National Library of Canada
Acquisitions and Bibliographic Services Branch
395 Wellington Street
Ottawa, Ontario
K1A 0N4

Bibliothèque nationale du Canada
Direction des acquisitions et des services bibliographiques
395, rue Wellington
Ottawa (Ontario)
K1A 0N4

Your file Votre référence

Our file Notre référence

NOTICE

The quality of this microform is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us an inferior photocopy.

AVIS

La qualité de cette microforme dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de qualité inférieure.

Canada

Mothers' Problem Solving in Relation to Child Nutrition in the Philippines

Cynthia J. Ticao
Department of Psychology
McGill University, Montreal
July 28, 1994

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfilment of the requirements for the degree of Doctor of Philosophy

ISBN 0-612-00140-7

Abstract

This study examined Filipino mothers' problem solving on issues related to child feeding, using a dyadic, peer-help approach. The participants were mothers of children under 6 years of age from the town of Camaligan, in the southern Philippines, where malnutrition among children is prevalent. Two studies were conducted: one using a controlled experimental session and the second using a multi-session nutrition education format. In the first study, mothers were paired with a mutual or unilateral friend to discuss a feeding problem to which they initially gave similar solutions and one to which they gave different solutions. Their post-discussion solutions were better in quality and number than the pre-discussion solutions; also mothers paired with a mutual friend gave more and better final solutions to the initially-agreed problem than other mothers. Mothers' final solutions were more likely to come from their own than their partner's discussed solutions, suggesting that the partner's role was to facilitate the mother's own problem-solving process. In the second study, mothers paired with a mutual or unilateral friend were compared with an unpaired control group, after pacing themselves through four problem-based nutrition education sessions. For all three groups, mothers' nutrition knowledge and target child's weight-for-age and height-for-age improved from before to after the sessions. In conclusion, mothers show improvements in the number and quality of solutions they generate and the nutrition knowledge they acquire as a result of a problem-solving apprcach to nutrition education.

Resume

Cette étude a examiné comment des mères des Philippines résoudent des problèmes sur des sujets reliés à l'alimentation de leurs enfants, en utilisant un "dyadic", par l'approche "peer-help". Les participantes étaient des mères ayant des enfants de moins de 6 ans provenant de la ville de Camaligan au sud des Philippines, un endroit ou la malnutrition est n'est pas rare parmi les enfants. Deux études ont été effectuées: la première consistant en une session expérimentale contrôlée et la deuxième structurée selon un format d'éducation sur la nutrition en plusieurs sessions. Lors de la première étude, les mères étaient jumelées avec une amie mutuelle ou une connaissance afin de discuter de certains problèmes de nutrition auxquels elles avaient donné des solutions similaires et une autre session ou elles avaient donné des solutions différentes. Les solutions énumérées après la discussion étaient de meilleure qualité et en nombre supérieur que les solutions énumérées avant la discussion; aussi, les mère jumelées avec des amies ont donné un plus grand nombre et de meilleures solutions que les autres mères. A la fin de ces sessions on a pu constater que les solutions énumérées par les mères venaient plutôt d'elle-mêmes que des solutions discutées avec leurs partenaires, ce qui veut dire que le rôle des partenaires était seulement de faciliter le processus de solution des problèmes de chaque mère. Lors de la deuxième étude, les mères jumelées avec une amie mutuelle ou une connaissance ont été comparées avec un groupe de mère non jumelées, qui ont reçu quatres sessions d'éducation sur la nutrition. Pour chacun des trois groupes, nous avons pu constater une nette amélioration après les sessions quant à l'acquis des mères sur la nutrition ainsi que la cible du poids + age et de la grandeur + age. En conclusion, on peut voir une nette amélioration dans le nombre et la qualité des solutions proposées et les connaissances sur la nutrition qu'elles

acquérissent à la suite d'une approche sur l'éducation sur la nutrition.

Acknowledgements

I would like to thank the Canadian International Development Agency (CIDA) and the Food Systems Development Project (FSDP) for their generous scholarship grant. McGill International was instrumental in the initial preparations for the scholarship. I deeply appreciate the support that the University of the Philippines in the Visayas has shown me. In particular, I owe a debt of gratitude to the late Vice Chancellor Lourdes V. de Castro, for her enthusiasm and trust. The field research would not have been possible without the patient cooperation of the mothers in Camaligan, Aklan. They warmly welcomed us to their homes and shared their ideas, their feelings, their food. Juvy Janeo, Barbara Santuyo, Dorothy Soldevilla, Julieta Buendia, and Rennel Hungay were tireless and persistent research assistants; working with them was both fun and stimulating. The FSDP staff were helpful in providing data, comfortable transportation, and housing. I am deeply grateful to my supervisor, Dr. Frances Aboud, for her invaluable suggestions and steady encouragement. Her inexhaustible patience and unfailing guidance sustained me all throughout my studies at McGill. I wish to thank Dr. Morton Mendelson for providing insightful feedback and support. Dr. John Lydon, Rhonda Amsel, and Dr. Kevin Dunbar provided support and suggestions in many ways. Sheila Morris and Minerva Kuhlenschmidt were always ready to provide assistance and to perk me up during the long hours of work. Special thanks go to Edwin Valencia, Luzette Teruel, Annabelle Panes, Ma. Elisa Diez-Baliao, Nazis Dorego, Ma. Luisa Mabunay, Grace Gregorio, Magdalena and Victor Volkov, Sonny & Lyncen Fernandez, Augusto Ramon Reyes--my stabilizers, my friends. Finally, all the hard work would not have meant anything without the love and unstinting support of my parents, Reinerio and Julianita Ticao; my brothers, Rene, Rex, and Rolly; and my sister, Sylvia.

Table of Contents

List of Tables

List of Appendices

Introduction

Malnutrition is a major problem in developing countries, with 36% of children under 5 years being moderately or severely underweight (UNICEF, 1994). In many developing countries such as the Philippines, lack of food, regionally or nationally, is not the primary reason for malnutrition. Indeed, developing countries, as a whole, produce 107% of the daily calorie requirement of their populations (UNICEF, 1994). Nonetheless, malnutrition prevails for a variety of reasons, many of which concern mothers' child feeding practices including the duration of breastfeeding, the age at which solid food is introduced, feeding after recovery of an illness, the number of daily feedings, and the quantity and quality of food given. Health and nutrition experts feel that mothers, particularly rural and underprivileged mothers, often lack basic information and methods needed to improve their child's growth and health. However, nutrition education programmes directed at mothers have not always been successful (Glatthaar, Fehrsen, Irwig, & Reinach, 1986).

Nutrition education usually follows a didactic approach. Information is provided in health centers to groups of mothers, usually in connection with a nutrition supplementation or immunization program. On a larger scale, health education interventions have employed mass media, such as radio, television, and print (Hubley, 1993). A more

effective, albeit labour-intensive, approach involves home visits by a community health worker who helps the mother solve recurring problems in feeding her children (Waterlow, 1992). For example, mothers who said they had no food to give a 1-year-old were shown how to use a small portion of the adults' meal to create weaning food for a child (Cowan & Dhanoa, 1983). This problem-solving approach has many interesting features: for example, a focus on recurring problems identified by the mother, a collaborative approach to devising solutions, and an orientation toward practical solutions. However, the process itself has not been studied systematically in the field of nutrition education. A study of mothers' problem-solving in relation to child feeding is necessary to identify what components of the process are useful.

The purpose of the present study was to examine mothers' problem-solving on issues related to child feeding, using a dyadic, peer-help approach. The problem-solving process used here provided an opportunity for mothers to identify and elaborate on potential solutions to common problems as well as exchange information as they searched for the best solutions to their feeding problems. Two studies were conducted. One examined the problem-solving process and outcome with pairs of mothers under controlled conditions. The second attempted to implement this approach with a series of nutrition education sessions aimed at

improving mothers' nutrition knowledge and the child's weight. The following literature review covers topics related to nutrition and feeding practices, problem solving, and dyadic collaboration.

Nutrition and Feeding Practices

Malnutrition

Malnutrition is defined as a condition that results from an excess, imbalance, or deficit of nutrients in relation to tissue needs. Children are considered malnourished when their diets contain less than standard international levels of nutrients. A general deficiency is reflected in the child's failure to grow at expected rates.

The most common types of malnutrition are protein-energy malnutrition, deficiencies in Vitamin A, iron, and iodine. Of these, the dominant malnutrition problem in large populations is insufficient intake of food energy resulting in protein-energy malnutrition (Waterlow, 1992). In its most extreme forms, protein-energy malnutrition can result in marasmus (chronic malnutrition) or kwashiorkor (acute malnutrition). However, it is most prevalent in the form of mild or moderate chronic malnutrition. Because this type of malnutrition is endemic in many developing countries, such as the Philippines, this study focused on mild and moderate malnutrition in children under six years. At this age range, children are vulnerable to diseases that influence growth.

Generally, four types of measures are used in nutrition studies, notwithstanding the methodological problems associated with each: (1) biochemical evaluations of specific nutrients, (2) clinical assessment, (3) measures of food intake from detailed dietary information, and (4) anthropometric measures of height, weight, and arm circumference (Waterlow, 1992). The last is most frequently used in community studies because it requires the least time and expertise to collect. A brief description of anthropometric indices follows, to facilitate interpretation of the subsequently discussed studies.

Commonly measured anthropometric indices are height, weight, and mid-upper-arm circumference. Arm circumference is a quick way of ascertaining the child's risk of death and remains relatively constant from 1 to 5 years. Weight reveals the steady increase in growth of soft and hard tissue. It is a sensitive indicator of nutritional deprivation in cases where individuals fail to reach expected increments. Height reveals growth in bone tissue. As a result of long term nutritional deficiency, a child will become stunted, but short-term changes in height are less easy to detect than short-term changes in weight. Three indices are commonly derived from these measures: weight-for-age, height-for-age (which may reveal stunting), and weight-for-height (which may reveal wasting). Weight-for-age as an overall index of growth accounts for over 95%

of the variance of the other two indices combined (Keller & Fillmore, 1983). Weight-for-age and height-for-age tend to correlate well with one another, particularly in regions, such as the Philippines, where wasting is not common (Waterlow, 1992).

A recurring controversy regarding the selection of growth norms for nutritional research is whether standards obtained from children belonging to one group can be applied to children of other national, ethnic, or racial groups. The World Health Organization (WHO, 1978) consensus is that norms derived from statistically representative samples in developed countries can be used to assess the nutritional status of infants and young children in other countries, because socioeconomic status, rather than ethnicity or race, is the primary determinant of growth in infancy and early childhood. Furthermore, deviations below international standards predict physical and mental health outcomes (Waterlow, 1992). Consequently, the weight and height medians for every age group provided by the National Center for Health Statistics are recommended as norms (WHO, 1983). Weight-for-age, height-for-age, and weight-for-height are expressed as a percentage of the median or as z-scores (standard deviations from the median). The Gomez classification (1956), which is used in the Philippines, and the more commonly used Waterlow (1992) classification are outlined below.

Index	Gomez % of Median	Waterlow % of Median	Waterlow St.Dev.
Weight-for-age:			
Mild	76 to 90	80 to 89	
Moderate	61 to 75	70 to 79	below
Severe	below 60	below 70	-2
Height-for-age:			
Mild		90 to 94	
Moderate		80 to 89	below
Severe		below 80	-2
Weight-for-height:			
Mild		80 to 89	
Moderate		70 to 79	below
Severe		below 70	-2

The United Nations Children's Fund (UNICEF, 1994) report on the State of the World's Children estimated that 36% of children under-5 in developing countries suffered from moderate to severe malnutrition using weight-for-age. Moderate to severe wasting (low weight-for-height) was reported in 10% of 12- to 23-month-old children. A much higher prevalence of 48% was reported for moderate to severe stunting (low height-for-age) among 24- to 59-month-old children. South Asia had the highest prevalence of under 5 children who were underweight (60%), followed by East Asia and the Pacific (26%), Sub-Saharan Africa (31%), Middle East

and North Africa (17%), and Latin America and the Caribbean (11%). The World Summit for Children set the goal of cutting these percentages by half in the year 2000.

The Philippines is located in the region of East Asia and the Pacific. As with most developing countries, a large proportion of its 65 million population are dependents, with 44% being under 16 years old and 15% under 5 years. Under-5 mortality rates (i.e., the probability of dying between birth and 5 years of age) are frequently used as an index of children's health. In 1992, the under-5 mortality rate in the Philippines was 60 per 1000 live births, and the infant mortality rate (i.e., the probability of dying between birth and exactly one year of age) was 46 per 1000 live births (UNICEF, 1994).

According to UNICEF (1994), 34% of children under 5 suffered from severe and moderate malnutrition, while 5% were severely malnourished. Moderate and severe wasting among 12- to 23-month-old children was 14%; moderate and severe stunting among 24- to 59-month-olds was 45%. Low birthweight was reported to occur in 15% of newborns. The Philippines is one of the 10 countries which contribute to 80% of the world's malnutrition, with 3 million children reported to be malnourished. Indeed, malnutrition is a serious problem in the Philippines.

In terms of specific nutrient deficiencies, iron deficiency anemia is the most prevalent, affecting 40% of

Filipino school children, 49% of pregnant women, and 57% of lactating mothers. Vitamin A deficiency in children was detected at 57% using blood serum and at 5% using ocular signs (Latham, 1983; Philippine National Nutrition Council, 1992), and the goitre rate was 15% among 6- to 11-year-olds (UNICEF, 1994).

Malnutrition is a disturbing problem because of its association with morbidity, mortality, and other indices of poor child development. Although malnutrition is not frequently the direct cause of child deaths, it renders young children vulnerable to life-threatening diseases and infections. Chen (1986) in a prospective study in Bangladesh reported that 45% of deaths were related to nutrition. In addition, even those who survive have experienced insecure attachment (Valenzuela, 1990), poor peer interaction (Barrett & Radke-Yarrow, 1985), and had lower scores on scales of mental and motor development (Grantham-McGregor & Powell, Walker, Himes, 1991; Sigman, Neumann, Baksh, Nimrod, Bwibo, and McDonald, 1989).

More recent studies have moved away from the assumption that there is a direct causal relationship between early malnutrition, altered brain development, and impaired psychological functioning. There is now a tendency to focus on the influence of the child's social environment and early experiences, along with the effects of feeding practices and illness on both malnutrition and the child's psychological

development. Feeding practices, for example, are important not only in terms of the quantity and quality of food given, but also in terms of the social interaction it provides.

Family and Maternal Determinants of Malnutrition

Malnutrition is caused by the interplay of factors that fall under four large categories (Dasen & Super, 1988): (1) macroenvironmental problems, such as food commoditization, cash-crop policy, and land desertification, (2) family characteristics, (3) caretaker characteristics, and (4) child characteristics. The two categories of interest here, family and caretaker characteristics, include child feeding practices, mother-child interaction, and parental education, especially mother's education.

