the office of the nursing home administrator and, as might be expected, into eternity. Even these explicit references are mere pinpoints in comparison to the complex webs of meaning occupying this woman's consciousness and being, which were sabotaged, indeed violated by literal interpretation, as this brief example shows.

2. *Dangers of solidarity and ostracism are generated by metaphor and myth.* I mentioned previously that the political is referenced in images. I do not mean this in the minimal sense of personal power of an individual to mobilize resources but rather in the transcendental sense of a whole polity, with sovereignty, solidarity, unity and governance of territory. Frye documents how metaphor operates to achieve this. For example, he stresses the powerful metaphors associated with the body of the Messiah (p. 224), compelling the growth of the early Christian church. We have its equivalent as a basis for unity today in "the body of nursing knowledge."

Myth too achieves and serves shifts in management of resources (Note 5). Frye (p. 150) points out that the story of Jacob and Esau, alluded to above, marked a change from a food-gathering economy to a ranching one (Esau, the foodgatherer, did not get the birthright). Myth serves the purpose of legitimizing such change. It is this aspect of mythic function which facilitated the dramatic response of dismissal of the "verbally incompetent" chronically ill woman mentioned earlier. Mythically, her irrelevance is encoded through metaphoric equivalence to Esau's irrelevance.

Again, I believe this insight could improve responses to patients in health care settings by forcing a selection of more humanitarian myths to organize our care. For example, a woman in her mid-fifties with a cancer which has metastasized to the brain had some pain for which she required narcotic injections to keep in check. The nurses observed that the woman seemed to be asking for the shots far more often than she needed them and a power struggle ensued in which exchanges of nasty names were made and the woman was labelled a "problem patient" (Note 6). In confidence, the woman talking about her pain used the image of Joan of Arc. She admitted to trying to increase the availability of the shots now while her pain was not too severe to avoid a time in which she would be

"burning at the stake" and a shot would not be forthcoming, either because the nurses had plotted against her, or because the order did not permit it. Her history of her relations with the nurses, she said, conjured the image, since she was made to wait for her shot as punishment for rebelling against some of the goings-on on the ward by expressing her disapproval.

This example suggests that the bureaucracies nurses work in can be experienced by patients as territorial units or policies with all the robust drama of militancy, intrigue, retaliation, etc. To nurses, the disease can be the enemy and so can the patient. This state of affairs raises serious questions about the position of nurses as interpreters where patients are literally at the mercy of cultural codes: collective and sovereign metaphors and mythic frameworks which structure unconscious interpretation and render patients ostracized.

3. *Causality and typology are used rhetorically.* Frye has marvelled, along with Whitehead, that causality is still permitted as a legitimate form of rhetoric, given Hume's succinct critique of it (Frye, 1982, p. 81; Whitehead, 1967). Critics of the relations in health care settings manifested in capitalist societies (e.g., Taussig, 1980) have lamented the imposition and implementation of causal models which violate the patient's own experience and deter healing and well-being. Taussig even implies that if serious attention is paid to interpretation of individual needs, then contingencies in the organization of care will preclude the sort of spontaneous reciprocity necessary to healing (Taussig, 1980, p. 10). I believe he has raised an important question worthy of empirical investigation. However, I believe there is a prior question which needs addressing. Do practitioners have an adequate model of interpretive procedures and of the nature of language and non-verbal behaviour in the dramatic settings we work in from which to conduct interpretation? Indeed, is interpretation part of the repertoire of skills of the average practitioner or do most practitioners make assumptions and unconsciously occupy some mythic mold to respond, however inappropriately, or interpret literally, as we saw in examples above? Can organizational changes be made which deter the use of some types of mythic frameworks, to improve "care"? Should nurses be organizing to make conditions of work more amenable to well-being which comes through attention to meaning and interpretation?

It is my belief that Frye's concepts offer a new outlook for the task of interpretation. Perceptions are not articulate representations of a single value of thought, but rather they are tied to deep narrative structures coded in our culture. In this view, interpretation is not a matter of "pinpointing" the correct value but rather a matter of decoding entire gestalts of interlinked values, entire rhetorical sequences. I believe it is this process of checking with patients, attempting to interpret the meanings

they have evoked in us, which is part of the process of caring. Caring is attending to meaning, individually specific and culturally specific, and the process itself has to vary with individuals and cultures despite there perhaps being something like universal invariant features in interpretive procedures (Cicourel, 1974). Frye's view that both causality and typology are forms of rhetoric is an important contribution to the performance of interpretation in nursing care. The results of our data gathering and observations in health care settings produce rhetorical versions of the so-called "real world" of our patients' physical and social being. There is always the danger that the myths, metaphors and typologies intuited by the nurse will be converted into "applied knowledge" representing inappropriate causal models which alienate patients and deter healing, growth or maintenance.

The implication of Frye's perspective which I have outlined, I believe, is that the interpretation of dramatic narrative must be preserved in nursing for problem identification. The handy lists of nursing diagnoses (Note 7) and coping strategies (Note 8) sanction working conditions which strip away narrative dialogue and reciprocity. This mechanical application threatens to promote inattention to meaning and promulgate a non-caring praxis, thus contributing to alienation in health care settings.

REFERENCES

- Cicourel, A. V. *Cognitive sociology: Language and meaning in social interaction*. New York: The Free Press, 1974.
- Craig, H. M., & Edwards, J. E. Adaptation in chronic illness: An eclectic model for nurses, *Journal of Advanced Nursing*, 1983, 8, 397-404.
- Frye, N. *Anatomy of criticism: Four essays*. Princeton, N. J.: Princeton University Press, 1957.
- Frye, N. *The critical path: An essay on the social context of literary criticism*. Bloomington, IN: Indiana University Press, 1971.
- Frye, N. *The great code: The Bible and literature*. Toronto: Academic Press, 1982.
- Goodenough, W. H. *Culture, language and society*. Addison-Wesley Modular Publication 11560, 10-15. New York: Addison-Wesley, 1971.
- Gordon, M., & Sweeney, M. A. Methodological problems and issues in identifying and standardizing nursing diagnoses. *Advances in Nursing Science*, 1979, 2, 1-16.
- Hagey, R. Healing entrepreneurship in the Philippines (Doctoral dissertation, Case Western Reserve University, 1980) *Dissertation Abstracts International*, 1980, 41, 4, 1670A. (University Microfilms No. 80-21, 696)
- Hagey, R. The phenomenon, the explanations and the responses: Metaphors surrounding diabetes in urban Canadian Indians. *Social Science and Medicine*, 1984, 18, 265-272.
- Hagey, R., & Buller, E. Drumming and dancing: A new rhythm in nursing care. *Canadian Nurse*, 1983, 79, 28-31.
- Hagey, R., & McDonough, P. The problem with professional labeling: A critical note on nursing diagnosis. *Nursing Outlook*, 1984, forthcoming.

- Jones, E. The theory of symbolism, *British Journal of Psychology*, 1918, 9 Part 2, 181-229.
- Jones, P. E., & Jakob, D. F. The definition of nursing diagnoses: Phase 3 and final report. Toronto: University of Toronto, Faculty of Nursing, 1982.
- Kelly, M. P., & May, D. Good and bad patients: A review of the literature and a theoretical critique, *Journal of Advanced Nursing*, 1982, 7, 147-156.
- Lacan, J. *Écrits* (Vol. 1). Paris: Editions du Seuil, 1966.
- Lacan, J. [*Écrits: A selection*] (A. Sheridan, trans.). New York: Norton, 1977.
- Lakoff, G., & Johnson, M. *Metaphors we live by*. Chicago: University of Chicago Press, 1980.
- Lambek, M. *Human spirits: A cultural account of trance in Mayotte*. New York: Cambridge University Press, 1981.
- Lévi-Strauss, C. *Myth and meaning*. Toronto: University of Toronto Press, 1978.
- Schlottfeldt, R. The significance of empirical research for nursing. *Nursing Research*, 1971, 20, 140-142.
- Sontag, S. *Illness as metaphor*. New York: Vintage Books, 1979.
- Stevens, B. J. *Nursing theory: Analysis, application, evaluation*. Boston: Little, Brown, 1979.
- Taussig, M. Reification and the consciousness of the patient. *Social Science and Medicine*, 1980, 14B, 3-13.
- Turnbull, C. M. *Forest people*. New York: Simon & Shuster, 1961.
- Valeri, V. Course on myth and structure. Department of Anthropology, University of Chicago, 1976-1977.
- Whitehead, A. N. *Science and the modern world*. New York: Free Press, 1967.
- Young, A. The discourse on stress and the reification of conventional knowledge. *Social Science and Medicine*, 1980, 14B, 133-146.

REFERENCE NOTES

1. The term *praxis* has gained recent popularity due to the work of Marxist scholars. Marx himself undoubtedly read Goethe and of course his mentor Hegel wrote a lot on the topic of praxis. A commonplace usage of the term today implies the synthesis of theory and practice or the incorporation of consciousness and insight into action . . . which we all know has its limits.
2. See Allan Young's argument (1980) showing the similarity in logical structure of the modern stress concept to many 'primitive' explanatory models of illness in non-industrial societies.
3. Lacan (1966, 1977) credits Ernest Jones (1918) with great insight into the theory of symbolism. See especially sections from *Écrits* entitled "Le stade du miroir comme formateur de la fonction du Je" (The mirror stage as formative of the function of the I) and "Fonction et champ de la parole et du langage en psychanalyse" (The function and field of speech and language in psychoanalysis) and "L'instance de la lettre dans l'inconscient ou la raison depuis Freud" (The agency of the letter in the unconscious or reason since Freud).
4. As an anthropologist, I am committed to the view that rationality is culturally and historically specific. Therefore, I define sub-cultures as holding to sub-sets of meaning and symbols which have their own "rationality." It is the job of the anthropologist to illuminate the logical coherence in a sub-cultural context that may appear irrational to outsiders. Frye's definition is more restricted than this in that it implies specific standards for cognitive operations which we value in the Western tradition.

5. This view of Frye's is consistent with those of French structuralist anthropologists such as Claude Lévi-Strauss, as I have learned it from Valerio Valeri (1976-77).
6. See Kelly and May (1982) for a recent review of bad patients, problem patients, etc., reported in the professional nursing literature in which an interactional approach is advocated to avoid or solve problems. However, such an approach does not provide the practitioner with the codes or blueprints for negative interactions.
7. See Gordon and Sweeney (1979) for their method of having trained clinician raters to generate the permanent set nursing diagnosis categories. These, I have argued in Hagey and McDonough (1984), acknowledge only the clinicians' view (and not the patients') of the social context from which categories are generated. Furthermore, the possibility of infinite interpretation of meaning in ever-evolving social contexts is ignored by this method.
8. See, for example, Craig and Edwards (1983) for effective and ineffective coping strategies to be determined by the nurse.

RÉSUMÉ

Codes et façons de composer: un hommage à Northrop Frye

La présente communication propose une perspective théorique pour la démarche infirmière face à l'adaptation humaine. La *praxis* y est envisagée tel un art à la fois créateur et réfléchi des soins infirmiers; elle est opposée à la *discipline critique* ou la Science qui cherche à élaborer une nomenclature et un discours. *L'interprétation* apparaît comme une autre option au diagnostic infirmier, plus compatible avec les soins dans la perspective des façons de composer (*coping*). *The Great Code: The Bible and Literature*, un ouvrage de Northrop Frye, est utilisé comme cadre de référence de l'expérience et du drame humains ainsi que des codes qui permettent à l'individu de composer avec la situation, codes dérivés de l'héritage culturel occidental. Les concepts de Frye, empruntés pour favoriser l'interprétation des drames littéraires et poétiques, sont examinés; ce sont: le mythe, la métaphore et la typologie.

L'insistance de Frye sur les images, le langage, et le pouvoir des mots et des gestes symboliques est soulignée afin de mettre en valeur l'art de dispenser les soins infirmiers en jetant une certaine lumière sur l'interprétation, la traduction, la reconstruction du sens et de l'action symbolique. Cet article nous met en présence de préoccupations d'interprétation dans le contexte infirmier. Les questions soulevées au sujet de la compréhension et de la création face au processus de *coping* sont: (a) l'interprétation rigoureuse et l'interprétation libre, (b) les dangers de la solidarité sociale et de l'ostracisme soulevés par les métaphores et le mythe, (c) l'utilisation rhétorique de la causalité et de la typologie en soins infirmiers.

LONGITUDINAL FOLLOW-UP OF PREMATURELY BORN CHILDREN: PREDISCHARGE OUTCOMES OF HOSPITAL STIMULATION PROGRAMME

Jacqueline S. Chapman

The purpose of this paper is (a) to present findings from current research of the effect of taped voice and music on the short-term development of the preterm infant and (b) to examine implications for clinical practice suggested by such findings.

ORIENTATION TO THE PROBLEM

In 1980, in an excellent tertiary level neonatal intensive care unit 91% of infants over 750 grams (1 pound, 10 ounces) survived (Shennan & Milligan, 1980). The capacity to save virtually all viable preterm infants may be associated with an increasing morbidity later in these survivors. Previous follow-up studies of preterm infants in the United States (Lubchenco, Delivoria-Pagadopoulos, & Searls, 1972), in Canada (Fitzhardinge & Ramsey, 1973) and in France (Dargassies, 1977) have shown that the majority of preterm infants demonstrate some type of morbidity. Commonly reported impairments are: IQs less than 90 (Drillien, 1967; Fitzhardinge & Ramsey, 1973); behavioural problems (Dargassies, 1979; Douglas, 1960; Robinson & Robinson, 1965); motor disorders (Dargassies, 1979); and difficulties in school performance (DeHirsch, Jansky, & Langford, 1966; Drillien, 1967; Fitzhardinge & Ramsey, 1973).

STATEMENT OF THE PROBLEM

A disproportionate number of children born prematurely prior to 1970 demonstrated subsequent morbidity. Regionalization of perinatal services in North America (Swyer, 1970) over the past decade has contributed to a much lower mortality rate in this population. Will the decrease in mortality add to the existing incidence of morbidity already evident in the preterm population?

Jacqueline S. Chapman, R.N., Ph.D., is professor, Faculty of Nursing, University of Toronto.
--

This project was supported by the National Health Research and Development Programme under National Health Research Scholar Award 6606-2024-48 and Project Grant 606-1602-43.

LITERATURE REVIEW

Three ideas directed the literature review: the rationale for morbidity abatement; supplemental stimulation as intervention; and means used to assess intervention.

Rationale for Morbidity Abatement

In 1963, a nurse, Eileen Hasselmeyer, proposed that one factor which might be related to the later morbidity of the preterm infant was the quality of the environmental stimulation afforded such an infant as a neonate. Giles (Note 1) in a review of the nursery policies that existed in the early 1960s noted that they were primarily concerned with asepsis and survival of the fittest. The concept of bonding was not in fashion and there was no facilitation of physical proximity immediately after birth between the premature and the parents. In fact, not only was the premature separated immediately from the parents at birth but no visitors, including parents, were permitted into the nurseries of the 1960s. In addition, Giles reported that if an infant was born at 30 or fewer gestational weeks it was "allowed" to die. Moreover, it was believed that surviving prematurely born infants should be disturbed as little as possible in an attempt to prevent infection. It now seems inconceivable that such policies ever existed.

The rationale underlying the proposition that the later morbidity of the premature was related to the inadequacy of his/her environment as a neonate was based on the following considerations:

1. The natural environment for the last trimester of human fetal growth and development is a dynamic one filled with minute-by-minute patterned stimulation in the tactile, vestibular, kinesthetic, and auditory modalities (Chapman, 1980, p. 12).
2. Experiments on animal models have shown that deprivation of such stimuli has resulted in detrimental changes in the structural complexity and chemical composition of the animal's developing brain (Schapiro & Vukovich, 1970).
3. In a busy neonatal intensive care unit the total amount of both aversive and nutritive stimuli that the non-nippling premature receives has been found to average only five minutes per hour (Barnard, 1979, p. 56).

Hence it was proposed that simulation of some aspects of the dynamic intrauterine environment be implemented in neonatal intensive care units.

Supplemental Stimulation as Intervention

In the 1960s the first four studies employing supplementary tactile and/or vestibular stimulation were instigated (Freeman, 1969; Hasselmeyer, 1963; Solkoff, Yaffe, Weintraub, & Blase, 1969; Freedman, Boverman, & Freedman, Note 2). Outcomes suggested that such interventions may promote short-term increments in weight gain, reduce crying, and have potential long-term effects on motor development. The decade of the 1970s saw eight further studies introduce supplementary tactile stimulation either alone or in combination with vestibular or kinesthetic stimulation (Korner, Kraemer, Haffner, & Cospers, 1975; Kramer, Chamorro, Green, & Knudtson, 1975; Neal, 1970, 1977; Powell, 1977; Siqueland, 1973; Solkoff & Matuszak, 1975; White & Labarba, 1976). These studies continued to indicate that weight gain was facilitated, as was the predischarge level of infant development in the tactile-stimulated subjects. Improvement in experimental subjects' respiratory and digestive functions was also noted. In 1981 Rausch administered a daily 15-minute tactile-kinesthetic regime over 10 days to 20 premature infants. She also concluded that gastrointestinal function was improved in experimental subjects.

Three supplementary auditory stimulation studies using taped parental voices or Brahms' lullaby also were introduced in the 1970s (Chapman, 1978; Katz, 1971; Segall, 1971). Again experimental subjects had better weight gain and also had higher scores on cognitive, motor, and sensory tests prior to discharge. Five studies which combined auditory and vestibular or combined visual and tactile stimulation also were completed in the 1970s (Barnard, 1973; Groom, 1973; Kramer & Pierpont, 1976; McNichol, 1973; Wright, 1971). Such multimodality stimulation appeared to aid weight gain, or increase head circumference, facilitate neurological development and help the infant cope better under stress.

Means Used to Assess Intervention

Three major yardsticks used to measure the "success" of the supplementary stimulation intervention have been anthropometric measurements, level of subjects' activity, and use of standardized developmental scales prior to discharge.

Anthropometric measurements. Gains in weight, length, and head circumference are scrutinized as well as the number of days required to regain birth weight.

Activity measurements. In the 1960s studies, simple rating scales of the activity levels of subjects were used (Hasselmeyer, 1963; Solkoff et

al., 1969). In 1978 Chapman had a watchmaker design a valid and reliable instrument called an accelerometer to measure quantitatively the limb movement of premature infants. This instrument looks like a miniature watch and can be worn comfortably on the wrist or ankle of a premature infant prior to discharge. For smaller infants a sensor which detects movement can be placed within the incubator's mattress (Campbell, Kuyek, Lang, & Partington, 1971). Maturation is thought to be reflected by a decrease in purposeless movements. During active sleep there are accompanying limb movements 80% of the time (Parmelee, K. Bruck, M. Bruck, Wenner, Akiyama, Stern, & Flescher, 1967). Active sleep decreases markedly between the 28th and 37th week of gestation (Parmelee et al., 1967); hence one would anticipate movement during sleep would decrease. Since the neonate prior to the 37th week spends 75%-80% of 24-hour period in sleep (Hasselmeyer, 1961) it seems feasible to measure the maturational progress in terms of activity level during these time periods.

Standardized developmental scales. Two scales, the Graham-Rosenblith (Rosenblith, 1961) and the Neonatal Behavioral Assessment Scale (NBAS) (Brazelton, 1973) have been used to assess the predischARGE behavioural repertoire of the premature infant. The Graham-Rosenblith assesses motor strength, adaptation to tactile stimuli, vision, hearing, motor tone and general maturation. It has been used to assess outcomes in four of the supplementary stimulation studies (Katz, 1971; McNichol, 1973; Neal, 1970, 1977). The NBAS is a more sophisticated test but was found to be disorganizing for the infant under 34 gestational weeks and Kang and Barnard (1979) caution that its validity for testing the preterm infant is yet to be established.

Summary

The literature reveals that there has been a vast change in accepted policies governing nursery practices in the past 20 years, that provision of supplementary stimulation has been found to be efficacious and that tools have been devised to assess the outcomes of nursing interventions.

THE PURPOSE

The purpose of the study presented here was to assess the effect of one type of supplementary stimulation, taped voice and music, on subsequent developmental attainment as demonstrated by (a) anthropometric measurements including days to regain birth weight, (b) activity level as a maturational index during hospitalization and at discharge as measured by mattress sensors and on accelerometers, and (c) developmental scores on the Graham-Rosenblith test.

RESEARCH HYPOTHESIS

The research hypothesis formulated a priori was that subjects exposed to a supplementary regimen of taped voice and music during hospitalization would score significantly better on all outcome measures than those not exposed to supplementary stimulation.

METHODOLOGY

Design

A posttest-only control group design was used (Campbell & Stanley, 1963). The design incorporated two hospital interventions and one control group. The hospital intervention consisted of intermittent, patterned auditory stimulation — either a lullaby during the first half of hospitalization, later replaced by parental voice(s), for 5-10 minutes at the mid-point of each feeding interval (hospital sequential group) or the lullaby alternated with speech at midpoint intervals throughout hospitalization (hospital alternate group). Selection of this specific independent variable was based on the following considerations:

1. Sound had been found to be more effective than the visual or tactile modalities in reduction of neonatal activity (Wolff, 1966, p. 40).
2. Molfese (1977) demonstrated that speech sounds evoke stimulation of the left hemisphere whereas musical notes produce stimulation in the right hemisphere. Hence an auditory regime which contained both speech and music would have the potential for stimulation of both hemispheres of the developing neonate's brain.

Sample

The sample comprised 259 infants born between November 4, 1975 and September 26, 1979. Fourteen subjects, seven with cerebral palsy and seven subsequently found to have severe developmental problems are not, as Tilford (1976) recommends, included in this analysis but will be analyzed separately. The 245 remaining subjects were assigned at random to one of the three groups. The control group had 82 subjects, the sequential group 83, and the alternate group 80 subjects. There were 121 females and 124 males comparably divided among the three groups (see Table 1).