Mothers' child-feeding practices are influenced by factors such as cultural beliefs, socioeconomic status, and mother's education. Breast milk is the first food given to newborns in most cultures. Children in rural areas of developing countries continue breastfeeding for their first year, though the early introduction of bottled milk is becoming common, as it has among urban and educated women (Winikoff & Laukaran, 1989). A study in Cebu City, the Philippines, reported that 40% of the children 7 to 9 months received some breast milk, in contrast to 97% of the same age group living in Kinshasa, Zaire (Gussler & Mock, 1983). By 10 months of age, 65% of Filipino children are given exclusively bottles of infant formula, or powdered milk, and

food. Infant formula and powdered milk become too expensive to continue before the child is completely weaned. However, there is no indigenous tradition of drinking animal milk (Adair, Popkin, VanDerslice, Guilkey, Black, Briscoe, & Flieger, 1993; Jelliffe, 1968), so once breast-feeding stops, the child does not frequently drink cow's milk.

The introduction of solid foods is recommended sometime between the fourth and the sixth month. In some countries it starts as early as the first month, and in others as late as 18 months (Cosminsky, Mhloyi, & Ewbank, 1993; Cowan & Dhanoa, 1983; Gussler & Mock, 1983; McCann & Bender, 1992). Filipino mothers feed formulas as well as condensed milk, powdered milk, fruit juices, and "lugao" (a porridge made with corn grits and water) starting around the fourth month, although 30% had started solids in the first 3 months. Other popular supplementary foods fed to weanlings are fruits, tea, soft rice, mashed potatoes, sweet potatoes, soft-boiled eggs, meat or fish cut in small pieces, and oatmeal (Armar-Klemesu, Wheeler, Brakohiapa, & Yamamoto, 1991; Gussler & Mock, 1983; Guldan, Zeitlin, Beiser, Super, Gershoff, & Datta, 1993). However, in many developing countries, the transition to solid foods is a problem. In Nigeria, mothers traditionally feed their infants a liquid pap, which was discovered to be very low in nutrient density (Bentley, Dickin, Mebrahtu, Kayode, Oni, Verzosa, Brown, & Idowu, 1991). In the Punjab, India, children under 18

months were often fed only tea (Cowan & Dhanoa, 1983). Even when children eat adult foods in Ethiopia, they may eat only occasional fruits and vegetables and very small amounts of meat, fish, and poultry (Bekele, Wolde-Gabriel, & Kloos, 1993). Consequently, they may not receive specific nutrients and frequently do not receive more than 80% of the calories they require (e.g. Bentley et al., 1991; Sigman et al., 1989). Sex differences in feeding practices have sometimes been noted, but do not appear to be universal (Cowan & Dhanoa, 1983; Gittelsohn, 1991).

Most traditional cultures avoid certain foods because they are thought to cause health problems. Children in Zimbabwe are prohibited from eating foods considered difficult to chew or digest, such as boiled maize, groundnuts, roundnuts, porridge, dried vegetables, meat, tea with sugar, and sweets, because such foods can cause diarrhea (Cosminsky et al., 1993). In rural India, some mothers avoid feeding meat, fruits and vegetables with skin (e.g., grapes, eggplant, and jack fruit), other fruits like guava and mango, and milk, because these foods are associated with gastrointestinal problems (Sivaramakrishnan and Patel, 1993). Similarly, Ethiopians tend to avoid fruit, vegetables, and fish (Bekele et al., 1993).

Feeding during illness is another topic of concern to nutritionists. In traditional cultures, mothers often withhold food and fluid from a child who has diarrhea

(Guthrie, Guthrie, Fernandez, & Estrera, 1980), thus leading to death by dehydration. Fruit, bread, cooked bananas, oily food, whole corn, and mother's milk are believed by some Filipino mothers to exacerbate diarrhea, and so are withheld during a diarrhea episode (Guthrie et al., 1980). Currently in the Philippines, mothers feed a sick child soda crackers, biscuits, instant noodle soup, Royal Tru-Orange (a carbonated drink), or rice porridge. Rarely do mothers give their child extra food after a bout of illness, and this perpetuates the state of malnutrition brought about by it.

These studies show that traditional feeding practices, although not entirely inappropriate, need to be modified and improved if children are to achieve optimal growth. In addition to feeding the proper foods, mothers need the knowledge to deal with hungry, sick, and fussy children. The present study provided the mothers an opportunity to evaluate their current feeding practices in a problem-solving situation as well as basic information that would help them deal with feeding obstacles.

Mother-child interaction is the second determinant that is of interest in this study. Behaviors exchanged by mother and child during feeding and on other occasions have been associated with food intake as well as with the child's physical, cognitive, and emotional growth. Sigman et al. (1989) found that mild to moderate malnutrition in Kenyan toddlers was associated with lower food intake, and reduced

intake was consistently associated with children who were more frequently held, carried and given physical care. In Kenya, poorly fed toddlers received more verbal responses and fewer nonverbal responses than well fed ones, whereas the reverse was true in Egypt (Wachs, Sigman, Bishry, Moussa, Jerome, Neumann, Bwibo, & McDonald, 1992). The child's food intake appeared to be a stronger predictor of mother-child interaction than the mother's food intake, though the causal direction is not clear.

Cultural preferences for a particular sex can determine the impact of food intake on mother-child interaction (Wachs et al., 1992) as well as food allocation within the household (Gittelsohn, 1991). In Egypt, well-fed female toddlers received more verbal responses and vocalizations, less nonverbal responses, and faster responses to distress by caregivers than did poorly fed girls. Male toddlers were cared for regardless of their food intake, perhaps because they are valued more than females in this culture. In Kenya, food intake was more strongly related to social interaction in boys (Wachs et al., 1992). Although gender plays an important role in some cultures, a clear interpretation awaits data from more countries.

The mother's education is a significant predictor, not only of the child's food intake but also of her interaction with the child (Guldan et al., 1993; Ruel, Habicht, Pinstrup-Andersen, & Grohn, 1992; Sigman et al., 1989).

Better-educated mothers gave more food to their children and had better child feeding practices, in addition to other health-promoting practices relating to treatment of diarrhea, family planning, and immunization (e.g. the Cebu Study Team, 1991; Goodburn, Ebrahim, & Senapati, 1990). However, maternal schooling was not a significant determinant of hand-feeding (Oni, Brown, Bentley, Dickin, Kayode, & Alade, 1991), child health status awareness, breastfeeding, care of sick children, artificial feeds, and immunization (Raman Kutty, 1989). Consequently, although mothers' education is a strong predictor in some contexts, it may depend on the variation of mothers' education levels in the sample, and the way it is categorized.

Nutrition Education

Most health improvement programs include nutrition education of mothers for the purpose of sustaining positive health outcomes when a particular project ends. Nutrition education can be defined as "a process with intellectual, psychological, and social dimensions relating to activities that increase the abilities of people to make informed decisions affecting their personal, family, and community well-being. This process, based on scientific principles, facilitates learning and behavioural change in both health personnel and consumers, including children and youth" (Hubley, 1993, p.17). It is intended to serve both the goals of the nutrition sciences--i.e., to teach people about

nutrients and their effects on bodily functions--and the learners, given their nutritional status, the nature of their food supply, and the context in which nutritional health is sought (Gussow & Contento, 1984).

Nutrition education sessions in the Philippines are mostly given by health personnel at health clinics. These sessions are intended to teach mothers what to feed their children, what to eat to be healthy, how often to feed children, how much food should be eaten, what types of food to give to different age groups, and what to feed during illness (UNICEF--Facts for Life, 1989), and feeding during weaning (Guptill, Esrey, Oni, & Brown, 1993; Cowan & Dhanoa, 1983; Philippine National Nutrition Council, 1992).

Nutrition education is often added on to other nutrition-related programmes, namely supplementation, incremental food production, nutrition-related health services, income generation, or psychosocial stimulation. Supplementation may be in the form of milk-based formula (Grantham-McGregor et al., 1991) and familiar food fortified with vitamins and calories (Guptill et al., 1993; Super, Herrera, Mora, 1990; Latham, 1983). Incremental food production may be to increase the home food supply through the establishment of home, school, or community food gardens (Philippine National Nutrition Council, 1992). Nutrition-related health services provide Vitamin A capsules, iron pills, or iodized oil injections to target groups. Income

generation may add to a family's capacity to buy nutritious food. Psychosocial stimulation encourages mothers to play and talk with their children. A combination of these strategies are recommended to achieve more nutritional impact.

Cowan & Dhanoa (1983) an example of home-based nutrition health education among mothers and their children in the Punjab, India. Severe malnutrition was alarmingly high among girls (47%) in their second to third year. The mothers were taught preparation of economical but adequate and time-saving diets, family planning, and management of illness. Supplementation of breastfeeding with semi-solid food at 5 to 6 months resulted in children who were lively and eager to accept food. A change in feeding habits was found for both privileged and underprivileged classes. Severe malnutrition dropped from 17% to 11% in boys and from 47% to 28% in girls.

A comparative report on rehabilitation interventions and undernutrition outcomes was done by Rankins, Maloney, Rainford, & Hopkins (1990) in Jamaica. The study investigated the outcomes of nutrition education, income generation, and container gardening among malnourished families with children under 5 years old. The authors reported that the gain in weight for the nutrition education group was significantly higher than for the gardening group but not equal to the supplemented income group.

These studies demonstrate that without nutrition education, projects aimed at increasing family food production and income generation may fail to eliminate malnutrition in children. Obstacles other than food availability may interfere with mothers' ability to feed their children properly. Some projects organize home visits in which a community health worker helps the mother identify these obstacles and provides alternative solutions (Bentley et al., 1991; Cowan & Dhanoa, 1983). Building on this strategy of nutrition education, the present research attempted to evaluate the process of problem solving among pairs of mothers without a community health worker. Because mothers' literacy was reasonably high, and because projects aimed at increasing family food production and income generation were in progress, this peer problem-solving strategy seemed to be appropriate.

The dyadic problem-solving approach focused on mothers' feeding interactions with both the child and other family members that affected the child's food intake. The approach is different from those taken by other studies in that mothers were asked to discuss feeding problems. Less information was transmitted to mothers. Instead, they were encouraged to solve problems and elaborate on a problem as they saw it within their family context. A set of problems were outlined for them based on the results of preliminary focus group discussions. The sessions gave them an

opportunity to actively define the problems and needs within their own family context, identify solutions relying on their own resources, and decide on the most appropriate action to promote child nutrition within their family. The following section outlines past research on problem solving and on the effects of collaborative efforts on problem solving and learning.

Problems and Problem Solving

Nutrition education sessions typically emphasize achieving a desired nutritional status of family members by means of specific feeding practices. In this sense, it could be described as a form of problem solving, where goals and means are discussed. However, nutrition education strategies do not often focus on the obstacles to solutions nor are they directed towards mothers' ability to overcome obstacles through problem solving. Therefore, this study focused on problem solving, because it is a cognitive skill necessary for daily living and is clearly relevant to mothers' childcare and household management.

Features of Problems and the Problem-Solving Process

A problem occurs when an initial state is created which is not the desired state and there is no direct, clear way to effect the change (Newell & Simon, 1972), usually because of the presence of obstacles. Problems can either be well-structured or ill-structured. Well-structured problems are those which have all the information needed at hand and an

appropriate heuristic is available that can be used to obtain the correct answer. In contrast, ill-structured problems encompass the many problems we face in daily life, including most of the social, economic, political, and scientific problems in the world (Simon, 1973). These everyday problems are not clearly stated, lack the necessary information, and often present many alternative solutions that may take time to confirm (Meacham & Emont, 1989).

Successful problem solving involves skillful identification of a problem and appropriately responding to it. A competent problem solver must be able to specify what the problem is in spite of the ambiguity of most everyday problems, and generate alternative solutions. Osborn (1963) believed that quantity breeds quality, i.e., the greater the number of ideas a person can generate, the greater is the likelihood that one of these will be optimal. Shure and Spivack (1978) consider both quantity and quality: quantity because it reflects flexibility in the ability to generate new solutions if the first one proves unsuccessful, and quality because pro-social solutions are better than agonistic ones. In the case of child feeding, it is important that the mother have many solutions available in case certain ones do not work, and that she have good quality solutions, i.e. ones that will enhance the nutritional status of her child. While the mothers may not always be able to identify the best solution from the

alternatives, they may be able to determine the "goodness" of their decisions by verifying from the actual consequences. It is unlikely that the optimal solution will always be achieved, but they must have some standard of evaluation that allows them to select among a number of different solutions (Simon, 1956), i.e., a basis whereby they can reasonably judge their decisions as successful.

Child feeding is an everyday problem which mothers can solve in different ways. Solutions to recurring feeding problems require effective responses or patterns of responses that will be relevant to their child's nutrition and feasible within their family context. In order to overcome their problem-solving deficits, mothers can engage in trial-and-error, obtain guidance from others, pattern strategies after effective models, or figure out solutions on their own (D'Zurilla & Goldfried, 1971). Thus, continual change in solutions to everyday feeding problems occur as the mothers adopt more heuristics produced by new information.

Characteristics of the problem solver appear to influence the strategies used and the outcome. For example, a major distinction has been drawn between novices and experts in the way they solve chess and physics problems. The inexperienced novice tends to categorize problems on the basis of surface features as compared to experts who base their solutions on the fundamental principles (Chi,

Feltovich, & Glaser, 1981; Chi, Glaser, & Rees, 1982). Experts have learned the schemas necessary to identify the important problem categories that will lead to a solution. For example, chess masters choose from fewer alternatives but spend their time considering good moves in comparison to weak players who spend more time exploring bad moves. Thus, success in problem solving depends on the accuracy of problem representation, and the effectiveness of the procedure used to identify good solutions. According to Chase and Chi (1980), experts tend to utilize fully these aspects mainly because of practice.

Thus, formulations of everyday problem-solving, such as those related to child feeding, tend to fit the conceptual framework of problem solving. The process is initiated once a person recognizes the discrepancy between a current state and a more desired one. A cognitive effort is made to find ways to accomplish the goal by searching through a set of alternative solutions that may or may not lead to a successful outcome. In the current study, mothers were asked to generate solutions to specific child-feeding problems, and then to identify ones they consider best.

Related Research on Everyday Problem Solving. Research on everyday (ill-structured) problem solving with children, adolescents and adults provide data on the correlates of successful problem solving. Studies generally focus on problems related to gaining access to desired

physical and social resources. These resources include use of money, acquiring desired toys, and acquiring a friend (Fischler & Kendall, 1984; Krasnor & Rubin, 1983; Shure & Spivack, 1978). The research has examined various strategies used in paper-and-pencil-measures, as well as in verbal and behavioral problem solving. It has also related these strategies to characteristics of the problem solver and to successful outcomes.

Problem-solving strategies produced during a verbal interaction have often been coded as: means-ends thinking, obstacles, alternative solutions, and consequential thinking (Fischler & Kendall, 1984; Shure & Spivack, 1978). Observation of verbal and nonverbal behaviour used to solve problems in a preschool setting also included codes for: directives and questions, as well as object-agonistic, affiliative, and orienting acts (Krasnor & Rubin, 1983). When verbal and behavioural codes are used, the frequency of each code is generally obtained and analyzed. These strategies have been incorporated into various paper-and-pencil measures, such as the Social Problem-Solving Inventory (D'Zurilla & Sheedy, 1991) and the Interpersonal Cognitive Problem-Solving measure (Fischler & Kendall, 1984). When the context for problem solving is a social one, including more than one person, additional codes are added to reflect statements aimed at facilitating and reinforcing the partner's output as well as justifying one's

own position. These include questioning the partner's statement, seeking information, evaluating solutions, elaborating one's own statement, and repeating the partner's statement (Fischler & Kendall, 1984; Gottman, 1983; Nelson & Aboud, 1985). Thus, the verbal output during problem solving includes cognitive strategies aimed at describing the problem, solutions and means to solutions, as well as social strategies that may affect the dialogue itself. To date, no research has examined the process of identifying solutions to child-feeding problems and the strategies that lead to good solutions.