Table 1
Randomized Assignment of Subjects to Three Treatment Groups

Sex	Treatment Group		
	Control	Sequential	Alternate
Male	42	42	40
Female	40	41	40
Total	82	83	80

In the total remaining sample the average gestational age at birth was 226 days (32 weeks, 2 days); the average birth weight was 1553 grams (3 pounds, 7 ounces). Twenty-two percent of the subjects came from a multiple birth. Of the 241 with complete labour records 54% (130) of the mothers had sedatives and/or analgesics administered during labour; 37% (91) of the subjects were delivered by caesarian section — 31% were delivered by emergency caesarian section. Approximately two-thirds of the subjects were born to parents who were both Caucasian (fathers 163; mother 170); approximately 13% were Black (fathers 30; mothers 35), 7% were East Indian (18 parental sets), 4% were Chinese, 4% were Philippino, and 2% were "other". At the time of birth 89% of the families were two-parent families (213 were married; 23 were living common-law); 11% (25) were born to a single parent. In 47% of the cases the subject was the first live born child for the family, 32% of the families had one other child, 15% had two other children and 6% had three or more other children.

Settings

The sample was drawn from the premature nurseries of three university teaching hospitals. The design incorporated stratification of treatment group by hospital. Table 2 demonstrates that in each hospital there was comparable representation among the three treatment groups.

Table 2
Stratified Random Assignment
of Subjects to Three Hospitals

Hospital Code	Hospital assignment			Total
	Control	Sequential	Alternate	
1	13	15	18	46
2	20	21	19	60
3	49	48	42	139

Procedure

During the first four days of the subject's life the investigator or her delegate visited the infant's parent(s) to explain the study and to secure written consent for the child's inclusion. Parents were provided with poems, rhymes, or short stories in their native tongue that they might use, or were free to tape what they wished. A master tape was made for each subject and, after pretest screening for hearing, the auditory regime was instigated on the 5th day of life.

The anthropometric measurements of weight, length, and head circumference at birth were recorded and the number of days required to regain birth weight was noted. Mattress sensors were used to obtain a 4th-day, 3rd-week, and predischARGE activity measurement over and eight-hour period. Accelerometers were placed on the ankle and wrist of subjects over a 24-hour period for an Adaptation Day, a Test Day One; and a Test Day Two, in the three-day period prior to discharge. For 50 percent of the sample two blind testers each independently performed the Graham-Rosenblith test just prior to discharge; for the other 50 percent a single tester assessed the subject. Anthropometric measurements were again recorded at discharge.

Statistical Plan for Data Analysis

Since the computer program used (SAS) deletes all variables for the case if even one observation is missing, multivariate and univariate

analysis was used in the examination of outcome variables. Chi-square was used to examine the distribution of descriptive variables among treatment or hospital groups. The alpha level for the study, determined a priori, was $p = .05$.

RESULTS

Anthropometric Measurements

Weight. There was no statistically significant difference in the three treatment groups' weight at birth, or predischarge. In addition, the initial weight loss and the number of days to regain birth weight did not differ among groups (see Table 3).

Length. There was no statistically significant difference in the three groups' length at birth or predischarge. In addition, the gain in length did not differ among groups (see Table 3).

Head circumference. There was no statistically significant difference in the three groups' head circumference at birth or predischarge. In addition, the growth in head circumference did not differ among the groups (see Table 3).

Activity Measurements

Mattress sensor measurements. There was no statistically significant difference in the total activity of the three treatment groups on the 4th day of life, during the 3rd week of life, or predischarge (see Table 4).

Limb activity recorded on accelerometers. Upper, lower, and total limb activity did not differ significantly among the groups on the Adaptation Day or on either Test Day One or Test Day Two (see Table 5).

Predischarge Developmental Test Measurement

Prior to examination of the groups' scores on the Graham-Rosenblith test it was ascertained that the gestational age of the subjects did not differ at the time of test. Hence the biological age at maturation did not affect these scores (see Table 6).

No statistically significant differences were found on any of the component parts of the Graham-Rosenblith Test (see Table 7).

DISCUSSION OF FINDINGS

Findings will be discussed in regard of anthropometric, activity and developmental measurements. Implications for practice in the care of prematurely born infants similar to those described in this sample are presented.

Table 3

Anthropometric Measurements for Three Treatment Groups

Anthropometric measurement	Treatment group						F	P		
	Control			Alternate						
	\bar{x}	s.d.	\bar{x}	s.d.	\bar{x}	s.d.				
Weight (grams)										
Birth	1569	303	1522	311	1568	305	1553	306	<1	n.s.
Predischarge	2181	186	2185	193	2187	196	2182	194	<1	n.s.
Initial loss	116	76	132	69	127	70	125	73	1.03	n.s.
Time to regain birth weight (days)										
	11.95	6.01	13.90	6.39	13.25	6.10	13.1	6.17	2.06	n.s.
Length (centimeters)										
Birth	41.80	3.01	41.30	2.91	41.45	2.52	41.52	2.98	<1	n.s.
Predischarge	45.75	2.37	45.45	2.40	45.45	2.11	45.57	2.37	<1	n.s.
Increment	4.25	2.64	4.50	4.78	3.95	2.39	4.25	2.51	<1	n.s.
Head Circumference (centimeters)										
Birth	28.89	1.86	28.68	1.67	29.32	1.89	28.96	1.81	2.50	n.s.
Predischarge	33.02	1.49	33.25	1.76	33.15	1.17	33.13	1.55	<1	n.s.
Increment	4.21	2.04	4.46	2.02	3.82	2.05	4.15	2.04	1.89	n.s.

Table 4
Time of Mattress Sensor Measurement of Activity of Three Treatment Groups

Time of mattress sensor measurement	Treatment Group						F	P		
	Control		Sequential		Alternate					
	\bar{x}	s.d.	\bar{x}	s.d.	\bar{x}	s.d.				
Fourth day	207	151	221	206	178	126	203	169	1.21	n.s.
Third week	168	138	202	165	209	190	194	167	1.39	n.s.
Predischarge	200	158	209	170	241	227	217	188	1.06	n.s

Table 5

Upper, Lower and Total Limb Accelerometer Scores for the Three Treatment Groups on the Adaptation Day, Test Day One and Test Day Two

Accelerometer score	Treatment group						F	P		
	Control		Sequential		Alternate					
	\bar{x}	s.d.	\bar{x}	s.d.	\bar{x}	s.d.				
Adaptation day										
Upper limb	83	48	96	78	84	58	88	64	<1	n.s.
Lower limb	94	58	102	71	115	71	104	64	1.87	n.s.
Total activity	171	78	191	116	200	117	187	109	1.43	n.s.
Test Day One										
Upper limb	98	88	89	48	104	71	97	72	<1	n.s.
Lower limb	112	81	99	52	121	84	110	76	<1	n.s.
Total activity	210	149	186	74	223	137	206	127	<1	n.s.
Test Day Two										
Upper limb	100	93	86	43	88	42	91	71	<1	n.s.
Lower limb	110	60	105	69	103	58	106	64	<1	n.s.
Total activity	203	107	189	117	192	87	197	113	<1	n.s.

Table 6
Maturation of Subjects in Three Treatment Groups at Time of Graham-Rosenblith Test

	Treatment group				F	P	
	Control		Sequential				Alternate
	\bar{x}	s.d.	\bar{x}	s.d.			
Maturation of subjects	261	15.56	263	13.09	263	15.09	
Gestational age	261	15.56	263	13.09	263	15	<1 n.s.

Table 7
PredischARGE Scores on the Graham-Rosenblith Test for the Three Treatment Groups

Score	Treatment Group				Sample				F	P
	Control		Sequential		Alternate		\bar{x}	s.d.		
	\bar{x}	s.d.	\bar{x}	s.d.	\bar{x}	s.d.				
Motor	4.60	1.70	4.70	1.76	4.45	1.57	4.60	1.68	<1	n.s.
Tactile-adaptive	7.55	1.73	7.25	1.82	7.40	1.66	7.40	1.76	<1	n.s.
General Maturation	12.20	3.01	11.95	3.24	12.50	3.15	12.38	6.17	<1	n.s.
Hearing	4.25	0.95	4.45	0.86	4.30	0.91	4.39	0.85	<1	n.s.
Vision	7.60	2.32	7.95	2.85	6.85	2.82	7.49	4.93	1.00	n.s.
Motor tone	5.10	0.37	5.15	0.53	5.10	0.66	5.12	0.57	<1	n.s.

Anthropometric Measurements

The change in weight, length and head circumference of the sample was monitored, on average, for a five-week period. Using the Canadian Usher and McLean (1969) curves for each of these three variables, the sample's head circumference growth curve between the 32nd and 37th week of gestation followed just below the 50th percentile. Length and weight curves, however, dropped precipitously to two deviations from the mean (at and below, respectively). Supplementary auditory stimulation did not alter this pattern in this sample. It took these subjects an average of 13 days — almost two weeks — to regain their birth weight.

Implications for practice. For the parents of the 1500-gram, 32-week gestational infant, nurses can allay their anxiety by telling them (a) that their infant is not expected to regain birth weight for about two weeks, and (b) that during the five weeks or so of hospitalization the most growth can be anticipated to occur in head size, which is important as that is believed to reflect brain growth.

Activity Measurements

Activity level as measured by mattress sensors or accelerometers was not different among the three groups. The 4th-day mattress sensor measurements probably were affected by the analgesics, sedatives, and anaesthetics that approximately 50% of the subjects' mothers received. Hence the 4th-day measurement probably represents an underestimate of activity level. Even so, the average activity score at 35 gestational weeks — the 3-week postbirth measurement — was slightly lower than the initial one. Hence, the expected pattern of fewer purposeless movements probably occurred. Prior to discharge, the activity rose and possibly reflects at 37-1/2 gestational weeks, longer alert states than sleep states.

When the "strange" accelerometers were first placed on the subjects' ankles and wrists prior to discharge, as had been found previously in prematurely born as opposed to full-term children, the subjects tended to move their limb less (Chapman, 1978) as if unable to adapt to the stress. The only group who did not evidence this pattern was the sequential group — those who had just approximately two weeks of taped parental voices. Did the human component of the auditory pattern help them adapt better?

Implications for practice. Parents can be told that the activity of their infant may be reduced through the effects of maternal medications during the first week of life. The tremors they observe in their sleeping infant should diminish by the 3rd week of life and are an indicator of their infant's maturation. Prior to discharge their infant will have longer alert periods accompanied by activity.

Developmental Measurements

Prior to discharge all subjects were assessed for general maturation and sensory functioning on the Graham-Rosenblith scale. This sample's scores on motor and tactile-adaptive items and hence total maturation score are higher than Rosenblith's (Note 3) own 1975 data on preterm infants of comparable gestational age. The mean motor score was 4.60 out of a possible total of 9.00. Similar scores were reported in two of the previous four supplementary studies (McNichol, 1973; Neal, 1977) of preterm infants in which no statistical differences among experimental and control groups were reported. Katz (1971) and Neal (1967), using auditory and vestibular supplementary stimulation respectively, had found significant differences between experimental and control groups. Their experimental subjects scored higher than the current sample. Since a decade ago infants were discharged at heavier weights, their experimental subjects had a longer exposure to the experimental treatment, which may account for the difference.

The mean tactile-adaptive score of 7.40 out of a possible 9 for this sample was comparable to Katz's (1970, p. 49) and Neal's (1967, p. 37) experimental groups' mean scores and higher than the other two reported studies' sample means (McNichol, 1973; Neal, 1977).

The highest hearing score mean (4.39 out of a possible 5) in the current sample was comparable again to Katz's (1970, p. 40) and Neal's (1967, p. 53) experimental groups and higher than the other two studies' means for the auditory scale (McNichol, 1973; Neal, 1977).

The vision mean score of 7.49 out of a possible 10 was higher than Katz's (1970, p. 40) subjects and similar to McNichol's (1973) tactile stimulation experimental group. Neal's results on vision (1967, 1977) were scored differently and cannot be compared.

The final score on the Rosenblith assesses muscle tension from flaccid (0) to marked tension (9), the normal being rated 5. The current sample's mean score of 5.12 falls, as did McNichol's (1973) sample and Katz's (1970, p. 43) experimental group, into the normal range. Katz's control group had lower scores.

Hence development as assessed on the Rosenblith, with the exception of motor strength, in this total sample including the control group was as good as or better than that reported in the experimental groups of the previous studies.

Implications for nursing. The weakest area of development predischarge as assessed by the Rosenblith in all these studies is the motor domain of the preterm infant. Encouragement of parent participation in all aspects of care to learn competent handling and

support of their infant prior to discharge is warranted. Ground rules to prevent interested siblings from causing detrimental effects to their new arrival's immature motor system need to be established after discharge. A weak sucking capability may need monitoring by the public health nurse to ensure adequate caloric intake.

SUMMARY

In this study there was no discernable effect of taped voice and music on any of the outcome measures. It is possible that the total sample of premature infants in these university teaching hospitals received adequate amounts of nutritive stimulation and thus the additional supplementary auditory stimulation was superfluous. The current study is the most recent one and it is entirely possible that the findings of the earlier studies have influenced nursing practice. If, indeed, staff nurses themselves and the parents they teach daily plan to provide the premature infant with visual, tactile, kinesthetic, auditory, and vestibular stimulation, the fruition of 20 years of research may have been realized. The long-term effects of such changing nursing practices on subsequent morbidity are yet to be determined but preliminary findings are encouraging (Chapman, 1980).

REFERENCES

- Barnard, K. Discussion. In G. C. Anderson & B. Raff (Eds.), *Newborn behavioral organization: Nursing research and implications*. New York: Alan R. Liss, 1979.
- Barnard, K. The effect of stimulation on the sleep behavior of the premature infant. *Communicating Nursing Research*, 1973, 6, 12-33.
- Brazelton, T. B. Neonatal behavioral assessment scale. *Clinics in Developmental Medicine* (No. 50). London: Heineman, 1973.
- Campbell, D., Kuyek, J., Lang, E., & Partington, M. W. Motor activity in early life. II. Daily motor activity output in the neonatal period. *Biology of the Neonate*, 1971, 18, 108-120.
- Campbell, D. T., & Stanley, J. G. *Experimental and quasi-experimental designs for research*. Chicago: Rand McNally, 1963.
- Chapman, J. S. *Potential of the premature infant: A 1980 perspective*. Annual Lecture Series. Winnipeg: School of Nursing, The University of Manitoba and VON, Winnipied Branch, 1980.
- Chapman, J. S. The relationship between auditory stimulation and gross motor activity of short-gestation infants. *Research in Nursing and Health*, 1978, 1, 29-36.
- Dargassies, S. Long-term neurological follow-up study of 286 truly premature infants. *Developmental Medicine and Child Neurology*, 1977, 19, 462-78.
- Dargassies, S. Normality and normalization as seen in a long-term neurological follow-up of 286 truly premature infants. *Neuropædiatrie*, 1979, 10, 226-244.

- DeHirsch, K., Jansky, M. S., & Langford, W. S. Comparisons between prematurely and maturely born children at three age levels. *American Journal of Orthopsychiatry*, 1966, 36, 616-628.
- Douglas, J. W. B. 'Premature' children at primary schools. *British Medical Journal*, 1960, 5, 1008-1013.
- Drillien, C. M. The incidence of mental and physical handicaps in school age children of very low birth weight. *Pediatrics*, 1967, 39, 238-247.
- Fitzhardinge, P., & Ramsey, M. The improving outlook for the small prematurely born infant. *Developmental Medicine and Child Neurology*, 1973, 15, 447-459.
- Freeman, E. K. The effects of interpersonal stimulation on growth and development of premature infants (Doctoral dissertation, The University of Florida, 1969). *Dissertation Abstracts International*, 1969, 30B, 2982-B. (University Microfilms No. 70-20754)
- Groom, G. L. The effect of perinatal factors and supplementary stimulation of premature infants upon measures of neonatal cognitive behavior (Doctoral dissertation, Purdue University, 1973). *Dissertation Abstracts International*, 1973, 34B, 4663-B. (University Microfilms No. 74-4969)
- Haselmeyer, E. G. Behavior patterns of premature infants: A study of the relationship between a specific nursing procedure and general well-being of the prematurely born infant (U.S. DHEW Publication No. 840). Washington, D.C.: U.S. Government Printing Office, 1961.
- Hasselmeyer, E. G. Handling and premature infant behavior: An experimental study of the relationship between handling and selected physiological, pathological, and behavioral indices related to body function among a group of prematurely born infants who weighed between 1501 and 2000 grams at birth and were between the ages of seven and 28 days of life (Doctoral dissertation, New York University 1963). *Dissertation Abstracts International*, 1963, 24B, 2847B02875B. (University Microfilms No. 64-257)
- Kang, R., & Barnard, K. Using the neonatal behavioral assessment scale to evaluate premature infants. In G. C. Anderson & B. Raff (Eds.), *Newborn behavioral organization: Nursing research and implications*. New York: Alan R. Liss, 1979, 119-144.
- Katz, V. The relationship between auditory stimulation and the developmental behavior of the premature infant (Doctoral dissertation, New York University, 1970). *Dissertation Abstracts International*, 1971, 31B, 4156B-4175B. (University Microfilms No. 70-26463)
- Katz, V. Auditory stimulation and developmental behavior of the premature infant. *Nursing Research*, 1971, 20, 196-201.
- Korner, A. F., Kraemer, H. C., Haffner, M. E., & Cospers, L. M. Effects of waterbed flotation on premature infants: A pilot study. *Pediatrics*, 1975, 56, 361-367.
- Kramer, L. I., & Pierpont, M. E. Rocking waterbeds and auditory stimuli to enhance growth of preterm infants. *The Journal of Pediatrics*, 1976, 88, 297-299.
- Kramer, M., Chamorro, I., Green, D., & Knudtson, F. Extra-tactile stimulation of the premature infant. *Nursing Research*, 1975, 24, 324-34
- Lubchenco, L. O., Delivoria-Pagadopoulos, M., & Searls, D. Long-term follow-up studies of prematurely born infant. II. Influence of birth weight and gestational age on sequelae. *The Journal of Pediatrics*, 1972, 80, 509-512.
- McNichol, T. A. Some effects of different programs of enrichment on the development of premature infants in the hospital nursery (Doctoral dissertation, New York University, 1973). *Dissertation Abstracts International*, 1973, 34B, 4707-8B. (University Microfilms No. 74-5013)

- Molfese, D. L. Infant cerebral asymmetry. In S. Segalowitz & F. Gruber (Eds.), *Language development and neurological theory*. New York: Academic Press, 1977.
- Neal, M. V. The relationship between a regimen of vestibular stimulation and the developmental behavior of the premature infant (Doctoral dissertation, New York University, 1967). *Dissertation Abstracts International*, 1970, 30, 4151A. (University Microfilms No. 70-73342)
- Neal, M. V. Vestibular stimulation and development of the small premature infant. *Communicating Nursing Research*, 1977, 8, 291-302.
- Parmelee, A. H., Bruck, K., Bruck, M., Wenner, W. H., Akiyama, Y., Stern, E., & Flescher, J. Electroencephalography and brain maturation. In A. Minkowski (Ed.), *Regional development of the brain in early life*. London: Blackwell, 1967, 459-476.
- Powell, L. F. The effect of extra stimulation and maternal involvement on the development of low-birth-weight infants and on maternal behavior. *Child Development*, 1974, 45, 106-113.
- Rausch, P. B. Effects of tactile and kinesthetic stimulation on premature infants. *Journal of Obstetric, Gynecologic and Neonatal Nursing*, 1981, 10, 34-37.
- Robinson, N. M., & Robinson, H. B. A follow-up study of children of low birth weight and control children at school age. *Pediatrics*, 1965, 35, 425-433.
- Rosenblith, J. F. The modified Graham Behavior Test for neonates: Test-retest reliability, normative data, and hypotheses for future work. *Biologica Neonatorum*, 1961, 3, 174-192.
- Schapiro, S., & Vukovich, K. R. Early experience effects upon cortical dendrites: A proposed model for development. *Science*, 1970, 167, 292-294.
- Segall, M. Relationship between auditory stimulation and heart rate response of the premature infant. *Nursing Research Conference*, 1971, 7, 119-129 (ANA Publication).
- Shennan, A. T., & Milligan, J. E. Role of prematurity in perinatal mortality. *Ontario Medical Review*, 1980, 47(3), 105-106.
- Siqueland, E. R. Biological and experimental determinants of exploration in infancy. In L. Stone, H. Smith & L. Murphy (Eds.), *The competent infant: Research and commentary*. New York: Basic Books, 1973, 822-823.
- Solkoff, N., & Matuszak, D. Tactile stimulation and behavioral development among low birthweight infants. *Child Psychiatry and Human Development*, 1975, 6, 33-37.
- Solkoff, N., Yaffe, S., Weintraub, D., & Blase, B. Effects of handling on the subsequent development of premature infants. *Developmental Psychology*, 1969, 1, 765-768.
- Swyer, P. R. The regional organization of special care for the neonate. *The Pediatric Clinics of North America*, 1970, 17, 761-776.
- Tilford, J. A. The relationship between gestational age and adaptive behavior. *Merrill-Palmer Quarterly*, 1976, 22, 319-326.
- Usher, R., & McLean, F. Intrauterine growth of live-born Caucasian infants at sea level: Standards obtained for measurements in 7 dimensions of infants born between 25 and 44 weeks of gestation. *The Journal of Pediatrics*, 1969, 74, 901-910.
- White, J. L., & Labarba, R. C. The effect of tactile and kinesthetic stimulation on neonatal development in the premature infant. *Developmental Psychobiology*, 1976, 9, 569-577.
- Wolff, P. H. The causes, controls, and organization of behavior in the neonate. *Psychological Issues*, 1966, 5, 1-93. (Monograph)
- Wright, L. The theoretical and research base for a program of early stimulation care and training of premature infants. In Jerome Hellmuth (Ed.), *Exceptional infant: Studies in abnormalities* (Vol. 2). New York: Brunner/Mazel, 1971.