Characteristics of the problem solver inevitably influence their relative use of these strategies and the quality of their solutions. Age differences are most frequently explained in terms of the social and cognitive skills of the solver, which include general competence, flexibility, and a wider range of strategies to choose from (Krasnor & Rubin, 1983). School competence was associated with a greater frequency of statements describing means, obstacles, and alternative solutions (D'Zurilla & Goldfried, 1971; Fischler & Kendall, 1984). Gender differences have also been reported. Girls, but not boys, showed higher correlations on all strategy codes with their parents' problem solving and with their parents' strategies for facilitating the problem-solving process (Fischler & Kendall, 1984). Finally, there is evidence from novice and

expert research that practice in a specific domain affects the accuracy of the problem representation and the number and quality of solutions tried (Chase & Chi, 1980). This distinction might well apply to mothers and nutrition experts when solving problems related to child feeding. However, mothers might have a more complex perception of the problems they encounter when feeding their children, as well as the feasibility of actually implementing the solutions.

Successful problem solving has been defined in terms of the number of solutions a person is able to generate, indicating flexibility, the quality of the solution to that problem, or in relation to an external criterion such as psychological adjustment. In the preschool setting, 57% of the behavioural sequences were judged successful in attaining the desired physical or social goal (Krasnor & Rubin, 1983). Evaluative, object-agonistic, affiliative, and orienting actions led to the greatest success. Half of all failed sequences were reattempted but with very low success. In studies with young adults, successful problem solvers were better at defining problems, i.e., translating difficult and unfamiliar terms to simpler, more concrete ones (D'Zurilla & Goldfried, 1971). In contrast, ineffective problem solvers had the tendency to use vague and unfamiliar concepts that resulted in an inaccurate understanding of the problem or an inability to recognize errors in their solutions (Heppner & Krauskopf, 1987).

The index of number of alternative solutions has been found to predict better psychological adjustment and fewer problems encountered in the future (D'Zurilla & Nezu, 1982; D'Zurilla & Sheedy, 1991; Fischler & Kendall, 1984; Gesten, Weissberg, Amish, & Smith, 1987). There is some disagreement, however, as to whether the number of alternative solutions is related to the quality of the solutions. D'Zurilla and Goldfried (1971) and Osborn (1963) point out that the two are correlated in non-expert problem solvers, though this does not account for the difference between novices and experts. However, to the extent that quantity of solutions allows for greater flexibility in trial-and-error sequences, it may be a practical measure of successful problem solving in mothers, along with the quality of solutions.

Group versus Individual Problem Solving

Group problem-solving is a process that involves more than one person engaged in a common task of finding alternative solutions to a shared problem. In the context of nutrition education, group problem solving occurs when a health professional guides mothers through a process of identifying a nutrition problem (e.g., feeding, food selection and preparation) and discussing solutions and the means to achieve these solutions, based on their scientific knowledge (WHO, 1988). Two ways by which health workers have attempted to accomplish these ideals are through

individual counselling and working with groups. In individual counselling, health workers give information and lend support to mothers by listening to their problems, presenting probable causes of the problem, providing possible solutions, and facilitating decision-making. However, because health agencies are usually understaffed, workers tend to give instruction to groups of people. In traditional health education sessions, group discussions may follow a formal lecture presented by a health professional in connection with a health program (e.g., immunization or vitamin supplementation) or a cooking demonstration to mothers (WHO, 1988; Werner & Bower, 1991). What is usually lacking in these sessions is the opportunity for mothers to solve their own problems. The health worker's presence encourages mothers to rely on the professional's solution to the problem.

In the 1980's, health professionals were introduced to the concept of "community empowerment," influenced by the work of Brazilian educator Paulo Freire. It involves "a participatory education process in which people are not objects or recipients of political and educational projects, but actors in history, able to name their problems and their solutions to transform themselves in the process of changing oppressive circumstances" (p.142, Wallerstein & Bernstein, 1994). The hope is that when people talk and listen to each other, they exchange common experiences that will enable

them to see each other's perspective, discover new ways of looking at a problem, and choose feasible solutions. Research relevant to group and dyad problem solving will now be examined in order to assess its potential as a strategy for nutrition education.

Groups, including dyads, have been compared to individuals in terms of the solutions they generate and the material they learn. The composition of the group is an important variable and is characterized by the size of the group, the ability of the members, whether it is peer led or teacher led, and whether the members are friends or nonfriends (nominal groups). Another variable of importance for this study is whether the members initially agree or disagree on their solutions.

Groups of three or more members tend to outperform individuals in terms of the number and quality of their solutions and the amount of material learned (Diehl & Stroebe, 1987; Hill, 1982; Johnson, Johnson, & Skon, 1979; Johnson, Johnson, Stanne, & Garibaldi, 1989; Laughlin & Jaccard, 1975; Slavin, 1990; Vasquez, Johnson, & Johnson, 1993; Yager, Johnson, & Johnson, 1985). These results appear to hold for different age groups, including preschoolers (Johnson et al., 1979), elementary school students (Slavin, 1990), and occupational trainees (Vasquez et al., 1993). The outcomes are particularly positive when the group process emphasizes cooperation along with group

goals and individual accountability (Slavin, 1990).

The process of learning and problem solving in groups appears to have certain features that may enhance productivity. For example, in comparison to individual, groups contribute more information, offer elaborations and explanations, evaluate proposed solutions, clarify hazy issues, and provide motivating social benefits. Although the number of ideas produced per group member does not exceed the number produced by an individual working alone, the total number of ideas generated by the group is greater (Hill, 1982). Furthermore, the quality of the solutions is reportedly higher in groups than individuals, though groups tended to incorporate the best ideas of only two or three of its most competent members (Diehl & Stroebe, 1987; Paulus, Dzindolet, Poletes, & Camacho, 1993). When statements made during the solving and learning process are coded in terms of information, elaboration, agreement, questions, repetitions, and praise, information and elaboration are most strongly related to final achievement (Vasquez et al., 1993). Group members also tend to benefit from the social support, cohesion and esprit de corps that develops, and subsequently show higher self-esteem, greater liking for their partners, more positive attitudes toward the task, and lower attrition rates (Johnson et al., 1979; Vasquez et al., 1993; Slavin, 1990).

Cooperative groups in the classroom are generally

composed of children with different ability levels. Those with high abilities tend to contribute more to group productivity and to benefit more in self-esteem (Azmitia, 1988; Johnson, Johnson, & Taylor, 1993). However, having an expert such as a teacher lead the group did not result in greater progress over the peer-led groups, and the latter produced more peer interaction and greater feelings of acceptance (Johnson et al., 1989). Thus, to the extent that peers possess different abilities, they may generate sufficient progress without being led by an expert.

For a number of reasons, the two-person group, or dyad, may be more effective than a larger group. There is less tendency for coalitions to form and competition to result. A large group of participants may generate too much information, resulting in cognitive overload, a condition that interferes with problem solving in less skilled students. Larger groups encourage social loafing in which some members remain passive and leave the work to other members (Harkins, 1987). Finally, it is easier for the researcher to study the contributions of each member when there are only two (O'Donnell & Dansereau, 1992).

Dyads have been studied under a number of different task conditions, including creativity (Thornburg, 1991; Torrance, 1970), peer tutoring (e.g. Fantuzzo, Riggio, Connelly, & Dimeff, 1989), and dyadic problem solving (e.g. Laughlin & Jaccard, 1975; Tudge, 1992). The research

confirms that dyads perform better than individuals, and sometimes better than larger groups, on measures which include number of ideas generated, material learned, and quality of solutions.

When the dyads consist of friends, their performance is often superior to dyads of nonfriends, sometimes called nominal pairs (Cohen, Whitmyre, & Funk, 1960; Nelson & Aboud, 1985; Thornburg, 1991). The discussions of friends reveal that friends may have a greater impact on each other because of their mutual respect and the reduced threat of negative self-evaluation when one's mistakes are criticized by a supportive partner (Aboud, 1989; Hartup, 1983; Nelson & Aboud, 1985). In contrast, other studies show that friends may be more competitive with one another (Nadler, Fisher, & Itzhak, 1983) and may spend more time socializing off-task (Foot & Barron, 1990) than nonfriends. Thus, although friends show greater reciprocity in their social and affective reactions, greater productivity of novel ideas, and higher quality solutions, they do not always learn more than nonfriend pairs (Foot & Barron, 1990).

In addition to the friendship status of the pairs, their level of disagreement is an important variable. The partners of a dyad have often been evaluated initially in terms of their individual solutions to the problem or their ability on the task. Dyads who initially disagreed were found to seek less information from each other, but

challenge each other's position and explain their own position (Garton & Renshaw, 1988; Nelson & Aboud, 1985). Consequently, disagreeing dyads often show greater change on posttest measures; this is particularly true for the less competent partner who subsequently adopts a solution better than the one given initially, while the more competent partner retains the original solution (Azmitia, 1988; Mugny & Doise, 1978; Garton & Renshaw, 1988; Nelson & Aboud, 1985; Tudge, 1992). Because friends expect to agree with each other more than nonfriends, friends have been found to seek more information from an agreeing partner than a disagreeing one, but to arrive at a superior solution with a disagreeing friend (Nelson & Aboud, 1985). Consequently, disagreement tends to result in better problem solving, though the process of seeking a solution may be more challenging.

The Present Research

The focus of the present research was the problem solving of mothers living in a rural village of the Philippines, concerning their child's nutrition. Because of the high rates of malnutrition of children under 6 years old in this community, the feasibility of the dyadic problem-solving strategy was examined as an alternative to the traditional didactic form of nutrition education. Common problems were first identified with groups of mothers in focused group discussions. Mothers were then paired with a mutual friend or a unilateral friend (one-way but not

mutual) to discuss solutions to these problems. The first study examined problem solving systematically in an experimental session, where friendship status and level of agreement could be manipulated, and where the dependent measures of process and outcome could be carefully assessed. The second study examined the feasibility of implementing this problem solving strategy on a longer term basis in the community. The problem-solving process was studied over several weekly sessions, and the outcome was evaluated in terms of the mothers' nutrition knowledge and their child's nutritional status. Mothers who were paired with a mutual or unilateral friend for these sessions were compared with mothers who followed the programme individually.

The general objectives of the research were two-fold:

1. To examine how Filipino mothers solved feeding problems in a dyad during an experimental session, and to find out whether mothers in mutual-friend dyads solved problems differently from those in unilateral-friend dyads (Study 1).
2. To assess the effectiveness of a multi-session nutrition education program based on dyadic problem solving, and to determine whether mothers paired with a friend differed from mothers who participated as individuals on two outcomes, namely, their nutrition knowledge and their child's nutritional status (Study 2).

Study 1. Dyadic Problem Solving as a Function of Friendship Status and Agreement

Study 1 examined the problem-solving process of mothers who encounter daily recurring problems in feeding their young children. A dyadic peer approach was chosen for a number of reasons. First, dyads may be more successful than individuals or larger groups at solving problems, and peer groups are at least as successful as teacher-led groups in cognitive outcome and more beneficial in social-affective outcomes. Second, the contribution of each member can be studied more systematically in a dyad than in a larger group, thus allowing for a careful analysis of the process and outcome. Third, in a community setting, peer dyads may be more sustainable than groups in the long term because friendship bonds tend to be stronger than group bonds, and meetings can be scheduled more conveniently for two. Consequently, pairs of mothers were asked to solve problems related to child nutrition in a single experimental session; their problem-solving discussion and their final solutions were analyzed. Two independent variables were examined: the friendship status of the mother's dyad (mutual or unilateral friends) and the level of initial agreement between the two mothers (agree or disagree).

Friend dyads have been found in the past to engage in a more reciprocal exchange of information and support (Hartup, 1983) and to generate more and better solutions than

nonfriend dyads. Because the level of familiarity is high in this small community, it was difficult to assign mothers randomly to nonfriend partners. Consequently, mothers were randomly assigned to work with either a mutual friend or a unilateral friend. Unilateral friends are found when one mother nominates the other as a friend but the nomination is not reciprocated. Such friends typically have a lower quality relationship which is of shorter duration than mutual friends (Berndt, Hawkins, & Hoyle, 1986; Ladd & Emerson, 1984). The problem-solving process of unilateral friends, however, has not been studied extensively. Thus, friends were not compared with strangers because past literature has established that friends produced more and better solutions. It was presumed that mutual friends generated more and better solutions than unilateral friends, who, in turn, would more likely perform better than strangers.

As mentioned, the initial agreement of the dyad is an important determinant of the problem-solving process and its outcome. Pairs who initially disagree on their solution seek less information from each other but express greater opposition (Garton & Renshaw, 1988; Nelson & Aboud, 1985). Nonetheless, they tend to show more change in their post-discussion solutions (e.g. Aboud, 1989; Mugny & Doise, 1978; Nelson & Aboud, 1985; Tudge, 1992), with less competent partners adopting the more competent solution of their

partner. Mutual friends, in particular, may find the disagreement more aversive than unilateral friends (Nadler et al., 1983), though they also evidence greater skill at negotiating the disagreement (Hartup, 1983), and in the end produce a superior solution.

The present study, therefore, examined the problem solving of mothers paired with a mutual or unilateral friend as they discussed two problems--one on which they initially agreed on the solution and one on which they initially disagreed. The mothers first provided their separate solutions to 10 problems; on the basis of these solutions, one agreement problem and one disagreement problem were identified for the dyadic discussion. Statements made during these dyadic discussions were coded according to whether they were solutions, elaborations of solutions, information seeking, agreement or disagreement with the partner's statement, and repetitions of the partner's statement. Finally, the mothers were separated to give the solutions each considered best. The number and quality of each mother's solution were examined to determine their improvement over pre-discussion solutions, and their source, i.e., from self or partner, from before or during the discussion.

The specific objectives of Study 1 were:

1. To examine pre- to post-discussion changes in the number and quality of solutions given by mothers as a

function of the friendship status of the mother's dyad and the level of initial agreement with her partner.

2. To examine the source of mothers' post-discussion solutions, as a function of friendship status and agreement, in terms of whether they came from her own or her partner's statements, and whether they first arose pre-discussion, during the discussion, or in neither phase.
3. To examine verbal statements made during the problem-solving discussion as a function of friendship and agreement.

Method

Description of Study Population

The study was conducted in the village of Camaligan, Batan Town, Province of Aklan. The land area is 663 hectares and the figures from a census survey conducted in 1991 indicate that the total population was 1,949 consisting of 376 families with an average household size of 5. Fifty-two percent of the population were under 20 years, 36% were under 13 years. Most of the residents had obtained some education: 52% had only elementary education, 29% had high school education, 14% went to college, and only 5% received no formal education. Roman Catholic was the predominant religion, although other churches were represented as well (e.g., Jehovah's Witnesses, Iglesia ni Kristo). Thirty-one percent were engaged in fishing, 31% were laborers, 28% of

the families were in farming, 11% worked in professional and clerical jobs, and 10% were in trading.