REFERENCE NOTES

1. Giles, H. R. Perinatology — an historical perspective. Paper presented at the 3rd Annual March of Dimes Perinatal Nursing Conference, Chicago, 1978.
2. Freedman, D., Boverman, H., & Freedman, N. Effects of kinesthetic stimulation on weight gain and on smiling in premature infants. Paper presented at the American Orthopsychiatric Association, San Francisco, April, 1966.
3. Rosenblith, J. Personal communication, 1975.

RÉSUMÉ

Suivi longitudinal d'enfants prématurés: résultats du programme de stimulation à la sortie de l'hôpital

Certains auteurs ont suggéré que la morbidité tardive observée chez l'enfant prématuré est liée à un environnement inadéquat à la période néonatale. Des recherches antérieures ont permis de constater qu'une stimulation additionnelle était efficace. L'objectif de la présente étude était d'évaluer les effets d'un type de stimulation additionnelle, en l'occurrence l'enregistrement de musique et de la voix des parents, en regard des caractéristiques anthropométriques, de l'activité et du développement de l'enfant. Pour le groupe témoin on a utilisé un devis-après-seulement. En tout, 245 sujets gardés en incubateur ou au berceau, ont été soumis à cette stimulation additionnelle. Aucune différence n'a été observée entre les sujets du groupe expérimental et les sujets du groupe témoin, à la sortie, dans chacune des trois caractéristiques mesurées. Les conséquences de cette recherche au niveau des soins infirmiers font l'objet d'une discussion.

LONGITUDINAL FOLLOW-UP OF PREMATURELY BORN CHILDREN: OUTCOMES OF HOME STIMULATION PROGRAMME TO AGE FOUR — A PRELIMINARY ANALYSIS

Jacqueline S. Chapman

This paper presents the initial findings from an ongoing project which examines the development of a group of prematurely born children at selected times during each of the first four years of life. Some of these children participated in a home stimulation programme. As the reader will appreciate, in reporting on research in process one faces the frustration of the unknown both in the data yet to be collected and in the data collected but still in the process of analysis.

CONTEXT OF THE PROBLEM

The incidence of preterm birth has changed very little since the turn of the century. The phenomenon of regionalized health care since 1960, however, has created strategically placed neonatal intensive care units, where the mortality rates for the preterm infant have declined markedly. In the same 20 years, research has been mounted to provide planned stimulation regimes for the increasing numbers of surviving preterm infants.

The philosophy directing the care provided to preterm infants in nurseries has altered markedly over the same two decades. In 1981 it was reported that supplemental stimulation in the nurseries of university teaching hospitals has no discernable effect at discharge on the preterm infant's development beyond that of the usual standard of care (Chapman, Note 1).

Most of the 20-odd intervention programmes to date have been conducted during the preterm infant's initial hospital stay and were evaluated immediately upon the study's conclusion (Chapman, 1980). Six of these hospital intervention projects have reported follow-up data on their subjects during the first year; one project reported outcomes at one year; and one project reported outcomes at three years.

Jacqueline S. Chapman, R.N., Ph.D., is professor, Faculty of Nursing, University of Toronto.
--

This project was supported by the National Health Research and Development Programme under National Health Research Scholar Award 6606-2024-48 and Project Grant 606-1602-43.

STATEMENT OF THE PROBLEM

The immediate and short-term effects of some stimulation programmes provided for the preterm infant were found to be beneficial but long-term outcomes were never evaluated. Whether or not there are sleeper effects that will appear later is unknown.

There is no study which has follow-up data beyond age 3 on preterm subjects who have participated in planned stimulation studies. In addition, follow-up data beyond the age of 3 on any preterm infant born subsequent to 1970, when changing patterns and philosophies of children's neonatal care were occurring, are scarce.

REVIEW OF THE LITERATURE

One reason there may be few longitudinal studies of preterm infants is that so many variables must be addressed. Over the first five years of life, developmental measures are known to be affected by a multiplicity of variables. In the first year of life the quality of the home environment (Wachs, Uzgis, & Hunt, 1971) and caretaker-infant relationship (Yarrow, Rubinstein, Pedersen, & Jankowski, 1972) affect cognitive development.

A 1979 report from the Department of Health, Education and Welfare demonstrated that the quality of stimulation provided in the home and the related parent-child interaction continue to demonstrate strong associations with the child's developmental status between the ages of 2 and 4.

In addition, by age 2, socioeconomic status (Caputo, Goldstein, & Taub, 1981; Sigman & Parmelee, 1979) and language background (Sigman & Parmelee, 1979) are significantly associated with developmental test scores. At this age, birth order has a significant effect on preterm infants' developmental scores independent of the infant's language or socioeconomic background (SES) (Sigman, Cohen, Beckwith, & Parmelee, 1981). First-borns score significantly higher than later born preterms in both the first 2 years.

Sigman and colleagues' (1981) preliminary data indicate that Spanish speaking preterm children continue to do poorly at ages 3 and 5 on the Stanford-Binet intelligence test. Whether this finding is related to an actual lower SES or inappropriate use of an English-based, culturally influenced measure to assess ability in non-English speaking children, or both, requires delineation.

A key issue in long-term study of preterm infants is: What is the earliest age at which valid prediction of actual intelligence to be attained can be identified? Grant review committees appropriating limited

funds take an additional look at a project, however meritorious it may be, that has the potential to commit scarce governmental funds to a seven-year project. Questions will be raised concerning (a) the attrition rate, (b) whether, when a large battery of tests is used over the years, statistical significance will be found sometimes by chance alone, and (c) whether the number of intervening variables over such a time period allows a reasonable interpretation of any results.

Some authors (Sigman et al., 1981) contend developmental measures made on preterm subjects at as early as 4 months corrected age can be correlated with intelligence tests at 5 years; others (White, 1975) believe test scores near the end of the second year can be predictive of later school success. There are also those who, because they believe sensorimotor intelligence is biologically determined and only influenced by major environmental influences, would not see a follow-up study on subjects exposed to intervention as necessary (Scarr-Salapatek, 1976, pp. 179-180; Wilson, 1972).

The studies conducted in the 1960s frequently contended that the stature of prematurely born children — in terms of height and weight — remained below the norms (Dann, Levine, & New, 1964; Lubchenco, Horner, Reed, Hix, Metcalf, Cohig, Elliot, & Bourg, 1963; Robinson & Robinson, 1965). In the 1970s, two studies did not find subjects to be undersized (Fisch, Bilek, Miller, & Engel, 1975; Fitzhardinge and Ramsay, 1973), whereas one did (Holstrum, 1979).

The use of standardized graphs (for example Reed & Stuart, 1959) may not be appropriate as the cohort of preterm children may include different proportions of ethnic groups than the standardized populations for such graphs.

Children born prematurely in the 1960s had fewer overt neurological sequelae but behavioural and academic problems remained (Fitzhardinge & Ramsey, 1973; Neligan, Kolvin, Scott, & Garside, 1976). Earlier it had been noted that prematures had more behavioural problems than their siblings (Mohr & Barthelme, 1930) or their full-term controls (Drillien, 1964).

Maladjustment had been found in 25% of Beskow's (1949) school-age premature sample and in the majority of Howard and Worrell's (1952) school-age sample. Hence "the behavior syndrome of prematurity" Shirley (1938, 1939) described for the premature's first two years of life persisted.

School problems on entrance were attributed to lack of readiness (Howard & Worrell, 1952; Jansky, 1975), but continued in spite of normal IQs and seemed related to deficits in underlying integration of neurological development (Beskow, 1949; Blegen, 1953; DeHirsch, Jansky, & Langford, 1966; Weiner, Rider, Oppel, & Harper, 1968).

To summarize, it is evident that multiple variables influence the preterm infant's development. Whether or not the long-term development of the preterm infant can be facilitated by manipulation of some of these variables is the focus of this project.

THE RESEARCH FRAMEWORK FOR LONGITUDINAL STUDY OF PRETERM INFANTS

Figure 1 illustrates the model proposed for longitudinal study of the preterm infant. It is an interactive model in which the preterm infant's potential for development is seen as dependent upon three major factors — his/her human interactors; the environmental context in which those interactions occur; and the uniqueness the individual preterm contributes. The model provides for interventions to be directed at any one of the three factors. It evaluates sequentially along the life process successive developmental outcomes in the anthropometric, motor, social/behavioural, cognitive, and academic performance domains.

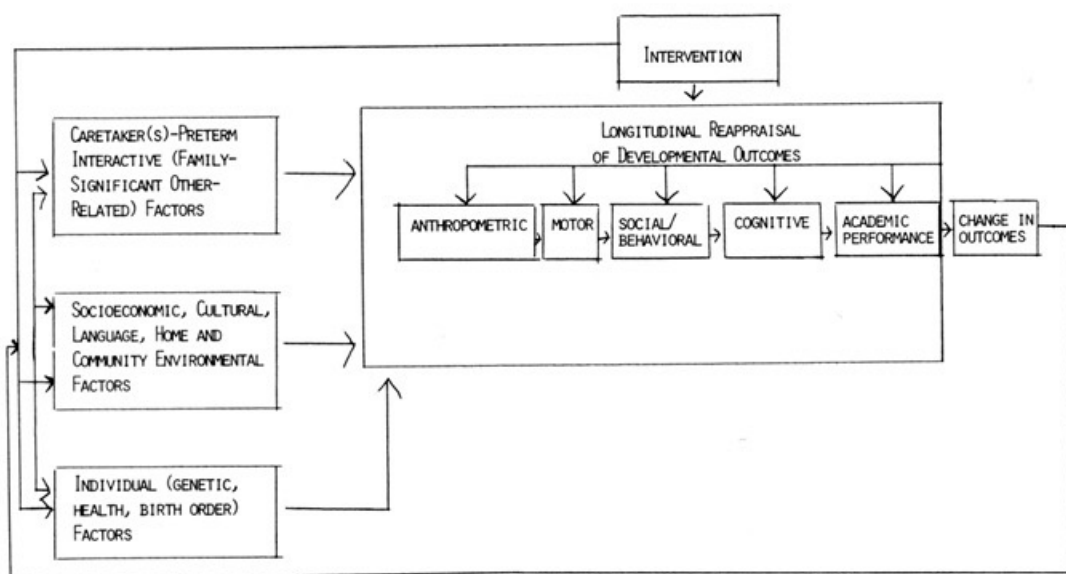


Figure 1: Model of research framework of longitudinal study of preterm infants (adapted from *Conceptual Framework for Nursing* of the Faculty of Nursing, University of Toronto, 1981).

Purpose

The purpose of this study is twofold; (a) to determine long-term developmental outcomes of preterm infants born during or after 1975; and (b) to determine if home intervention programs for preterm infants/children affect long-term developmental outcomes of preterm infants born during or after 1975.

Specific Research Questions

1. Do preterm infants/children born during or after 1975 demonstrate comparable developmental outcomes with the standardized populations on the measurement tools for assessment at ages 9 and 18 months from their mother's expected date of confinement and/or at 3 and subsequent years of age?
2. Do preterm infants/children exposed to home stimulation programs demonstrate different developmental outcomes from preterm children not exposed to such programs on the measurement tools used for assessment at ages 9 and 18 months from their mother's expected date of confinement and/or at 3 and subsequent years of age?

Research Hypotheses

1. Preterm children born during or after 1975 will demonstrate comparable developmental outcomes to standardized populations at some time between 18 months and 5 years of age.
2. Preterm children exposed to home stimulation programs in the first 3 years of life will demonstrate superior developmental outcomes to preterm children not exposed to such programs.

Definition of Terms

Preterm children refers to 259 children who (a) were born in one of three university teaching hospitals in Ontario between November 1, 1975 and October 31, 1979; (b) had a mean birth weight of $1,551 \pm 317$ grams; and (c) had a mean gestational age of 226 ± 16 days.

Developmental outcomes in this paper will refer to subjects' (a) mental and motor scores on The Bayley Scales of Infant Development (Bayley, 1969) for 9 and 18 month olds; (b) IQ scores on the Stanford-Binet Intelligence Scale (Form L-M) (1972 Norms) for 3 and 4 year olds (Terman and Merrill, 1973); (c) social competence scores on the Vineland Social Maturity Scale (Doll, 1953); and (d) anthropometric measures of height and weight.

Home control group refers to subjects who received no home program.

Early home stimulation refers to subjects who following discharge had 10 monthly visits of one-hour duration for a tutor to provide a prescribed module of parental education and designated toys.

Late home stimulation refers to subjects who following their Bayley assessment at 9 months from EDC had an individualized program consisting of tutoring and toys provided monthly until age 2 and bimonthly to age 3.

Continual home stimulation refers to subjects who had both early and late home stimulation.

METHODOLOGY

Design

A posttest-only control group design was used (Campbell & Stanley, 1963). At discharge from the hospital, by a stratified (by sex) random method, subjects were assigned to one of three posthospital intervention groups or to a group who had comparable time spent with them as the experimental group.

Procedure

All four groups had a monthly home visit from the public health nurse for the first 10 months after discharge to deal with health promotion and problem alleviation. Although methodologically the addition of a "pure" control group, without any visits, would have improved the project from a design standpoint, such a group was rejected on ethical grounds. In addition to the monthly visits of the Home Control Group, the Early Home and Continual Home Stimulation groups had (during the same hourly visits) a specified teaching module presented to the caretaker and age-appropriate toys left for the intervening month. Hence all subjects received the attention provided in ten one-hour visits to control the Hawthorne effect but in two of the intervention groups planned tutoring and provision of toys occurred. The Bayley Scales of Infant Development were administered in the home by a qualified psychometrist, who did not know the group assignment of the child, after the conclusion of the ten visits. The time selected for the first Bayley assessment was when the child was 9 months from the mother's date of confinement (EDC) so that the variable of biological maturation would be controlled.

Following the first Bayley assessment, the latter half of the control group admitted to the sample was designated the Late Stimulation Group. They, together with the latter half of the Early Stimulation Group admitted to the sample (who became the Continual Stimulation Group), received, based on the results of the Bayley assessment, an individualized monthly program of tutoring and toys until age 2, and then a bimonthly program until age 3.

All subjects were reappraised 18 months from their mothers' EDC on the Bayley Scales of Infant Development. At ages 3 and 4 cognitive assessment was appraised on the Stanford-Binet (Terman & Merrill, 1973), social maturity on the Vineland (Doll, 1953), and the anthropometric measures were recorded. The validity and reliability of these measurement tools is documented in the literature.

Sample

The original sample had 259 subjects. Attrition rates over the period 1975-1981 are illustrated in Table 1.

Table 1
Attrition Rate by Year

Variable	Year						Total
	75-76	76-77	77-78	78-79	79-80	80-81	
Subject intake (I)	65	64	80	52	0	0	261
Total remaining subjects from previous year (TRS)	0	62	123	192	237	236	236
I + TRS	65	126	203	244	237	236	
Lost during year/study	3	3	11	7	1	4	29
Remaining/start of year sample	62/65	123/126	192/203	235/244	236/237	232/236	232/261
Attrition rate of sample/year/to date	4.6%	2.4%	5.4%	2.9%	0.4%	1.7%	11.2%

Losses were due to death (2), emigration (12), inability to trace (7), and refusals (8; 2 after cerebral palsy diagnosed). Tilford (1976) warns results may be equivocal if children with major neurological deficit are left in the main sample. Hence, 7 children with cerebral palsy (incidence 2.7%) were removed from the main sample and will be analyzed separately.

In addition, it was decided that a subject would be placed in a special group designated Developmental Delay if on either Bayley Scale he/she did not attain a score of 50, or if on the Stanford-Binet he/she did not attain the basal score at the year 2 level. Based on these criteria, seven subjects were assigned to the Developmental Delay Group and removed from the main sample. The attrition from the sample due to cerebral palsy was distributed across all four treatment groups; the attrition due to developmental delay was distributed across all groups except the Continual Stimulation Group. Up to the time of the 18-month assessment, 86% (223/259) of the original sample remained in the main sample, another 4.6% (seven with developmental delay and five with cerebral palsy) were still members of special follow-up groups, so over 90% of the original cohort were followed to 2 years of age.

FINDINGS AND DISCUSSION

Cognitive and Motor Developmental Outcomes in the First Two Years

There were no significant differences found at 9 months from EDC on either the mental or motor development Bayley Scale corrected-age scores between the subjects who had a home stimulation programme and those who did not (see Tables 2 and 3).

Table 2

Ranges, Means, Standard Deviations of Age-Corrected Bayley Mental Development Indices at 9 Months from Mother's Expected Date of Confinement for Premature Infants Exposed and Not Exposed to an Infant Stimulation Programme^a

Exposure to programme		n	Range	Mean	Standard deviation
No	Male	56	65-136	102.26	15.91
	Female	55	60-146	109.20	16.91
Yes	Male	55	72-150	111.10	16.58
	Female	56	69-150	115.16	14.03
Total	Male	111	65-150	107.04	15.80
	Female	111	60-150	112.38	15.64

^a F — Value n.s. for treatment, sex, and treatment \times sex.

Table 3

Ranges, Means, Standard Deviations of Age-Corrected Bayley Motor Development Indices at 9 Months from Mother's Expected Date of Confinement for Premature Infants Exposed and Not Exposed to an Infant Stimulation Programme^a

Exposure to programme		n	Range	Mean	Standard deviation
No	Male	56	66-139	97.31	15.56
	Female	55	72-150	104.16	17.07
Yes	Male	55	69-134	102.19	12.99
	Female	56	75-143	103.73	11.28
Total	Male	111	66-139	99.41	14.87
	Female	111	72-150	102.76	15.16

^a F — Value n.s. for treatment, sex, and treatment \times sex.

Females consistently scored higher than males but not significantly so. Mental development outpaced motor development in the first year. Overall group means for both sexes demonstrated these corrected scores to be comparable to the means and standard deviations of the test's standardized population for motor development and better than the standardized means for mental development. Other authors have noted that use of corrected scores on the Bayley Mental Development Indices probably inflates the score during the first year of life (Hunt & Rhodes, 1977).

However, if one follows Lubchenco's (Note 2) suggestion and uses corrected age scores during the first year, the following observation can be made concerning the proportion of the sample with IQs under 90 at 9 months from the subject's mother's expected date of confinement: 21 of the 111 children who had no planned program had IQs under 90 (18%); whereas 10 of the 111 children who had exposure to a stimulation program were found to have IQs under 90 (9%).

At 18 months from the subject's mother's expected date of confinement, again there were no statistically significant differences found among the treatment groups on either the Bayley unadjusted mental or motor scores (see Tables 4 and 5). At this age again females scored higher than males in mental development but not significantly so. Motor and mental development appeared to parallel each other better at 18 months than they had at 9 months. Although the mean unadjusted scores for both mental and motor development fell within a standard deviation of the mean, this sample of prematures had not attained the mean score of their full-term counterparts in the standardization population by the time they reached 18 months from their mother's expected date of confinement. Forty per cent of the sample (113/223) would have IQs under 90 with the use of unadjusted Bayley Mental Indices. With age-corrected scores 13% (31/223) of the sample have IQs less than 90 at this age. The percentage varied by group from 9% to 18%, with the lowest incidence (9%) occurring in the group who had been exposed to continual stimulation.

Table 4

Ranges, Means, Standard Deviations of Unadjusted Bayley Mental Development Indices at 18 Months from Mother's Expected Date of Confinement for Premature Infants Exposed to Different Timing of Stimulation Programmes^a

Timing of programme		n	Range	Mean	Standard deviation
None	Male	23	62-118	88.00	15.90
	Female	26	73-124	95.85	12.09
Early	Male	27	62-116	89.30	16.08
	Female	26	75-137	101.08	14.66
Late	Male	33	54-129	85.39	16.22
	Female	29	56-135	91.34	16.83
Continual	Male	29	72-112	88.79	11.11
	Female	30	58-131	94.80	16.71
Total	Male	112	54-129	87.75	
	Female	111	56-137	95.61	

^a F — Value n.s. for treatment, sex, and treatment \times sex.

Table 5

Ranges, Means, Standard Deviations of Unadjusted Bayley Motor Development Indices at 18 Months from Mother's Expected Date of Confinement for Premature Infants Exposed to Different Timing of Stimulation Programmes^a

Timing of programme		n	Range	Mean	Standard deviation
None	Male	23	64-119	94.52	17.83
	Female	26	64-124	101.96	15.58
Early	Male	27	64-137	98.93	15.41
	Female	26	70-137	104.12	14.22
Late	Male	33	50-116	90.28	18.20
	Female	29	60-112	90.28	17.25
Continual	Male	29	50-115	97.86	13.92
	Female	30	54-124	96.53	16.77
Total	Male	112	50-137	95.20	
	Female	111	54-137	98.73	

^a F — Value n.s. for treatment, sex, and treatment \times sex.

Cognitive Developmental Outcomes at Ages 3 and 4

At the completion of the stimulation regimes at 3 years of age there were no significant differences found among the groups on their scores on the Stanford-Binet (see Table 6).

Table 6

Ranges, Means, Standard Deviations of IQ at Ages 3 and 4 Years of Age for Premature Children Exposed to Different Timing of Stimulation Programmes^a

Timing of programme		n	Range	Mean	Standard deviation
None	3 Years	48	57-127	93.19	16.48
	4 Years	45	72-132	100.91	15.41
Early	3 Years	53	62-134	95.91	19.33
	4 Years	46	70-134	101.56	16.97
Late	3 Years ^b	27	62-129	95.78	21.47
Continual	3 Years ^b	25	73-132	98.76	17.05
Total	3 Years	153	57-134	95.50	18.53
	4 Years	91	70-134	101.21	16.22

^a F — Value n.s. at both ages 3 and 4.