The mothers had access to basic health care at the community health center where a midwife was available to serve them. The midwife conducted group nutrition education sessions in conjunction with regular weighing of children, immunization, and food and vitamin supplementation. The 1991 community nutrition survey reported that 75% of children between 24 and 71 months were below 90% weight-for-age, (80% boys, 69% girls), 18% were below 90% height-for-age (23% boys, 12% girls), and 32% were below 90% weight-for-height (31% boys, 32% girls).

Subjects

The selection of the entire research sample will be described first. This includes the 74 mothers who were paired with a friend for Study 1 and the 36 mothers who constituted the control group in Study 2. Thus, a total of 110 mothers were selected for the research, but only the subsample of 74 who were paired with a friend participated in Study 1.

Although there is a list of households in the village of Camaligan, Batan Town, there was no information about which had children 6 years old and younger. A few mothers who were initially approached gave the names of other mothers who had children 6 years old or younger. This insured not only the recruitment of mothers but also that

they would live close enough to meet conveniently with their partners.

A total of 122 mothers with children 6 years and younger were approached individually to participate in the study. All had attended some sessions at the health center. They signed consent forms that outlined the nature, purpose, and duration of the study. Of those approached, 110 mothers completed the study; 3 mothers subsequently moved out of the community; 8 mothers refused to participate after the initial set of questions; 1 mother dropped out at the posttest period after her son died. All mothers were asked to give friend nominations to ensure that they all could be paired with a mutual and unilateral friend. However, only the 74 mothers randomly paired with a mutual or unilateral friend participated in Study 1.

Information was collected on the demographic characteristics of mothers (see Table 1). Mothers' ages ranged from 20 to 49 ($\underline{M}$ = 31.8). Twenty-five per cent received only elementary education, 40% of the mothers obtained high school education, 33% finished a college degree or spent some years in college; one mother had no formal education, and one failed to give information on her educational background. Most of the mothers were housekeepers (73%) with an average monthly income of P1,209 (which is equivalent to $60 Canadian), equivalent to the average Filipino monthly family income of $61 (UNICEF,

Table 1

Demographic Characteristics of Mothers and Their Children

Characteristic	Mean	Range	SD
Age of mother	31.8	20 - 49	6.8
Mother's education	9.3	0 - 14	3.3
Family income in pesos	1,209.0	0 - 9000	1,594.0
Number of children	3.9	1 - 10	2.4
No. of children under 6	1.7	1 - 4	0.7
Age of target child (months)	30.5	9 - 64	15.4

1994). Eighty-eight per cent were Roman Catholics. Total number of children ranged from 1 to 10 (M = 3.9).

Although mothers were not randomly selected, based on available data obtained on number of households and number of children under 6 years, it was estimated that approximately 66% of the total mothers in the community who likely fit the selection criteria participated in the study. No group differences were found for the three groups on demographic characteristics.

Design and Overview of Procedure

The design was a pre-post testing of mothers paired with a mutual or unilateral friend under two conditions (Agree and Disagree). This 2 (Pre-Post) x 2 (Friendship) x 2 (Agree-Disagree Item) design allowed for comparisons between two types of friend dyads and two levels of initial agreement. A control group was not compared with dyads because it was assumed that mothers' pre-solutions were a product of previous information learned in traditional health education classes as well as their own experiences. After the discussion, solutions were assumed to be the result of mothers' discussion with their partners in addition to the ones they originally produced. It was likewise unethical to make mothers work alone or in pairs from which they do not derive much nutritional advantages, e.g, making the mothers discuss an irrelevant topic, such as watching television, in order to control for the effects of

a dyadic problem-solving interaction.

The procedure included a pretest of mothers' solutions to 10 problems given individually, a tape-recorded problem-solving discussion by mothers paired with a mutual or unilateral friend of two nutrition problems (an Agree item and a Disagree item), followed by a posttest of each mother's final solutions, again, given privately.

Friendship status was based on mothers' friend nominations. Partners were considered to be mutual friends if they jointly nominated each other and unilateral friends if only one nominated the other.

Agreement or disagreement was based on whether the mothers in the dyad initially gave similar or dissimilar solutions to the selected problem. Two problems were chosen by the researcher, an agreement item for which the two mothers in the dyad initially gave similar solutions and a disagreement item for which the two mothers initially gave different solutions.

Measures of Friendship and Nutrition Problems

The scales and questionnaires were written in Akeanon, the dialect spoken by the people living in the Province of Aklan. All instructions and questions were read in Akeanon from the structured questionnaires. Additional explanations and clarifications were conducted by the researchers in Ilonggo and Tagalog, two other dialects that the mothers spoke, read, and understood.

Three sets of measures were assessed before the experimental session: (1) demographic information, (2) nomination and quality of friendship, and (3) ten problems. Mothers were visited at home where they were individually interviewed using the structured questionnaires and their answers were recorded.

Demographic information. The structured questionnaire included items on mother's age, mother's educational attainment, income, religion, total number of children, and the names and birth dates of children under 6 years.

Friend Nomination. Mothers were asked to name as many best friends as they had who lived close to them. If they nominated more than five, they were asked to rank their friends, i.e., from 1 to n. All of the mothers had at least one mutual friend, thus ensuring equal social competence among the different groups. All had at least one unilateral friend; they either made or received an unreciprocated nomination. This information was used to assign mothers to 3 groups: (1) the mutual friend group (n=38) consisted of mothers who were paired with a mutually nominated friend, (2) the unilateral friend group (n=36) consisted of mothers where only one had nominated the other as a friend. Mothers who mentioned family members, such as sisters, as their friends were not paired with them. The Control group of mothers (n=36) had mutual and unilateral friends, but were asked to work alone in Study 2 and did not participate in

Study 1.

Quality of Friendship. The Acquaintance Description Form A (ADF-A) (Wright, 1991) was used to validate the pairings of mutual and unilateral friends. The structured questionnaire measures seven qualities of a friendship: (1) Utility Value, (2) Stimulation Value, (3) Ego Support Value, (4) Self-Affirmation Value, (5) Security Value, (6) Voluntary Interdependence, and (7) Person-Qua-Person. There were seven items for each scale and each was rated on a 5-point scale (0 = "never" or "unlikely"; 1 = "seldom" or "probably not"; 2 = "about half the time" or "perhaps"; 3 = "usually" or "probably"; and 4 = "almost always" or "extremely likely").

Mothers assigned to a mutual or unilateral friend rated the 49 items on the ADF-A according to their relationship with the assigned friend. Composite scores were obtained by taking the average of the 49 ratings. Cronbach's alpha coefficient was .79. Between-scale correlations ranged from .43 to .86. A t-test indicated that the composite scores were significantly higher for mothers assigned to the mutual friend group (M = 89.1, SD = 16.7) than for those assigned to the unilateral friend group (M = 78.8, SD = 17.2), $t(72) = 2.61$, $p < .05$.

Nutrition problems. Ten nutrition problems were developed based on information from focus group discussions of mothers in a nearby village and on knowledge of the

situation in Camaligan. The problems related to breastfeeding, serving second helpings, dealing with a fretful child at mealtime, selecting food for the child, using modern versus traditional medicine, finding out that a child is underweight, giving junk food, training a child to self-feed, growing vegetables, and managing a fussy child at mealtime (see Appendix A). The problems were framed to show, implicity or explicitly, two sides of each issue (e.g., What should you do if you give food to your child that others say are not nutritious?).

The ten nutrition problems were read one at a time to the mothers individually sometime during Month 1 and Month 2. The mothers were asked to give as many solutions as they could. When they had given their answers to each problem, they were asked, "What else?" If the mother paused for a long time after one or more answers, she was asked, "Do you have anything else to add?" The probe ensured that the mothers gave as many answers as they could think of instead of moving on to another item after they had generated one answer. If they indicated that they could not come up with any more solutions, they moved on to the next problem.

The number of solutions given to each problem were counted. Two raters scored each item independently and resolved any differences.

Problem-Solving Discussions

During a single session, mothers were paired with a

mutual or unilateral friend to discuss solutions to two of the 10 previously seen problems: an Agree item on which the partners had initially proposed the same solution(s), and a Disagree item on which they had initially proposed different solutions. For example, one problem asked mothers what they would do if their child asked for junk food and they could not offer an alternative. Two partners answered, "I don't give junk food. I buy bread instead." This problem was selected as their Agree item. On another problem, mothers were asked what to do when their child fretted during meals. One partner of a dyad said, "I spank my child." Her partner answered, "I put my child to sleep before he eats or I allow him to take a stroll with others." This problem was selected as their Disagree item. The criteria used for the selection of a problem was based on similarity or dissimilarity of solutions and on an upper limit of two solutions. Choosing a problem with more than two solutions might result in a ceiling effect. As it turned out, few problems initially received more than two solutions.

Paired discussions started 6 to 8 weeks after the 10 problems were answered. Mothers met in pairs with their friend. They were told that they would be discussing two nutrition problems and that their conversation would be tape-recorded. Half of the dyads were given the Agree item first and half were given the Disagree item first. For each item to be discussed, the following feedback was given to

the dyad:

Agree item: "On the basis of previous answers, you seemed to agree on this item (the item selected for the dyad was read). You both said that ..."

Disagree item: "On the basis of previous answers, you seemed to disagree on this item (the item selected for the dyad was read). Mother A, your solution(s) to this problem was/were (the solutions were stated). Mother B, your solution(s) to this problem was/were (the solutions were stated)."

Instructions for the dyadic discussion indicated that the goal was to generate good solutions.

> "Now you will discuss the problem with your partner. Try to come up with the best solution or solutions to the problem. You have 15 minutes to discuss this item."

The researcher left the mothers to discuss the problem alone. After the discussion, the mothers were separated and asked to give their best solutions.

Final solutions of each mother were coded on the basis of: Time Source (first mentioned before, during, or after the discussion) and Person Source (first mentioned by the mother herself or by her partner). Thus, six categories incorporating the sources of solutions were framed as follows:

(1) Prediscussion solution(s) of self;

(2) Prediscussion solution(s) of the partner; both were restated by the researcher at the start of the discussion;

(3) Discussion solutions initially mentioned by the mother (self);

(4) Discussion solutions initially coming from the partner (partner) but repeated by the mother during the discussion;

(5) New solutions given by the mother (self) after the discussion that were never said previously; and

(6) New solutions which she may have heard from her partner but never repeated during the discussion (partner).

The number of final solutions that fit each code were summed.

The quality of solutions was evaluated on the basis of relevance and feasibility by a Filipino Ph.D. student in Food Science. Each solution given before and after the discussion was rated according to its relevance (1 to 5) and its feasibility (1 to 5). Solutions high in relevance were those that were directly related to a positive nutritional outcome. Highly feasible solutions involved steps or resources that were available and affordable to the mothers. The researcher also rated 40% of the discussions. Agreement was 92% for the Agree item solutions and 90% for the Disagree item solutions. Two indices of quality were derived: mean quality of all the solutions given and the maximum quality score received for a single solution. The latter indicated the quality of the mother's best solution.

Coding of discussions. The tape-recorded discussions were transcribed and statements were coded as solutions, elaborations, evaluations, questions, or problems.

Solutions were categorized as those offered by mother, repetitions of partner solution, or repetitions of their own solution. An elaboration was defined as a rationale or a specific example of the solution. It was coded as either an elaboration of the mother's own solution, an elaboration of the partner's solution, or as a repetition of either the mother's or her partner's elaboration. Evaluation was either positive (i.e., agreement--e.g., "That's what I think, too") or negative (i.e., disagreement--e.g., "No, you don't have to spoonfeed him"). Questions were either information-seeking (e.g., "So what do you do when your child asks for food?") or agreement-seeking (e.g.,"Don't you think so, too?"). Problems were coded as restatement of the problem or a related problem (e.g., "When I call them to eat, sometimes they respond right away, sometimes they don't"), elaborations (e.g., "Their grandmother visits and she gives them food"), or denials (e.g., "If they are not sick, they'll eat anything"). The researcher coded all conversations and a second coder evaluated 28 discussions (38%). Agreement between coders was 88% for the Agree item and 90% for the Disagree item. The frequency of each type of comment was tallied.

Results

The analysis of the experimental problem-solving sessions focused on firstly the number of solutions generated by mothers, and secondly their quality. Comparisons were made between mothers in mutual and unilateral friend dyads for items on which they initially agreed or disagreed. Within-subject comparisons examined: (1) the change in number and quality of solutions from before to after discussions (pre-post), (2) the time when the solutions were first stated (before, during, or after discussion), and (3) the person who generated the solutions (self or partner). Secondary analyses were conducted on the number of solutions, using a subsample of one mother from each dyad (n=37), to determine if the results were replicated after eliminating the potential correlation between two mothers of a dyad. Other potential predictors of solutions, such as educational attainment, were also examined. Finally, the problem-solving discussions themselves were analyzed to examine Mutual-Unilateral and Agree-Disagree differences on six selected codes.

Number of Pre- versus Post-discussion Solutions of All Mothers

The first issue addressed in the analysis of solutions was whether the mothers proposed more solutions after the discussion than before. This was measured by a within-subject comparison of the increase in number of solutions

from before to after discussions. The post-discussion solutions were those given by mothers when they were asked to list all the final best solutions they had for the problem.

An ANOVA was used to examine differences in mean number of solutions. Despite low frequencies, the number of solutions was normally distributed. The F test is said to be robust to violations of normality of variables, provided there are no outliers and at least 20 degrees of freedom for the ANOVA error term (Tabachnik & Fidell, 1989).

A 2 (Friendship) x 2 (Item) x 2 (Pre-Post) ANOVA was performed on the number of subjects' solutions before and after the discussion. Friendship (Mutual and Unilateral) was a between-subjects factor while Item (Agree-Disagree) and Time (Pre-Post) were within-subject factors. The means are shown in Table 2.

The analysis yielded a significant Friendship effect, $F(1,72)= 14.12$, $p< .01$. Mutual friends gave more solutions per problem than did Unilateral friends (1.8 vs 1.4). The significant main effect for Time, $F(1,72)= 39.35$, $p< .01$, indicated that there were more solutions per problem at the post-discussion than the pre-discussion (1.9 vs 1.3). The analysis did not yield a significant effect of Item, or significant interactions between Friendship and Time, $F(1,72)= 3.69$, $p> .05$, or Item and Time, $F(1,72)= 2.53$, $p> .05$.

Table 2

Mean Number (and Standard Deviations) of Solutions Pre and Post Discussion by Friendship, Item, and Time (Individual Analysis)

	Friendship		
Item/Time	Mutual	Unilateral	Total
AGREE ITEM	2.0 (0.7)	1.4 (0.8)	1.7 (0.8)
Pre	1.4 (0.8)	1.3 (0.8)	1.3 (0.8)
Post	2.5 (1.3)	1.6 (0.9)	2.1 (1.2)
DISAGREE ITEM	1.7 (0.6)	1.4 (0.5)	1.6 (0.6)
Pre	1.5 (0.8)	1.2 (0.6)	1.3 (0.7)
Post	1.9 (0.8)	1.7 (0.7)	1.8 (0.7)
MEAN PER ITEM	1.8 (0.4)	1.4 (0.5)	1.6 (0.5)
Pre	1.4 (0.5)	1.2 (0.5)	1.3 (0.5)
Post	2.2 (0.7)	1.6 (0.6)	1.9 (0.8)

There was a significant Friendship x Item x Time effect, $F(1,72)= 7.97$, $p< .01$. Newman-Keuls post hoc tests for repeated measures revealed that for the Agree item, Mutual friends offered a significantly greater number of solutions post- than pre-discussion ($p< .01$), but among Unilateral friends the difference was not significant. In the Disagree item, Mutual friends gave more solutions post- than pre-discussion ($p< .05$); Unilateral friends also offered more solutions post than pre ($p< .05$). Mutual friends who agreed generated more solutions at the post-discussion than any group.

Number of Pre- versus Post-discussion Solutions of Subsamples. Mothers were divided into two groups, one from each dyad, in order to examine correlations between pairs. There were high correlations between pairs of mothers in the number of Agree-item solutions both Pre-discussion, $r= .56$, $p< .01$, and Post-discussion $r = .72$, $p< .01$. However, on the Disagree item, correlations between pairs were not significant on either pre or post solutions.

Consequently, pre- and post-discussion solutions were examined in a 2 (Friendship) x 2 (Item) x 2 (Time) ANOVA on two subsamples, namely, odd- and even-numbered mothers. Friendship was a between-group factor while Item and Time were within-subject repeated measures.

For the odd subsample, significant main effects were found for Friendship, $F(1,35)= 6.43$, $p< .05$, and Time,

$F(1,35) = 23.76$, $p < .01$. No interaction effects were observed for Friendship, Item, and Time in the analysis of all mothers' data. However, for the even subsample, aside from the significant main effects of Friendship, $F(1,35) = 7.47$, $p < .01$, and Time, $F(1,35) = 15.45$, $p < .01$, there was also a Friendship x Item x Time interaction, $F(1,35) = 5.28$, $p < .05$, consistent with the previous analysis of all mothers. Thus, the Friendship and Time results were reliable although the three-way interaction was not replicated in both subsamples. The subsample mean scores were observed to be in the same direction as those obtained for all mothers. Mutual friends exceeded Unilateral friends and post-discussion solutions were greater than the pre-discussion (see Appendix B and C).

In order to identify significant differences from the three-way interaction (Friendship x Item x Time) among the even subsample, Newman-Keuls tests for repeated measures were performed. The only significant difference replicated by the even subsample was that between Mutual friends' pre-discussion solutions and their post-discussion solutions for the Agree item. Mutual friends who agreed gave more solutions post than pre-discussion compared to any other comparisons. The rest were not significant.

Source of Post Solutions (Analysis of All Subjects)

The second concern in the analysis of solutions involved the dependent variable, number of post-discussion

solutions. Of interest were the sources of these solutions, i.e., time and person. The number of post solutions was analyzed in a 2 (Friendship) x 2 (Item) x 3 (Time Source - Before, During, After discussion) x 2 (Person Source - Self, Partner). Friendship was a between-subjects factor while Item, Time Source, and Person Source were within-subject factors.

A main effect for Friendship, $F(1,72)= 13.14$, $p< .01$, indicated that Mutual friends produced more solutions than Unilateral friends in both conditions (2.2 vs 1.6) (Table 3). While there was no significant Item effect, there was a Friendship x Item interaction, $F(1,72)= 5.76$, $p < .05$, indicating that when Mutual friends agreed, more solutions were generated than in any other group or condition. Newman-Keuls tests confirmed that a significantly greater number of solutions were found among Mutual than Unilateral friends in both the Agree ($p < .01$) and Disagree ($p < .05$) items. More solutions were also found when Mutual friends agreed than when Unilateral friends agreed ($p < .01$). These comparisons showed that mutual friends produced more solutions in the Agree item than all other interactions. No significant difference in number of solutions was seen between the Agree versus Disagree items for Mutual or Unilateral friends. Significant interactions were not found between Friendship and Time Source, $F(2,144)= .51$, $p> .05$, nor between Friendship and Person Source, $F(1,72)= 1.49$,

$p > .05$.

The analysis revealed a Time source effect, $F(1,72) = 3.21$, $p < .05$ (see Table 3). Results of the Newman-Keuls tests for repeated measures indicated that the only significant difference occurred between solutions taken from the discussion and those mentioned for the first time by the mother after the discussion ($p < .05$). Mothers were more likely to give as their final solutions those that they selected from their discussion.

The analysis produced a strong Person Source effect, $F(1,72) = 210.71$, $p < .01$, demonstrating that final solutions were Self- rather than Partner-generated. As shown in Table 4, mothers selected their final solutions from those that they themselves first generated. There was no significant interaction between Person Source and Time Source, $F(2,144) = .97$, $p > .05$.

Finally, a significant Item x Person Source interaction was produced, $F(1,72) = 4.71$, $p < .05$. Newman-Keuls tests indicated that there was a greater number of Self-generated solutions than Partner-generated ones for both Agree ($p < .01$) and Disagree ($p < .01$) items. However, Self-generated solutions were greater in the Agree than the Disagree item ($p < .01$). No significant difference between Items occurred for Partner-given solutions.

There was no significant Item x Time Source interaction, $F(2,144) = .15$, $p > .05$, and no significant

Table 3

Mean Number (and Standard Deviations) of Final Solutions by Friendship, Item, and Time Source (Individual Analysis)

	Friendship		
Item/Time	Mutual	Unilateral	Total
AGREE ITEM	2.5 (1.3)	1.6 (0.9)	2.0 (1.2)
Before	0.7 (0.7)	0.6 (0.7)	0.6 (0.7)
During	1.1 (1.1)	0.5 (0.7)	0.8 (1.0)
After	0.7 (1.0)	0.5 (0.7)	0.6 (0.9)
DISAGREE	1.9 (0.8)	1.7 (0.7)	1.8 (0.7)
Before	0.7 (0.7)	0.4 (0.5)	0.5 (0.6)
During	0.8 (0.8)	0.8 (0.6)	0.8 (0.7)
After	0.4 (0.6)	0.5 (0.7)	0.5 (0.7)
MEAN PER ITEM	2.2 (0.7)	1.6 (0.6)	1.9 (0.8)
Before	0.7 (0.6)	0.5 (0.4)	0.6 (0.5)
During	0.9 (0.8)	0.6 (0.5)	0.8 (0.7)
After	0.6 (0.5)	0.5 (0.6)	0.5 (0.5)

Table 4

Mean Number (and Standard Deviations) of Solutions by Friendship, Item, and Person Source (Individual Analysis)

	Friendship		
Item/Person Source	Mutual	Unilateral	Total
AGREE ITEM	2.5 (1.3)	1.6 (0.9)	2.0 (1.2)
Self	2.2 (1.1)	1.5 (1.0)	1.8 (1.1)
Partner	0.3 (0.9)	0.1 (0.3)	0.2 (0.7)
DISAGREE ITEM	1.3 (0.9)	1.4 (0.8)	1.3 (0.8)
Self	1.0 (0.8)	1.1 (0.8)	1.0 (0.8)
Partner	0.3 (0.5)	0.3 (0.4)	0.3 (0.5)
MEAN PER ITEM	1.9 (0.9)	1.5 (0.6)	1.7 (0.8)
Self	1.6 (0.6)	1.3 (0.7)	1.4 (0.7)
Partner	0.3 (0.5)	0.2 (0.3)	0.3 (0.4)

higher-order interactions: Friendship x Item x Person Source, $F(1,72) = .51$, $p > .05$; Friendship x Item x Time Source, $F(2,144) = 2.99$, $p > .05$; Friendship x Time Source x Person Source, $F(12,144) = 2.29$, $p > .05$; Item x Time Source x Person Source, $F(2,144) = .46$, $p > .05$; Friendship x Item x Time Source x Person Source, $F(2,144) = 1.91$, $p > .05$.

In summary, the four-way ANOVA on mothers' post-discussion solutions showed that Mutual friends offered more solutions than Unilateral friends particularly on the Agree item. A greater number of solutions were derived During discussion rather than After, but solutions from Before discussion were equally prevalent. Self-generated solutions were recalled more than Partner-generated solutions particularly in the Agree item. On the other hand, Partner-generated solutions were recalled similarly in both conditions.

Sources of Post Solutions (Subsample Analysis). A Pearson correlation was performed to find out whether partners in dyads produced a similar number of solutions taken from each time source for Agree and Disagree items. Results showed that for the Agree item, there was a significant correlation such that mothers were consistent with their partners, $r = .70$, $p < .01$. In the Disagree item, no overall reciprocity was seen on the number of solutions, $r = .20$, $p < .21$.

The ANOVA results showed that the odd-numbered

subsample significantly differed in number of post solutions as a function of Friendship, $F(1,35)= 4.53$, $p< .05$, and Person Source, $F(1,35)= 107.31$, $p< .01$. However, three other significant effects found in the individual analysis were not significant here. The mean scores are shown in Appendix D.

For the even-numbered subsample, Friendship, $F(1,35)= 9.09$, $p< .01$, Time, $F(2,70)= 3.22$, $p< .05$, and Person Source, $F(1,35)= 121.94$, $p< .01$, had significant effects. A close-to-significant effect was seen for Item x Person Source interaction, $F(1,35)= 3.77$, $p< .06$. The Friendship x Item interaction was not replicated here. The mean scores (Appendix E) were in the expected direction in terms of Time Source except for Agreeing Mutual friends in the even subsample. Self-generated solutions were more frequent than Partner-generated solutions for both subsamples. Thus, the Friendship and Person Source effects were most reliable; the Time and interaction effects were less reliable.

Other Predictors of Number of Solutions. A correlation analysis was performed to find out if there were other variables that had an effect on the number of final solutions. Eight variables were examined: (1) age of mother, (2) educational level of mother, (3) family income, (4) number of children in the family, (5) number of children under 6, (6) sex of target child, and (7) age of target child at the start of the study. No analyses were made for

religion (dummy coded Roman Catholic = 1, Other = 0) and occupation (dummy coded into 7 categories) because most of the mothers were in one category: 73% were housewives and 88% were Catholic. None of the other demographic variables were significantly correlated with number of solutions. Quality of friendship, measured through the ADF, was not significantly correlated with number of solutions. Therefore, there was no reason to use the friendship quality measure as a covariate in subsequent analyses.

Quality of Solutions

Mean quality of pre- and post-solutions. A 2 (Friendship) x 2 (Item) x 2 (Time) ANOVA on mean quality scores (out of 10) showed a Time effect, $F(1,72)= 7.48$, $p< .01$. Post-discussion solutions were of higher quality than pre-discussion solutions (6.6 vs 6.1). No other main effects were significant. The interactions between Friendship and Item, $F(1,72)= 1.99$, $p> .05$, Friendship x Time, $F(1,72)= 3.08$, $p> .05$, Item x Time, $F(1,72)= .55$, $p> .05$, and Friendship x Item x Time, $F(1,72)= .20$, $p> .05$, were not significant (see Table 5).

Quality of best solution pre- and post-discussion. The quality of the mother's best solutions pre- and post-discussion were analyzed. Although she may have generated many solutions of differing quality, it was important to know if her maximum quality improved. A 2 (Friendship) x 2 (Item) x 2 (Time) ANOVA on the highest quality score for any

Table 5

Mean Quality (and Standard Deviations) of Pre and Post Solutions

	Friendship		
Item/Time	Mutual	Unilateral	Total
AGREE ITEM	6.8 (1.4)	6.0 (2.1)	6.4 (1.8)
Pre	6.7 (2.1)	5.6 (2.7)	6.2 (2.5)
Post	6.8 (1.2)	6.3 (2.1)	6.5 (1.7)
DISAGREE ITEM	6.4 (1.2)	6.4 (1.2)	6.4 (1.2)
Pre	6.3 (1.9)	5.9 (2.2)	6.1 (2.0)
Post	6.6 (1.1)	6.8 (.9)	6.7 (1.0)
MEAN PER ITEM	6.6 (1.0)	6.1 (1.2)	6.4 (1.1)
Pre	6.5 (1.5)	5.8 (1.7)	6.1 (1.7)
Post	6.7 (0.8)	6.5 (1.1)	6.6 (1.0)

one solution was conducted. This analysis yielded a Friendship effect, $F(1,72)= 4.46$, $p< .05$. The best solution of mothers paired with a Mutual friend was superior to that of Unilateral friends (7.0 vs 6.4). A significant Time effect, $F(1,72)= 18.22$, $p< .01$, showed that the mother's best solution was of higher quality post-discussion than pre (7.1 vs 6.4)(see Table 6). Thus, both the mean and the maximum quality of solutions improved. The following interactions were not significant: Friendship x Item, $F(1,72)= 2.92$, $p> .05$; Friendship x Time, $F(1,72)= 3.13$, $p> .05$; Item x Time, $F(1,72)= .44$, $p> .05$; and Friendship x Item x Time, $F(1,72)= .71$, $p> .05$.

To determine the source of these best-quality solutions, a score of 1 was given to each Item x Time Source x Person Source cell where that solution appeared; a score of 0 was given to the other cells. If there were more than one best solution of equal quality, both cells received a score of 1. It was appropriate to perform a two-way repeated-measures ANOVA on the present data because the sample proportions for the cells were between .25 and .75 and there were more than 20 degrees of freedom for error (D'Agostino, 1971).

A 2 (Friendship) x 2 (Item) x 3 (Time Source) x 2 (Person Source) ANOVA on these frequency scores produced a Time effect, $F(2,144)= 4.82$, $p< .01$, indicating that the best solutions were taken more often from the discussion

Table 6

Maximum Quality (and Standard Deviations) of Pre and Post Solutions

	Friendship		
Item/Time	Mutual	Unilateral	Total
AGREE ITEM	7.2 (1.5)	6.2 (2.3)	6.7 (2.0)
Pre	7.0 (2.1)	5.8 (2.8)	6.4 (2.5)
Post	7.4 (1.3)	6.6 (2.2)	7.0 (1.8)
DISAGREE ITEM	6.8 (1.2)	6.7 (1.2)	6.8 (1.2)
Pre	6.6 (1.9)	6.0 (2.3)	6.3 (2.1)
Post	7.0 (1.2)	7.4 (0.6)	7.2 (1.0)
MEAN PER ITEM	7.0 (1.0)	6.4 (1.3)	6.7 (1.2)
Pre	6.8 (1.6)	5.9 (1.8)	6.4 (1.7)
Post	7.2 (0.8)	7.0 (1.2)	7.1 (1.0)

than from after the discussion (.5 vs .3), $p < .01$, (see Table 7). However, no significant interactions were found for Time and Friendship, $F(2,144) = .31$, $p > .05$, Time and Item, $F(2,144) = .30$. $p > .05$, and Time and Person Source, $F(2,144) = 2.76$, $p > .05$.

There was a significant Person source effect, $F(1,72) = 204.64$, $p < .01$, showing that the best solutions were more often Self-generated than Partner-generated (1.0 vs .2). This is not entirely inconsistent with the previous conclusion drawn from mean quality scores when it is remembered that most solutions were self-generated and so the maximum score would more likely come from these solutions. Person source was not found to have a significant interaction with Friendship, $F(1,72) = .10$, $p > .05$, or Item $F(1,72) = 2.80$, $p > .05$.