^b Subjects have not yet attained 4 years of age.

The overall mean IQ score of 95.50 ± 18.53 demonstrated that this sample of prematurely born 3-year-olds had not, by this age, attained the standardized population mean of 100. Bakeman and Brown (1980) compared 21 preterm infants with 22 full-term infants who were born in 1975 when these children were 3 years of age. No intervention was provided. The preterm's mean score on the Stanford-Binet was 83.5 ± 10.7 ; the full-term's mean score was 94.6 ± 14.2 . The current preterm sample has a mean comparable to their full-term group. Even so, 40% of the sample (62/153) who have already attained the age of 3 have IQs under 90 at this age.

Ninety-one subjects have reached their 4th birthday. Due to the nature of the design, 45 of these subjects are in the control group; 46 in the early stimulation group. There was no significant difference between the IQ score on the Stanford-Binet for these two groups (see Table 6). The mean IQ for the entire group of 4-year-olds was 101.21 ± 16.22 . Therefore, by 4 years of age these premature children born

in university teaching hospitals during 1975 or 1976 have comparable means and standard deviations on the Stanford-Binet to this test's standardized 4-year-old population; 29% (26/91) have IQs less than 90.

Social/Behavioural Outcomes at Ages 3 and 4

There was no significant difference among the treatment groups' scores on the Vineland Social Maturity Scale at either age 3 or age 4 (see Table 7).

Table 7

Ranges, Means, Standard Deviations of Social Quotients at Ages 3 and 4 Years of Age for Premature Children Exposed to Different Timing of Stimulation Programmes^a

Timing of programme		n	Range	Mean	Standard deviation
None	3 Years	48	87-167	124.00	22.99
	4 Years	45	80-158	118.87	19.59
Early	3 Years	53	87-173	122.64	19.43
	4 Years	45	80-180	118.98	17.90
Late	3 Years ^b	27	87-160	116.19	19.83
Continual	3 Years ^b	25	87-173	114.56	21.91
Total	3 Years	153	87-173	120.61	21.08
	4 Years	90	80-180	118.92	18.77

^a F — Values n.s. at both ages 3 and 4.

^b Subjects have not yet attained 4 years of age.

It is recognized that, in general, 1983 children are much more sophisticated than the 1953 children on whom this test was standardized. The means of the overall sample at both ages 3 and 4 exceed plus one standard deviation of the standardized population's mean. Most of these premature children perform the life skills involved in self-care at the table, in toileting, in dressing, in locomotion, in reciprocal play, in communication, in assuming responsibility for household tasks and in hand manipulation skills exceptionally well. Only 14% (22/153) and 11% (10/90) at ages 3 and 4 respectively fall below the standardized mean. Bakeman and Brown (1980) data support the finding that preterm cohorts have adequate social competence by age 3.

Anthropometric Developmental Outcomes at Ages 3 and 4

The heights of the sample at 3 and 4 years of age are shown in Table 8.

Table 8

Ranges, Means, Standard Deviations of Height (cm) at Ages 3 and 4 Years of Age for Premature Children Exposed to Different Timing of Stimulation Programmes^a

Timing of programme		n	Range	Mean	Standard deviation
None	3 Year	47	85-102	94.34	3.42
	4 Year	44	91-109	101.45	4.04
Early	3 Year	53	84-108	94.13	5.04
	4 Year	45	90-115	101.33	5.50
Late	3 Year ^b	27	88-101	94.30	4.07
Continual	3 Year ^b	24	85-103	94.04	4.15
Total	3 Year	151	84-108	94.21	4.28
	4 Year	89	90-115	101.39	4.58

^a F — Value n.s. at both ages 3 and 4.

^b Subjects have not yet attained 4 years of age.

The weights of the sample at ages 3 and 4 are shown in Table 9.

Table 9

Ranges, Means, Standard Deviations of Weight (kg) at Ages 3 and 4 Years of Age for Premature Children Exposed to Different Timing of Stimulation Programmes^a

Timing of programme		n	Range	Mean	Standard deviation
None	3 Year	48	11.10-18.10	13.80	1.51
	4 Year	45	11.40-20.00	15.78	1.83
Early	3 Year	53	10.00-20.00	13.90	1.91
	4 Year	44	11.80-24.90	15.85	2.46
Late	3 Year ^b	27	9.90-16.80	13.36	1.62
Continual	3 Year ^b	25	9.50-25.9	13.06	3.00
Total	3 Year	153	9.50-25.9	13.63	1.98
	4 Year	89	11.40-24.90	15.81	2.16

^a F — Value n.s. at both ages 3 and 4.

^b Subjects have not yet attained 4 years of age.

There are no significant differences among the treatment groups at ages 3 or 4 in either height or weight. This sample of premature children is approximately 2 centimeters shorter and 1 kilogram lighter at both 3 and 4 years of age than the average measurements reported (Reed & Stuart, 1959; Watson & Lowry, 1967). Hence their growth increment in height (7 cm) and in weight (2 kg) between 3 and 4 is comparable to the growth increment of the average child between 3 and 4 but the premature child started at a lower baseline.

SUMMARY AND CONCLUSION

The findings of this project to date indicate that preterm children in this sample (a) do not attain comparable anthropometric measurements to standardized growth curves up to age 4, (b) do attain social maturity comparable to standardized populations by age 3, and (c) do attain comparable IQ scores to standardized populations by age 4. There is no evidence that provision of stimulation programs at different times during the first 3 years affects overall outcomes.

In conclusion, a quotation from Koenig (1950) seems appropriate:

The first chapter in the life of the premature infant is by all odds the most dramatic one. In it, he utilizes the best talents of the medical and nursing professions and by the mere act of remaining alive achieves that so desirable result — the lowering of the infant mortality rate. His brief moment of triumph over, he usually disappears into oblivion. (p. 803)

It is hoped that the model for longitudinal study of the preterm infant offered here will provide understanding of the health of premature children in the 1980s and bring them out of oblivion.

REFERENCES

- Bakeman, R., & Brown, J. V. Early interaction: Consequences for social and mental development at three years. *Child Development*, 1980, 51, 437-447.
- Bayley, N. *Manual for the Bayley Scales of Infant Development*. New York: Psychological Corporation, 1969.
- Beskow, B. Mental disturbance in premature children at school age. *Aeta Paediatrica Scandinavia*, 1949, 37, 125.
- Blegen, S. D. The premature child. *Aeta Paediatrica Scandinavia*, 42, (Supp. 88), 1953.
- Campbell, D. T., & Stanley, J. G. *Experimental and quasi-experimental designs for research*. Chicago: Rand-McNally, 1963.

- Caputo, D. U., Goldstein, K. M., & Taub, H. B. Neonatal compromise and later psychological development: A ten-year longitudinal study. In M. S. L. Friedman and M. Sigman (Eds.), *Preterm birth and psychological development*. New York: Academic Press, 1981.
- Chapman, J. S. *Potential of the premature infant: A 1980 perspective*, Winnipeg: School of Nursing, The University of Manitoba and VON, Winnipeg Branch, 1980.
- Dann, M., Levine, S., & New, A. A long-term follow-up study of small premature infants. *Pediatrics*, 1964, 733, 945-954.
- DeHirsch, K., Jansky, M. S., & Langford, W. S. Comparisons between prematurely and maturely born children at three age levels. *American Journal of Orthopsychiatry*, 1966, 36, 616-628.
- Department of Health, Education and Welfare. *Child health assessment: Part III: 2-4 years*. Final report of project supported by Grant Number R02-NU-00559, Division of Nursing, Bureau of Health Manpower, Health Resources, and Administration, 1979.
- Doll, E. A. *The measurement of social competence: A manual for the Vineland Social Maturity Scale*. Circle Pines, Minn.: American Guidance Service, Inc., 1953.
- Drillien, C. M. *The growth and development of the prematurely born infant*. Baltimore: Williams & Wilkins, 1964.
- Faculty of Nursing, University of Toronto. *Conceptual framework for nursing*. Toronto: Faculty of Nursing, University of Toronto, 1981 (mimeographed).
- Fisch, L. O., Bilek, M. K., Miller, L. D., & Engel, R. R. Physical and mental status at 4 years of age of survivors of the respiratory distress syndrome: Follow-up report from the collaborative study. *The Journal of Pediatrics*, 1975, 86, 497-503.
- Fitzhardinge, P. M., & Ramsey, M. The improving outlook for the small prematurely born infant. *Developmental Medicine and Child Neurology*, 1973, 15, 447-459.
- Holstrum, W. J. The prediction of three year developmental status of high risk infants (Doctoral dissertation, The University of Florida, 1979). *Dissertation Abstracts International*, 1980, 40, 4882-A. (University Microfilms No. 80-05465)
- Howard, P. J., & Worrell, M. A. Premature infants in later life. *Pediatrics*, 1952, 9, 577.
- Hunt, J. V., & Rhodes, L. Mental development of preterm infants during the first year. *Child Development*, 1977, 48, 204-210.
- Jansky, J. The marginally ready child. *Bulletin of the Orthodontological Society*, 1975, 25, 69.
- Koenig, H. What happens to prematures? *American Journal of Public Health*, 1950, 40, 803.
- Lubchenco, L., Horner, F. A., Reed, L. H., Hix, I. E., Metcalf, D., Cohig, R., Elliott, H. C., & Bourg, M. Sequelae of premature birth: Evaluation of premature infants of low birth weight at ten years of age. *American Journal of Diseases in Children*, 1963, 106, 101-115.
- Mohr, C., & Barthelme, P. Mental and physical development of children prematurely born. *American Journal of Diseases of Children*, 1930, 40, 1000.
- Neligan, G. A., Kolvin, I., Scott, D. M., & Garside, R. F. *Born too early or too soon*. Clinics in developmental medicine, 61. London: Heinemann, 1976.
- Reed, R. B., & Stuart, H. C. Patterns of growth in height and weight from birth to eighteen years of age. *Pediatrics*, 1959, 21, 904-909.
- Robinson, N. M., & Robinson, H. B. A follow-up study of children of low birth weight and control children at school age. *Pediatrics*, 1965, 35, 425-433.

- Scarr-Salapatek, S. An evolutionary perspective on infant intelligence: Species patterns and individual variations. In M. Lewis (Ed.), *Origins of intelligence*. New York: Plenum Press, 1976.
- Shirley, M. A behavior syndrome characterizing prematurely-born children. *Child Development*, 1939, 10, 115.
- Shirley, M. Development of immature babies during their first two years. *Child Development*, 1938, 9, 347.
- Sigman, M., Cohen, S. E., Beckwith, L., & Parmelee, A. H. Social and familial influences on the development of preterm infants. *Journal of Pediatric Psychology*, 1981, 6, 1-13.
- Sigman, M., & Parmelee, A. H. Longitudinal evaluation of the high-risk infant. In T. M. Field, A. M. Sostak, S. Goldberg & H. H. Shuman (Eds.), *Infants born at risk*. Jamaica, N. Y.: Spectrum, 1979.
- Terman, L. M., & Merrill, M. A. *Stanford-Binet Intelligence Scale: Manual for the third revision form L-M*. Boston: Houghton Mifflin, 1973.
- Tilford, J. A. The relationship between gestational age and adaptive behavior. *Merrill-Palmer Quarterly*, 1976, 22, 319-326.
- Wachs, T., Uzgis, I., & Hunt, J. Cognitive development in infants of different age levels and from different environmental backgrounds: An exploratory investigation. *Merrill-Palmer Quarterly*, 1971, 17, 283-317.
- Watson, E. H., & Lowry, G. H. *Growth and development of children* (4th ed.). Chicago: Year Book Medical Publishers, 1962.
- Weiner, G., Rider, L. V., Oppel, W. C., & Harper, P. A. Correlates of low birth weight, psychological status at eight to ten years of age. *Pediatric Research*, 1968, 2, 110.
- White, B. *The first three years of life*. Englewood Cliffs, N. J.: Prentice-Hall, 1975.
- Wilson, L. S. Twins: Early mental development. *Science*, 1972, 175, 914-918.
- Yarrow, L., Rubinstein, J., Pedersen, R., & Jankowski, J. J. Dimensions of early stimulation and their differential effects on infant development. *Merrill-Palmer Quarterly*, 1972, 18, 205-219.

REFERENCE NOTES

1. Chapman, J. S. Effects of supplemental taped voice and music during incubator and crib confinement in hospital on premature infant development. Paper presented at the Third National Meeting of the Nurses Association of the American College of Obstetricians and Gynecologists, San Francisco, April 3, 1981.
2. Lubchenco, L. O. Long-term outcome of the SGA infant. paper presented at the Third Annual March of Dimes Prenatal Nursing Conference, Chicago, 1978.

RÉSUMÉ

Suivi longitudinal d'enfants prématurés: résultats du programme de stimulation à la maison jusqu'à l'âge de quatre ans — analyse préliminaire

Les résultats à long terme des programmes d'intervention destinés aux enfants prématurés n'ont pas fait l'objet d'écrits. Une seule étude (N = 5-6/groupe) a été faite auprès d'enfants âgés de 3 ans; aucune recherche n'a porté sur les observations au delà de cet âge. La présente étude avait pour objectif de mesurer le développement à long terme des prématurés afin de déterminer si les programmes d'intervention ont une influence sur leur développement. Dans un échantillon de 223 sujets, les résultats relatifs au développement cognitif et moteur au cours des deux premières années ne pouvaient se comparer aux normes. A 9 mois et à 18 mois, les filles et les sujets exposés au programme de stimulation tendaient à présenter un Q.I. plus élevé que les garçons et les sujets témoins. A 3 ans et à 4 ans, aucune différence au niveau du Q.I. n'a pu être établie entre les groupes d'enfants stimulés et non stimulés. A 4 ans, mais non à 3 ans, le Q.I. était comparable aux données normatives. On n'a constaté aucune différence entre les groupes de stimulation quant au développement social et de comportement chez les enfants de 3 et 4 ans. Parallèlement, aucune différence sur le plan de la taille ou du poids n'a été observée entre les groupes à 3 ans ou à 4 ans; le taux de croissance observé à 3 ans et à 4 ans était normal mais les sujets avaient quand même une taille et un poids inférieurs à ceux d'enfants du même âge.

NURSING RESEARCH A BASE FOR PRACTICE: SERVICE AND EDUCATION

The University of Victoria has on hand some copies of the Proceedings of the 8th National Nursing Research Conference. They are available at \$12.50 per copy.

Requests should be addressed to the School of Nursing, University of Victoria, P.O. Box 1700, Victoria, BC V8W 2Y2.

INFORMATION FOR AUTHORS

Nursing Papers/Perspectives en nursing welcomes research and scholarly manuscripts of relevance to nursing and health care. Please send manuscripts to *The Editor, Nursing Papers/Perspectives en nursing*, School of Nursing, McGill University, 3506 University Street, Montreal, PQ H3A 2A7.

Procedure

Please submit three double-spaced copies of the manuscript on 216mm × 279mm paper, using generous margins. Include a covering letter giving the name, address, present affiliation of the author(s). It is understood that articles submitted for consideration have not been simultaneously submitted to any other publication. Please include with your article a statement of ownership and assignment of copyright in the form as follows: "I hereby declare that I am the sole proprietor of all rights to my original article entitled '_____' and that I assign all rights to copyright to the School of Nursing, McGill University, for publication in *Nursing Papers/Perspectives en nursing*. Date ____ Signature_____."

Style and Format

Acceptable length of a manuscript is between 10 and 15 pages. The article may be written in English or French, and must be accompanied by a 100-200 word abstract (if possible, in the other language). Please submit original diagrams, drawn in India ink and camera-ready. Prospective authors are asked to place references to their own work on a separate sheet and to follow the style and content requirements detailed in the Publication Manual of the American Psychological Association (3rd. ed.), Washington, D.C.: APA, 1983.

Manuscript Review

Manuscripts submitted to *Nursing Papers/Perspectives en nursing* are assessed anonymously by two members of a Review Board, using the following criteria:

Assessing content

Internal validity — relatedness: Is the problem the paper deals with identified? Is the design of the research or the structure of the essay appropriate to the question asked? Are the statistical, research and logical methods appropriate? Can the findings be justified by the data presented? Are the implications based on the findings?

External validity — relevance, accountability: Is the question worth asking? Is the problem of concern? Are there problems of confidentiality or ethics? Are the findings of the research or the conclusions of the essay significant? Can the findings or the conclusions be applied in other situations? Does the article contribute to knowledge in nursing? In what way?

Assessing presentation

Are the ideas developed logically? Are they expressed clearly? Is the length appropriate to the subject? Does the number of references or tables exceed what is needed?

Publication Information

On receipt of the original manuscript, the author is advised that the editorial board's response will be forwarded within six weeks. When a manuscript is returned to the author for revision, three copies of the revised manuscript (dated and marked 'revised') should be returned to the editor within four weeks. The complete procedure of review, revision, copy editing, typesetting, proofreading and printing may result in a six to eight month lapse between submission and publication.

RENSEIGNEMENTS À L'INTENTION DES AUTEURS

La revue *Nursing Papers/Perspectives en nursing* accueille avec plaisir des articles de recherche ayant trait aux sciences infirmières et aux soins de la santé. Veuillez adresser vos manuscrits à la rédactrice en chef, *Nursing Papers/Perspectives en nursing*, École des sciences infirmières, Université McGill, 3506 rue University, Montréal, P.Q., H3A 2A7.

Modalités

Veuillez envoyer trois exemplaires de votre article dactylographié à double interligne sur des feuilles de papier de 216mm × 279mm en respectant des marges généreuses, accompagné d'une lettre qui indiquera le nom, l'adresse et l'affiliation de l'auteur ou des auteurs. Il est entendu que les articles soumis n'ont pas été simultanément présentés à d'autres revues. Veuillez inclure avec votre article une déclaration de propriété et de cession de droit d'auteur conformément à la formule suivante: "Je déclare par la présente que je suis le seul propriétaire de tous droits relatifs à mon article intitulé ' ' et je cède mon droit d'auteur à l'École des sciences infirmières de l'Université McGill, pour fins de publication dans *Nursing Papers/Perspectives en nursing*. Date _____ signature _____."

Style et présentation

La longueur acceptable d'un article doit osciller entre 10 et 15 pages. Les articles peuvent être rédigés soit en anglais, soit en français et ils doivent être accompagnés d'un résumé de 100 à 200 mots (si possible, dans l'autre langue). Veuillez remettre l'original des schémas, dessinés à l'encre de Chine et prêts à être photographiés. Les auteurs sont tenus de fournir les références à leurs propres oeuvres sur une feuille séparée et de suivre les consignes énoncées dans le *Publication Manual of the American Psychological Association* (3rd. ed.), Washington, D.C.: APA, 1983, en ce qui concerne le style et le contenu de leurs articles.

Examen des manuscrits

Les manuscrits présentés à la revue *Nursing Papers/Perspectives en nursing* sont évalués de façon anonyme par deux lectrices selon les critères suivants:

Évaluation du fond

Validité interne: Le problème dont traite l'article est-il clairement défini? La forme des recherches ou la structure de l'essai sont-elles appropriées à la question soulevée? Les méthodes statistiques, logiques et les modalités de recherche sont-elles appropriées? Les conclusions peuvent-elles être justifiées à l'aide des données présentées? Les implications de l'article sont-elles fondées sur les conclusions?

Validité externe: Le problème soulevé présente-t-il un intérêt véritable? Ce problème est-il d'actualité? Existe-t-il des problèmes de divulgation ou de déontologie? Les conclusions de la recherche ou de l'article sont-elles importantes? Ces conclusions ou résultats peuvent-ils s'appliquer à d'autres situations? Est-ce que l'article contribue à l'avancement du savoir dans le domaine des sciences infirmières? De quelle façon?

Évaluation de la présentation

L'auteur développe-t-il ses idées de manière logique? Les exprime-t-il clairement? La longueur de son article est-elle appropriée au sujet abordé? Est-ce que le nombre de notes ou de tableaux dépasse le strict nécessaire?

Renseignements relatifs à la publication

À la réception du manuscrit original, l'auteur est avisé que le Comité de rédaction prendra une décision au sujet de la publication de son article dans les six semaines. Lorsqu'un manuscrit est renvoyé à son auteur pour qu'il le remanie, trois exemplaires dudit manuscrit remanié (daté et portant l'inscription "revu et corrigé") doivent être renvoyés à la rédactrice en chef dans les quatre semaines. Les modalités complètes de lecture, de remaniement, d'édition, de composition et d'imprimerie expliquent qu'il s'écoule souvent de six à huit mois avant qu'un article soumis soit publié.



**McGILL UNIVERSITY
SCHOOL OF NURSING**

**GRADUATE PROGRAM IN NURSING
MASTER OF SCIENCE (APPLIED)**

This program has been designed to prepare clinicians and researchers for the expanding function of nursing in our rapidly developing health care services.

Options available:

Option A: Clinical Nursing Practice

Option B: Research in Nursing and Health Care

Graduates will be prepared to incorporate either option within careers in the teaching of nursing or the development and management of nursing service.

Admission requirements

Either a Baccalaureate degree in Nursing comparable to B.Sc.(N) or B.N. from McGill; or a Baccalaureate degree comparable to B.A. or B.Sc. offered at McGill.

Length of program

Two years for those with nursing degrees

Three years for those with non-nursing degrees

Language of study: English

Further information from:

Director, School of Nursing
Master's Program
3506 University Street
Montreal, P.Q. H3A 2A7