There was no significant Friendship x Item interaction, $F(1,72) = 2.22$, $p < .14$, but there was a significant Friendship x Item x Time interaction, $F(2,144) = 4.55$, $p < .01$. Newman Keuls tests revealed that Mutual friends generated their best-quality solutions from the discussion of an Agree more than a Disagree item ($p < .05$), whereas Unilateral friends generated their best solution from the discussion of aDisagree more than an Agree item ($p < .05$). Mothers in Mutual pairs chose their best solution more often from the discussion than after the discussion of an Agree item ($p < .01$), while Unilateral mothers chose equally from

Table 7

Mean Frequency (and Standard Deviations) of Highest Quality Final Solutions (Time Source)

	Friendship		
Item/Time	Mutual	Unilateral	Total
AGREE ITEM	1.4 (1.5)	1.0 (.4)	1.2 (1.1)
Before	.5 (.5)	.4 (.5)	.4 (.5)
During	.7 (1.6)	.3 (.5)	.5 (1.2)
After	.2 (.4)	.3 (.4)	.2 (.4)
DISAGREE ITEM	1.2 (.4)	1.1 (.4)	1.2 (.4)
Before	.5 (.5)	.2 (.4)	.4 (.5)
During	.4 (.5)	.7 (.5)	.5 (.5)
After	.3 (.5)	.2 (.4)	.3 (.4)
MEAN PER ITEM	1.3 (.8)	1.1 (.3)	1.2 (.6)
Before	.5 (.4)	.3 (.4)	.4 (.4)
During	.5 (.9)	.5 (.4)	.5 (.7)
After	.3 (.3)	.3 (.3)	.3 (.3)

both. A subsample analysis similar to number of solutionsconfirmed the Pre-post and Person Source main effects, and the Friendship x Item x Time Source interaction for quality of solutions. Other interactions were not significant: Friendship x Time Source x Person Source, $F(2,144)= 1.84$, $p> .05$; Friendship x Item x Person Source, $F(1,72)= 1.32$, $p> .05$; Item x Time Source x Person Source, $F(2,144)= .12$, $p> .05$; and Friendship x Item x Time Source x Person Source, $F(2,144)= 2.36$, $p> .05$.

To examine demographic correlates and friendship scores on the ADF of the quality of solutions, correlations were run on the mean quality scores. Family income, $r= .30$, $p< .01$, was correlated with mean quality of solutions on the disagree item only; mean quality was not correlated with the mother's educational level. Friendship scores were correlated with mean quality of solutions on the disagree item only, $r= .26$, $p< .05$. Maximum quality was significantly correlated with educational level, $r= .29$, $p< .01$, for the disagree item only. Thus, good solutions were associated with higher income while best solutions were associated with better education.

Relation Between Number and Quality of Solutions

A correlation between number and quality (mean and maximum quality) of solutions was analyzed. The mean quality of solutions was significantly related to number of solutions for the disagree item only, $r= -.33$, $p< .01$,

suggesting that overall, the quality of solutions was better when mothers produced fewer solutions for a disagreed-upon item.

The maximum quality of best solutions was significantly correlated with number of solutions in the agree item only, $r = .44$, $p < .01$, indicating that the more solutions generated by mothers in the agree item, the higher their best solution was.

Discussion variables

There were 18 discussion codes used in each condition. These codes allowed for frequency measures of subjects' responses according to type of statements (solution, elaboration, question, evaluation, or restatement of a problem), person source (self or partner), and originality of statement (new or repetition) (see Appendix F).

Each set of 18 codes for the Agree and Disagree items were subjected to factor analyses for the purpose of selecting a more manageable number of high-loading variables whose ranges were good and that were, at the same time, conceptually interesting. This was an exploratory analysis that allowed the researcher to choose codes that did not share too much variance, i.e., loaded on different factors. Looking for the same codes for Agree and Disagree items, the 6-factor solutions with varimax rotation provided a set of codes that fit these criteria. Six high-loading codes were identified namely: (1) number of solutions, (2) elaboration

of own solutions, (3) information-seeking questions, (4) elaboration of a problem, (5) elaboration of the partner's solutions, and (6) positive evaluation.

A 2 (Friendship) x 2 (Item) ANOVA was performed on 6 discussion codes. Friendship was a between-subjects factor while Item was a within-subject factor. A significant Friendship effect was observed for information-seeking questions, $F(1,72)= 7.06$, $p< .05$. Mothers paired with Mutual friends posed more questions than Unilateral friends for both Agree (.5 vs .1) and Disagree items (.4 vs .1). No significant differences were found between Agree and Disagree Items (see Table 8).

Interaction effects for Friendship and Item were almost significant for Solutions, $F(1,72)= 3.75$, $p< .06$. Newman-Keuls tests showed that in the Agree condition, mothers paired with Mutual friends offered more solutions than Unilateral friends (3.5 vs 2.4), $p< .01$, whereas in the Disagree item they did not produce significantly more solutions than Unilateral friends (2.8 vs 2.5) $p<$ ns. This variable is particularly important when compared with the number of final solutions mothers gave after the discussion (discussed previously). Significant correlations were found between number of final solutions and three discussion codes in the Agree condition: number of solutions offered, $r = .39$, $p< .01$, repetition of self-generated solutions, $r = .32$, $p< .01$, and positive evaluation, $r = .29$, $p< .01$. No

Table 8

Mean Frequencies (and Standard Deviations) of Six Discussion Codes

Discussion Codes	Friendship		
	Mutual	Unilateral	Total
Different solutions			
Agree	3.5 (2.8)	2.4 (1.1)	3.0 (2.2)
Disagree	2.8 (2.2)	2.5 (1.0)	2.7 (1.7)
Elaboration of own solutions			
Agree	2.3 (2.2)	2.2 (1.9)	2.2 (2.0)
Disagree	2.2 (2.0)	2.1 (1.8)	2.1 (1.9)
Information-seeking questions			
Agree	0.5 (1.1)	0.1 (0.4)	0.3 (0.9)
Disagree	0.4 (0.8)	0.1 (0.2)	0.2 (0.6)
Elaboration of problem			
Agree	1.2 (2.0)	0.5 (1.3)	0.9 (1.7)
Disagree	1.0 (2.1)	0.75 (1.40)	0.9 (1.8)
Elaboration of partner's solution			
Agree	0.9 (1.6)	0.5 (1.0)	0.7 (1.3)
Disagree	0.8 (1.2)	0.9 (1.1)	0.9 (1.2)
Positive evaluation			
Agree	0.8 (1.7)	0.4 (0.8)	0.6 (1.4)
Disagree	0.6 (0.8)	0.4 (0.6)	0.5 (0.7)

significant correlations were found between number of final solutions and discussion codes for the Disagree item. Thus, at individual rather than group level, there is also some relation between process and outcome.

In summary, Mutual friends asked for information during problem-solving sessions more than Unilateral friends. Mutual friends who Agreed proposed more solutions than Unilateral friends, but no other discussion differences were found between Mutual and Unilateral friends on the two items. Three discussion codes were significantly correlated with number of solutions in the Agree item: number of solutions offered, repetition of self-generated solutions, and positive evaluation.

Conclusion

The major findings of the problem-solving session for number of solutions were (1) that number of solutions increased from pre- to post-discussion, particularly among mothers paired with a mutual friend; and that most final solutions were given by mothers paired with a mutual friend on an item for which they agreed; (2) that more solutions came from the discussion itself, and from solutions generated by the mother herself rather than from her partner, particularly when the two initially agreed.

The major findings for the quality of solutions were: (1) quality increased from pre- to post-discussion regardless of the source of these solutions; (2) the best solutions more often came from the mother herself rather than her partner (as was the case with most solutions generally) and from the dyadic discussion. Whereas mothers with mutual friends took their best solutions from the discussion of initially agreed items, those with unilateral friends more often took their best solutions from the discussion of the disagreed item.

Friendship and Agreement

Mothers working with a mutual friend offered more and better quality solutions after their discussion than they had initially. Overall, the greatest number of final solutions as well as high quality solutions were found for mothers working with a mutual friend on the agree item. The

friendship effect is consistent with previous literature, although the current study compared mutual with unilateral friends rather than nonfriends. There is some evidence from the discussions themselves, that mutual friends asked more questions seeking information. Thus, greater information exchange between mutual friends could account for their good performance. However, more detailed analyses of the source of the mother's final best solutions indicate that other social-emotional factors are also relevant.

The most unexpected finding was that Filipino mothers paired with a mutual friend produced more and better quality solutions on the agree rather than the disagree item. Previous research has found the opposite (Mugny & Doise, 1978; Nelson & Aboud, 1985). In this study, the mothers paired with unilateral friends produced their maximum quality, but not more, solutions from their discussion of a disagree item. The only explanation is that Filipino mothers expected agreement and self-validation from a mutual friend (Wright, 1991) and felt comfortable enough to work on the problem only if they received them. They did not expect to have to use their conflict-resolution skills with mutual friends. The mothers paired with a unilateral friend, perhaps did not expect self-validation, and so saw this as an appropriate context in which to express their differences and use their negotiating skills, which they did to good effect. Mothers' negotiating skills rarely included

questioning, criticizing, or pointing out weaknesses in their partners' solutions. Instead they showed a type of reciprocity by elaborating and repeating both their own solutions and their partner's solutions. The orientation towards mutual friendship and agreement is therefore quite different for these mothers than for most of the samples reported in the research.

Interpersonal harmony, personal dignity, and shared identity are highly valued in Philippine culture (Enriquez, 1992). Filipinos are more comfortable in non-confrontational situations and prefer harmony over conflict unless directly provoked. Balance within a relationship is threatened when a person's opinions are challenged or opposed by another. This is not to say that disagreements never occur; it means that when they do occur, they are more likely to be interpreted as an attack on one's person instead of one's work or ideas. Disagreements entail greater effort because one must keep the balance between personal dignity and shared identity. However, while disagreements are avoided, differences of opinion are allowed, but each is considered legitimate. There is consequently no need for one person to adopt the opinion of another.

Sources of Best Final Solutions

The pre-post increase in both number and quality of solutions indicates that the problem-solving discussion

produced beneficial outcomes. This was confirmed by the time source analysis of the mother's solutions; at the end, mothers mentioned as many or more solutions from the discussion as they did from the pre-discussion. Often their best quality solutions came from the those generated during the discussion. However, mothers also gave many of their initial solutions as their final ones. Thus, they continued to believe that their original solutions were good. However, the best quality solutions did not frequently come from those given before the discussion; rather they came from the discussion of an agreed-upon problem by mutual friends and the discussion of a disagreed-upon problem by unilateral friends. Once again, these results demonstrate that the benefits of dyadic problem solving are maximized for mutual friends who initially agree and for unilateral friends who initially disagree.

One of the more interesting findings was that mothers' final solutions were more often their own. Rarely did they adopt the solutions offered by their partner. What, tnen, was the role of the partner in these problem-solving sessions? The partner's role may have been to facilitate the mother's thinking aloud about solutions that would work for her and evaluating her own solutions. The best facilitator is an agreeing friend, presumably because she is best able to give the mother a feeling of self-validation, through mutual liking and through consensual agreement.

Thus, the mothers seem to generate more and better solutions for themselves when the social context is validating and supportive.

The interesting exception is that mothers paired with unilateral friends adopted their best solutions, but not more solutions, from discussion of an item on which they disagreed rather than agreed. In this context, mothers did not give many final solutions, but the ones they did give were of good quality. They were perhaps evaluating their own solutions more carefully, having been in a social context in which their solutions did not gain automatic acceptance from the disagreeing unilateral friend.

Process and Outcome

The dyadic problem-solving situation appears to be beneficial in terms of encouraging mothers to solve actively their own daily child feeding problems. Although there were few correlations between the discussion codes and the final solutions, analyses of the sources of solutions demonstrated the value of the discussions. On average, mothers generated almost 3 different solutions during their discussions; their final solutions were a subsample of these, those best recalled and/or preferred. Furthermore, the maximum quality increased from 6.4 to 7.1 out of 10. These outcomes demonstrate that the mothers were capable of generating many new solutions to their feeding problems, with a peer rather than with an expert.

Quantity versus Quality

On the agree item, the quality of the mother's best solution was higher if she gave many final solutions. In contrast, on the disagree item the mean quality of all final solutions was higher if mothers gave fewer solutions. Thus, on both items, quantity was related to quality but in different directions. Perhaps because the agree item generally produced more solutions during the discussion, mothers who continued to recall their discussion solutions eventually gave a very good solution. Thus, in this case quantity did lead to good quality.

Quantity, however, was detrimental to good quality solutions for the disagree item. Perhaps because of the mother's evaluative orientation during the discussion of a disagree item, she came up with her best solution at the beginning of her list. If she continued to give more solutions, their lower quality tended to reduce the overall mean quality of her solutions.

Study 2. Multi-session Nutrition Education Using the Dyadic Problem-solving Strategy

Based on the results of Study 1, the dyadic problem-solving strategy was extended to cover six sessions. As with most health education, the goals were to identify problems, seek solutions to these problems, impart knowledge about nutrition, and encourage the mothers to implement the new solutions and knowledge in their daily feeding practices. Unlike the traditional health education sessions, the mothers worked toward these goals in peer dyads, without the help of an expert. For each session, they met at a partner's home, conducted the necessary activities, and returned the completed forms to the researcher. The activities included helping each other to identify problems and solutions, completing a session quiz with the help of an information sheet and any other resource available, and monitoring their own feeding practices during the following week. Because most mothers had attended school for at least four years, their literacy level was considered sufficiently high for them to follow the written instructions and information. However, because ability level has been an important determinant of dyadic problem solving and learning in the literature, educational status was examined as a predictor. A control group of mothers who had, like the others, attended the usual nutrition education sessions at the clinic completed all the activities alone.

Thus, a comparison was made between those who participated with a mutual or unilateral friend and those who participated alone.

The specific objectives for the nutrition education sessions were as follows:

1. To assess improvements in the mothers' nutrition knowledge as a function of her participation group.
2. To compare pre-post changes in the target children's nutritional status for the three participation groups.
3. To examine several process variables, such as the number of problems and solutions identified, and the mother's self-report of weekly feeding practices.

Method

Subjects

The 110 mothers described previously participated in this study. All of them had at least one mutual friend, so that differences could not be attributed to their friendship skills, and all had attended some health education sessions at the nearby clinic. This included 38 from Study 1 who were paired with a mutual friend (19 pairs), 36 from Study 1 who were paired with a unilateral friend (18 pairs), and 37 control mothers who were randomly assigned to participate alone. On the demographic variables outlined in Table 1, the mothers in the three groups did not significantly differ. For each mother, a target child was selected based on the criteria of weight and age (see Measures).

Design and Overview of Procedure

The design involved three groups of mothers (Mutual friends, Unilateral friends, and Controls) and two time assessments (pre- and post-intervention). There were two outcome measures: mother's nutrition knowledge and child's nutritional status. The analysis of the education process included three measures: problem-solving, answers to the quiz, and self-reporting of feeding behaviors.

The multi-session nutrition education program dealt with six feeding topics: (1) meals, (2) snacks, (3) sensitivity and communication, (4) self-feeding, (5) home remedies, and (6) growing vegetables. The first four activities were completed by all mothers, while only 40 (36%) answered Home Remedies and 41 (37%) completed Growing Vegetables. Each topic included materials for: problem-solving, quiz, self-reporting on feeding practices, and an information sheet. They were handed out on an ongoing basis, according to the mothers' schedule. The mother's nutrition knowledge and the target child's nutritional status were assessed before and after the sessions.

Measures and Procedures

Nutrition knowledge test. The nutrition knowledge test consisted of questions on 9 topics concerning the following areas of nutrition that influenced feeding practices and were seen as potential sources of feeding problems in the Philippines: (1) food benefits and deficiencies,

(2) detecting and reacting to signals from a hungry, full, or sick child, (3) child's nutritional status, (4) training a child to self-feed, and (6) sources of food for the family (see Appendix G).

There were 50 different items to be scored on the 9 topics. Scoring was based on whether an answer was appropriate or correct. Each correct/appropriate answer was scored as 1. For example, a mother who reported that she knew her child was full when he stopped eating and started to play with his food instead was given a score of 2. An inappropriate answer or no response was scored as zero. A maximum score for each item was set based on the nature of the question and the range of answers received (e.g., a maximum of 1 for knowing the child's weight, and a maximum of 2 for examples of foods in each food group). Scores for the 50 items were aggregated into 9 scores, one for each topic, which were summed to arrive at a final raw composite score, yielding a maximum score of 90.

The test was given twice, first at the beginning before Study 1 was conducted, and then at the end of the study. During the pretest, the mothers preferred that the questions be read to them by the researcher. An assistant recorded the answers during the session. However, at the time of the posttest, many mothers were less available because of work. After several attempts to interview them, 75% asked to complete the nutrition test on their own; the remaining 25%

answered it during an interview.

Nutritional status. All children aged 9 to 64 months were assessed for weight and height at both the start and end of the study. Three indices were derived: weight-for-age, height-for-age, and weight-for-height (WHO, 1983). For each index, the percentage of the median and the number of standard deviations above or below the international median were computed. However, it was decided to use the number of standard deviations from the international median (referred to here as z-scores) for subsequent analyses, as this is now advocated in place of percent of the median. Standard deviations were calculated for the child's particular age to the nearest birth month both at pre-intervention and post-intervention.

One underweight child younger than 6 years was identified for each mother. If there was more than one child meeting this criteria, the more underweight child was selected, based on the Philippine Department of Health's (1992) weight-for-age tables for rapid screening. In families with more than one underweight child in the same nutrition category, the youngest was chosen. Thus, the sample was biased toward more underweight and younger children, which was appropriate because such children face greater risks. Among the target children, 68% were boys and 32% were girls, which was consistent with the previous census that indicated higher rates of malnutrition among

Table 9

Percent Distribution of Target Children on Nutrition Indices at Pre-Intervention

Weight-for-Age	>=90%	80.00-89.99%	< 80%	< -2 SD
	20.7	39.1	40.0	34.5
Height-for-Age	>=95%	90.00-94.99%	< 90%	< -2 SD
	22.7	40.0	37.3	57.3
Weight-for-Height	>=90%	80.00-89.99%	< 80%	< -2 SD
	74.5	23.6	1.8	3.6

boys in this village. The average age of target children was 30.5 months with ages ranging from 9 to 64 months. There were no group differences on the pretest for the three indices. See Table 9 for distribution of target children atpre-intervention.

Nutrition Education Sessions. There were six nutrition topics for the educations sessions: (1) meals, (2) snacks, (3) sensitivity and communication, (4) self-feeding, (5) home remedies, and (6) growing vegetables. The sessions were conducted from Month 5 to 7 (March to June). The mothers arranged to meet with their partner or alone to complete the activities for each session.

The following is a brief description of the problems and feeding practices that mothers discussed and reported for each of the four topics:

1. Meals. These problems focused on food procurement, providing nutritious food for adults and children, and reactions to other people's suggestions regarding nutritious food. The number of times milk, rice, fish, meat, vegetables, fruits, and root crops were given were recorded by mothers on Days 2, 4, and 6 during the week.

2. Snacks. The problems covered food procurement, preparation of money-saving and time-saving snacks, and schedule for snacks. Mothers reported on the snacks (whether home-made or store-bought) that they prepared for their children on Days 2, 4, and 6, and whether the children

fed themselves or were assisted by an adult.

3. Sensitivity and Communication. The problems touched on how to give the right amount of food, when to give seconds and how much, and verbal interaction between mother and child regarding food. Mothers were asked to report the number of times that their children self-fed and requested more food. They also reported the number of times the children were questioned for more food, given food and/or refused when the child asked for more food.

4. Self-feeding. These problems focused on how mothers knew if their children were ready to self-feed before 3 years of age, steps taken to train them to self-feed, strategies to minimize waste during training of self-feeding, ways to teach a child to eat rice, and reactions to a child's demands to be fed. For six days during the week, mothers were asked to record their child's behavior during lunch in terms of: (1) ate by him/herself, (2) asked to be fed, (3) played with food, and (4) passively sat while being fed. Beside each child behavior, the mother rated her satisfaction with what happened on a 5-point scale (1 = very dissatisfied; 3 = neither dissatisfied nor satisfied (neutral); and 5 = very satisfied).

A set of activities consisting of four sheets of paper were given to the dyad before each session: (1) the Problem-solving sheet, (2) the Quiz, (3) the Self-report of practices, and (4) an Information sheet. Seven to ten days

after the session, the researcher or an assistant collected the completed problem-solution sheet, the quiz, and the feeding practices self-report. Materials were handed out for two sessions at a time (see Appendix H).

The problem-solving sheet contained at least three problems relevant to that feeding practice. Mothers were asked to discuss at least one problem that was relevant to one or both of them. If none of the problems was relevant, they were told that they could choose an alternative issue and discuss it. The mothers indicated the problems they encountered, identified who experienced the problem by writing the mother's initials, and listed solutions to these problems. The number of problems and solutions generated per problem were tallied and analyzed.

The Quiz sheet contained the questions about basic nutrition knowledge and the mother's feeding practices that pertained to the topic being discussed. This could be answered individually and/or with the help of the partner and the Information sheet, and was intended to provide a review of the basic problems and solutions related to the topic.

The Self-report sheet was a record of the mother's and target child's feeding practices pertinent to the session topic. It was completed by the mother alone during the week following the session. Mothers ticked off the relevant behavior (e.g., making or eating a fruit snack) each time

she or her child performed it. It was collected before the start of the next session and scored for frequency.

The Information sheet contained basic information on each topic that were taken from Facts for Life (UNICEF, 1989), child nutrition sources (Lambert-Lagace, 1982, 1991; Health & Welfare Canada, 1986; Cameron & Hofvander, 1983; Pipes, 1977; Spock, 1976), and handouts used by the Philippine National Nutrition Council (1976).

Composite scores for problem-solving (e.g., number of problems and solutions) and self-report (e.g., frequency of behavior) were calculated and analyzed for the four topics covered by all mothers. There were two scores for problem-solving--the number of problems discussed and the number of solutions offered. The self-report of feeding practices was scored for frequencies of reported practices. Quiz scores were not analyzed because the Quiz was given for practice only as there was no control on how it was answered.

Results

Nutrition Knowledge Tests

A 3 (Group) x 2 (Time) ANOVA was conducted on the composite raw scores, where Group (Mutual friend, Unilateral friend, and Controls) was a between-subjects factor and Time (Pre and Post) was a within-subject factor. The analysis yielded a Group effect, $F(2,107) = 4.81$, $p < .01$, indicating through the Newman-Keuls tests that mothers participating with Unilateral ($M = 30.5$) and Mutual ($M = 29.3$) friends had higher overall mean scores than mothers in the Control group ($M = 26.5$). Mothers working with friend pairs had higher raw scores than those working alone. There was a Time effect, $F(1,107) = 47.30$, $p < .01$, but no Group x Time interaction, indicating that all groups improved on the post-intervention. Means are presented in Table 10, and results for each of the 9 questions are in Appendix I.

A stepwise multiple regression analysis was performed on post-intervention raw scores to determine the contribution of demographic variables after entering pretest scores. The results revealed that pre-intervention raw score (beta=.18, $p < .10$) and mothers' education (beta=.26, $p < .05$) were the best predictors of post-intervention scores, R-squared = .15, $F(2,95) = 8.35$, $p < .01$. That is, in addition to the mother's baseline knowledge, her education level contributed most to her knowledge on the post-intervention.

Table 10

Mean Scores (and Standard Deviations) of Nutrition Test Composite Raw Scores

	Group			
Time	Mutual	Unilateral	Control	Total
Pre	26.2 (4.2)	27.9 (6.2)	23.9 (6.1)	26.0 (5.7)
Post	32.4 (9.0)	33.1 (8.6)	29.2 (7.1)	31.6 (8.4)

Nutritional Status of Target Child

Table 11 shows results for the three indices of nutritional status using standard deviation from the median. The 2 (Group) x 2 (Time) ANOVA on weight-for-age produced a main effect of Time, $F(2,107)= 6.27$, $p< .01$, and no Group or Group x Time effects. A similar ANOVA on height-for-age produced a main effect of Time, $F(2,107)= 12.41$, $p< .01$, and no other significant effects. Thus, children of all mothers, regardless of their participation group, showed increases in weight-for-age and height-for-age from before to after the sessions. No effects were found for weight-for-height.

Predictors of nutritional status z-scores (standard deviations) were examined in a series of stepwise multiple regressions, forcing entry of the pre-intervention score for that index. The predictor variables were raw composite Knowledge score and five demographic variables--mother's education, family income, sex of target child, age of target child, and number of children in the family. Correlations and multiple regressions statistics from the final step are in Table 12.

Weight-for-age at Time 2 was best predicted by weight at Time 1, and was also positively associated with family income and negatively with age of child. It was unrelated to the mother's knowledge at Time 2. Height-for-age at Time 2 was best predicted by height-for-age at Time 1 and was

Table 11

Mean z-Scores (and Standard Deviations) of Target Child's Nutritional Status

Index	Time	Group: Mutual	Unilateral	Control	Total
I. Weight-for-age					
	Pre	-1.8	-1.7	-1.7	-1.7
		(1.0)	(.9)	(.8)	(.9)
	Post	-1.6	-1.5	-1.7	-1.6
		(1.1)	(.9)	(.8)	(1.0)
II. Height-for-age					
	Pre	-2.5	-2.0	-2.3	-2.3
		(1.6)	(1.1)	(1.1)	(1.3)
	Post	-2.2	-1.7	-2.0	-1.9
		(1.5)	(1.4)	(1.2)	(1.3)
III. Weight-for-height					
	Pre	-.2	-.6	-.4	-.4
		(1.3)	(.9)	(1.1)	(1.1)
	Post	-.4	-.5	-.7	-.5
		(1.1)	(.9)	(1.0)	(1.0)

Table 12

Correlations and Multiple Regression Analyses on Child's Nutritional Status

	Weight-for-age		Height-for-age		Weight-for-height	
Predictor Variables	r	beta	r	beta	r	beta
T1 Nutrition index	.82	.75**	.74**	.66**	.58**	.58**
T2 Knowledge	.15	-	.28**	-	-.12	-
Mother's education	.27**	-	.43**	.20**	-.08	-
Family income	.39**	.21**	.32**	-	.13	-
Sex of child	-.01	-	.00	-	-.01	-
Age of child	-.22*	-.11*	-.02	-	-.22*	-
No. of children	-.24**	-	-.22*	-	-.05	-
R-squared		.71		.62		.34
F (df)		78.45** (3,94)		50.05** (3,94)		48.98** (1,96)

* p< .05 ** p< .01

Note: r refers to Pearson product-moment correlations. beta refers to standardized multiple regression beta weights.

also positively associated with mother's education. Although the mother's nutritional knowledge was positively correlated with height-for-age it did not make an independent contribution beyond the other variables, particularly mother's education with which it was correlated. Weight-for-height at Time 2 was predicted only by weight-for-height at Time 1.

Nutrition Education Sessions

Six nutrition topics were originally prepared for the education sessions. However, only four topics were completed by all mothers. Three composite scores were obtained for each topic: number of problems answered, number of solutions, and self-report.

A one-way ANOVA was used to examine group differences on the number of problems and solutions discussed across the four completed sessions. A Group effect was found for number of problems discussed, $F(2,108)= 3.9$, $p< .05$. Mothers who were in the Mutual and Unilateral friend groups dealt with significantly more problems than did mothers in the Control group, according to Newman-Keuls tests. No differences were found for solutions or self-reported feeding practices (see Table 13).

The correlation between nutritional status and the three process variables was examined as with the previous analysis in Study 1. No significant correlations were found between nutritional status and any of the nutrition education variables.

Table 13

Mean Frequencies (and Standard Deviations) of Problems, Solutions, and Feeding Practices Reported During Sessions

	Group			
Variable	Mutual	Unilateral	Control	Total
Problems	6.7 (3.2)	5.6 (3.2)	4.8 (2.4)	5.7 (3.1)
Solutions	9.0 (5.1)	7.4 (4.8)	6.5 (4.2)	7.6 (4.8)
Self-report	36.5 (5.9)	39.7 (9.4)	39.3 (10.0)	38.5 (8.6)

Conclusion

Mother's Nutrition Knowledge

Mothers from all three groups improved their nutrition knowledge scores from before to after the education sessions. That is, they all benefitted from the problem-solving, the quizzes, and the self-monitoring of their own feeding practices. Those paired with friends obtained slightly higher scores on the pretest, but improved as much from before to after the intervention. The overall level of knowledge was moderate, and the increase was only 7%. This is somewhat disappointing, given the time and effort of conducting the intervention. However, the mothers participated in only four or six sessions, and although the topics were familiar, the issues and ideas may have been somewhat novel to the mothers. For example, rather than simply telling the mothers what to feed their child, the problem-solving information focused on strategies for encouraging a child to eat the desired foods, how to read signals from the child concerning their state of hunger and fussiness, and how to respond to these signals, as well as how to encourage a child to self-feed. Exposure to these ideas once or twice may not have been enough to consolidate them in the mother's memory. Moreover, the test placed heavy demands on the mothers' memory by asking open-ended questions that required recall, rather than using multiple-choice questions that require recognition. The increases

noted in this study are comparable with those of Glatthaar et al. (1985) who found a mean change from 35% to 45% for mothers living in South Africa, after six sessions with a nurse; children of the mothers had been admitted to hospital with severe malnutrition.

At this point, one can only speculate about why the control mothers improved as much as mothers paired with friends. The control group in this study, unlike others (e.g., Glatthaar et al., 1985), actually worked through all the same materials as the paired mothers, the only difference being that they worked alone. It was assumed that the pairs would benefit from the information and the social-emotional support provided by their friend and that this would maintain their interest in the sessions and enhance their learning. However, all the control mothers completed their problem-solving, quiz, and self-report materials and none dropped out of the sessions. They appear to have maintained enough involvement to learn as much as the paired mothers, perhaps because of the problem-based approach or because the activity was something new in the community. This is consistent with other research showing that, although problem-solving outcomes are facilitated by dyads, learning new material is not (Foot & Barron, 1990).

Mothers' education was an important predictor of her nutrition knowledge score, as has been reported by others (e.g., Ruel et al., 1992). More educated mothers also tend

to use better child feeding strategies (Goodburn, et al., 1990; Guldan et al., 1993). In this study, the mother's education was a better predictor of her post-intervention knowledge than was the pre-intervention score, implying that educated mothers benefited more from the sessions. Mounting evidence on many aspects of family health strongly demonstrates the importance of education.

The process variables, like the knowledge test, showed few differences between the three groups of mothers. Only the number of problems discussed during each session was higher for mothers paired with a friend. Solutions and self-reports of feeding practices were not different. None of the process variables correlated with the mother's knowledge or the child's nutritional status.

Child's Nutritional Status

The target children's nutritional status improved on two of the three indices: weight-for-age and height-for-age. Few significant results were associated with weight-for-height; furthermore, few children were moderately or severely wasted. Consequently, the weight-for-age index best reflects differences in stunting (height-for-age). As with nutrition knowledge, children of mothers in all three groups improved their weight-for-age and height-for-age over the 6- to 8-month period. It is difficult to compare these results with other studies, most of which give direct nutrition education to mothers of severely underweight

children. The children's height, but not weight, index was correlated with the mothers' nutrition knowledge; however, the latter shared much of its variance with the mothers' education, and so dropped out of the multiple regression equations. Consequently, the children's weight and height indices were best predicted by the demographic variables of family income and mother's education, respectively.

General Discussion

The original contribution of this research is its demonstration that under controlled conditions, mothers can generate more and better quality solutions to daily child feeding problems when collaborating with a friend. Specifically, there were three important findings from the experimental session that contribute to our understanding of everyday problem solving. First, mothers paired with a mutual friend tended to produce more and better final solutions when working on a problem to which they had similar initial solutions. Second, mothers paired with a unilateral friend selected better, but not more, solutions from their discussion, when they initially disagreed on their solution to the problem. Finally, the role of the partner was to facilitate the mother's own problem solving, rather than to provide new solutions for her to adopt. When implemented in a multi-session, unsupervised nutrition-education program, the problem-solving approach appeared to benefit all mothers and target children regardless of whether they worked in pairs or alone.

This discussion will focus on the nature of everyday problem solving as studied in the context of child feeding, and the role of friendship and initial disagreement in the process and outcome. The specific issue of whether the process effects the outcome will be examined in light of the results for the two studies. Finally, the similarities and

differences between the two studies allow for conclusions about the translation of results from controlled to unsupervised nutrition education activities.

Problem-Solving about Child Feeding

The problem-solving approach in this study focused on recurring problems that Filipino mothers deal with everyday --e.g., feeding a child who is underweight, attending to a fussy child without disturbing other family members during meals, and finding ways to encourage a child to eat vegetables. Rather than focusing on the problem of where to find the next meal, which may not always be the major problem, those selected for discussion were family-based, involving the social and emotional aspects of feeding that can influence the child's growth. This approach is different from the traditional form of nutrition education that advises mothers what to feed their children. The latter does not take into account the fact that mothers run into many obstacles in trying to implement this advice, not the least of which is the mood and wishes of the child. These problems were identified during preliminary focus group discussions with other mothers, but they also appeared to be relevant to most of the research mothers, as reflected in their lengthy discussions. For example, the fact that so many mothers were coping with fussy eaters implied that food was available, but the child did not immediately eat it at mealtime.

The collaborative problem-solving process, as in other research (Gottman, 1983), was characterized by the exchange of both informational and social resources, with solutions and elaborations of solutions most prevalent. Reciprocity was demonstrated by the consistent correlations of each mother's remarks with those of her partner, particularly on the Agree problem. Like brainstorming, the discussions yielded many solutions, particularly when the dyads consisted of mutual friends discussing an agreed-upon problem. Also consistent with other research (Azmitia, 1988; Nelson & Aboud, 1985; Phelps & Damon, 1989) was the finding that the quality of solutions selected in the end did not suffer when people worked in dyads.

However, several findings were inconsistent with past research on problem-solving in friend dyads. The first was that when mothers agreed, rather than disagreed, on their initial solutions they eventually produced more and better quality solutions. This appears surprising only if one assumes that the partner's role is to provide new solutions for the mother. However, with this sample, the role of the partner was to facilitate the mother's own problem solving, and thus an agreeing friend provided the best context for facilitation.

The second was that it was unilateral rather than mutual friends who benefited more from the discussion of problems on which they initally disagreed. Although

unilateral friends produced lower quality solutions than mutual friends--even considering their best solution--this solution was most likely to be generated from the disagree discussion. The disagree context did not generate a large number of solutions, but it did generate the best quality solutions for unilateral friends. In the Philippine context, disagreement may be accepted outside mutual relationships and lead to more careful filtering of the solutions one proposes.

The third finding is that mothers did not frequently adopt solutions offered by their partners during the discussion. In previous research, the solutions offered by group or dyad partners were often selected in the end (Aboud, 1989; Mugny & Doise, 1978; Nelson & Aboud, 1985), especially if the partner was more competent (Tudge, 1992). These Filipino mothers were more likely to adopt the solutions they themselves generated during the discussion. They may have felt that the partner's solutions, however good, were not tailored to their own family's needs. Consequently they relied on their own problem solving.

Relation Between Process and Outcome

The process by which mothers solved problems in Study 1 and the certain aspects of the process they went through during their education sessions were examined. However, because few direct correlations between process and outcome were found in the first study which took place all in the

same session, it was not surprising that correlations were not significant in the second study. In Study 1, the only relation was between number of final solutions and number of solutions generated during the agree discussion, repetition of self-generated solutions (which were few), and positive evaluation of the partner (which were also infrequent). Thus, the number of solutions generated during the process of problem solving did influence the number selected afterwards.

Quality of final solutions was not related to any process code. However, a more direct examination of the final solutions indicated that most came from the discussion and from those generated by the mother herself. Thus, the process of problem solving did supply new solutions and high quality solutions, but these were generally added on to the ones produced by the mother initially.

Many of the friendship and agreement variables influencing outcome solutions did not affect the process itself. Only the number of solutions proposed during the discussion, which was higher for mutual friends on an agree item, paralleled differences on the final solutions selected. Thus, the process, like brainstorming, provided a number of solutions from which the mother subsequently selected only a subsample. Presumably the final subsample was derived from those the mother could recall from the discussion and evaluated highly. In this sense, the process

was useful. It might also have been useful in facilitating problem-solving skills. The mothers from the two friendship groups, who participated in the controlled problem-solving session, generated more problems to discuss during the subsequent education sessions. But this was the only indication that the skills transfered to another context. They did not, however, generate more solutions during the sessions, and did not put these solutions into practice more than did control mothers. There was no correlation between mean quality of solutions from Study 1 and the target child's nutritional status at the end.

Comparison of Controlled versus Unsupervised Problem-Solving: Limitations and Implications for Future Research

The controlled problem-solving session, as expected, produced more differentiated outcomes than the unsupervised sessions. The superiority of mutual friends during the controlled session was not replicated in the long-term education sessions. There was also no advantage to being paired over working alone during the unsupervised sessions. Presumably, mothers sought the optimum strategy for solving problems and learning the best child-feeding practices given their paired or unpaired context. Perhaps, the mutual friends sought agreement, and the unilateral friends disagreement when this was not controlled.

The controlled session of problem solving contributed to our understanding of what conditions best facilitate the

quantity and quality of solutions. However, one major limitation of Study 1 was that no long-term follow-up was conducted to determine whether mothers continued to maintain the new solutions or returned to their old solutions. A second limitation was that dyadic problem solving was not compared with an individual problem solving group or with dyadic discussion of a topic unrelated to nutrition. Only the pre-post differences allowed for a comparison of solutions generated alone versus solutions generated after collaboration. A better design to answer this question would have been to ask mothers alone to work on two problems, giving them the same amount of time as the dyads. If it were not unethical, a second control group of dyads who generated solutions to two problems, but did not problem solve, would have provided more information on the effectiveness of dyadic problem-solving.

During unsupervised sessions, only the friendship variable was manipulated. However, working in a dyad did not produce any observable advantage over working alone, as all three groups showed equal improvement. Even the advantage that friend pairs had from participating in the prior controlled problem solving did not give them an advantage in the multi-sessions. Although it is difficult to manipulate the level of agreement between pairs if sessions were not controlled, more detailed instructions could have been provided to the mothers to ensure that they

discussed solutions that were similar to each other. Another limitation is that mothers were exposed to each topic only once and might not have concretely integrated all the information. In future, a repetition of each session could lead to better problem solving and information exchange.

A final limitation is that the problem-solving approach was not compared with a non-problem-solving approach. Thus, it is not clear to what one can attribute the improvement of all mothers who took the programme. Because all mothers had previously participated in the health center's nutrition education sessions, their pre-intervention knowledge presumably reflected whatever they learned from the traditional method, and their post-intervention knowledge what they learned from the problem-solving approach. However, their post-intervention improvement could also have reflected a halo-effect of participating in a novel programme. A better design could include a control group exposed to traditional health classes regularly conducted by a midwife.

Implications for Nutrition Education

In conclusion, the findings suggest that the dyadic problem-solving approach to child feeding problems produces a number of benefits for both the mother and her child. The information acquired from this research may be useful for nutrition educators, who often do not understand the daily

problems encountered by mothers when they fail to implement the experts' advice. The approach used in this research could be usefully implemented in a regular nutrition education programme that allows mothers to generate and evaluate their own solutions to child feeding problems.

The mother's preference for her own over her partner's solutions has implications for women's acceptance of the solutions offered by nutrition experts. These solutions are likely to be seen as having maximum quality; however, if they are regarded as being unrelated to the mother's particular family situation, they will not be accepted. There is some suggestion from the results that if mothers do accept a partner's solution, it must be a high quality one. They were clearly evaluating each other's solutions and not blindly accepting solutions for the sake of conformity.

Other implications of these results for nutrition education concern the role of peer rather than expert facilitators. In this context, novice peers served as facilitators of the mother's problem solving in the absence of an expert community health worker. Not only were many solutions generated, but the quality was fairly good. This is consistent with other research demonstrating that peer-led groups perform as well as teacher-led groups (Johnson et al., 1989). Peer-led groups have an advantage of fostering greater levels of social-emotional well-being. This appeared to be the case with mutual friends who initially

agreed on their solutions. Experts who disagree with the mothers' solutions might produce the same benefits as unilateral friends who disagree, i.e. low quantity but high quality solutions. Otherwise, peer-dyads appear to produce beneficial results, despite the long and circuitous process they must go through in order to generate a few good solutions.

References

Aboud, F.A. (1989). Disagreement between friends. InternationalJournal of Behavioral Devpt., 12, 495-508.

Adair, L., Popkin, B.M., VanDerslice, J., Guilkey, D., Black, R., Briscoe, J., and Flieger, W. (1993). Growth dynamics during the first two years of life: A prospective study in the Philippines. European Journal of Clinical Nutrition, 47, 42-51.

Armar-Klemesu, M.A., Wheeler, E.F., Brakohiapa, L.A., and Yamamoto, S. (1991). Infant feeding and growth in rural Ghana: Is the use of the traditional fermented porridge a case for early supplementation? Journal of Tropical Pediatrics, 37, 111-212.

Azmitia, M. (1988). Peer interaction and problem solving: When are two heads better than one? Child Development, 59, 87-96.

Barrett, D.E., & Radke-Yarrow, M. (1985). Chronic malnutrition and child behavior: Effects of early caloric supplementation on social and emotional functioning at school age. Developmental Psychology, 18, 541-556.

Bekele, A., Wolde-Gebriel, Z., Kloos, H. (1993). Food, diet and nutrition. In H. Kloos and Z.A. Zein (Eds.), The ecology of health and disease in Ethiopia. Boulder, Colorado: Westview Press.

Bentley, M.E., Dickin, K.L., Mebrahtu, S., Kayode, B., Oni, G.A., Verzosa, C.C., Brown, K.H., and Idowu, J.R. (1991). Development of a nutritionally adequate and culturally appropriate weaning food in Kwara State, Nigeria: An interdisciplinary approach. Social Science and Medicine, 33, 1103-1110.

Berndt, T., Hawkins, J., & Hoyle, S. (1986). Changes in friendship during a school year: Effects on children's and adolescents' impressions of friendship and sharing with friends. Child Development, 57, 1284-1297.

Cameron, M. & Hofvander, Y. (1983). Manual on feeding infants and young children. Oxford: Oxford University Press.

Cebu Study Team (1991). Underlying and proximate determinants of child health: The Cebu longitudinal health and nutrition study. American Journal of Epidemiology, 133, 185-201.

Chase, W.G. & Chi, M.T.H. (1980). Cognitive skill: Implications for spatial skill in large-scale environments. In J. Harvey (Ed.), Cognition, social behavior, and the environment. Potomac, MD: Erlbaum.

Chen, L.C.(1986). Primary health care in developing countries: Overcoming operational, technical, and social barriers. Lancet, 29, 1260-1265.

Chi, M.T.H., Feltovich, P.J., & Glaser, R. (1981). Categorization and representation of physics problems by experts and novices. Cognitive Science, 5, 121-152.

Chi, M.T.H., Glaser, R., & Rees, E. (1982). Expertise in problem solving. In R.J. Sternberg (Ed.), Advances in the psychology of human intelligence, 1. Hillsdale, NJ: Erlbaum.

Cohen, D., Whitmyre, J., & Funk, D. (1960). Effect of group cohesiveness and training upon creative thinking. Journal of Applied Psychology, 44, 319-322.

Cosminsky, S., Mhloyi, M., Ewbank, D. (1993). Child feeding practices in a rural area of Zimbabwe. Social Science and Medicine, 36, 937-947.

Cowan, B. & Dhanoa, J. (1983). The prevention of toddler malnutrition by home-based nutrition health education. In D.S. McLaren (Ed.), Nutrition in the community. New York: John Wiley & Sons Ltd.

D'Agostino, R. (1971). A second look at analysis of variance on dichotomous data. Journal of Educational Measurement, 8, 327-333.

Dasen, P.R. & Super, C.M. (1988). The usefulness of a cross-cultural approach in studies of malnutrition and psychological development. In P.R. Dasen, J.W. Berry, & Sartorius, N. (Eds.), Health and cross-cultural psychology. New York: Sage Publications.

Diehl, M. & Stroebe, W. (1987). Productivity loss in brainstorming groups: Toward the solution of a riddle. Journal of Personality and Social Psychology, 53, 497-509.

D'Zurilla, T.J. & Goldfried, R. (1971). Problem solving and behavior modification. Journal of Abnormal Psychology, 78, 107-126.

D'Zurilla, T.J. & Nezu, A.M. (1982). Social problem solving in adults. In P.C. Kendall (Ed.), Advances in cognitive-behavioral research and therapy, 1, 201-274. New York: Academic Press.

D'Zurilla, T.J. & Sheedy, C.F. (1991). Relation between social problem-solving ability and subsequent level of psychological stress in college students. Journal of Personality & Social Psychology, 61, 841-846.

Enriquez, V. (1992). From colonial to liberation psychology: The Philippine experience. Philippines: University of the Philippines Press.

Fantuzzo, J.W., Riggio, R.E., Connelly, S., & Dimeff, L.A. (1989). Effects of reciprocal peer tutoring on academic achievement and psychological adjustment: A component analysis. Journal of Educational Psychology, 81, 173-177.

Fischler, GL & Kendall, PC (1984). Social cognitive problem-solving and childhood adjustment: Qualitative and topological analyses. Unpublished manuscript.

Foot, H. & Barron, A. (1990). Friendship and task management in children's peer tutoring. Educational Studies, 16, 237-250.

Garton, A.F. & Renshaw, P.D. (1988). Linguistic processes in disagreements occurring in young children's dyadic problem solving. British Journal of Developmental Psychology, 6, 275-284.

Gesten, E.L., Weissberg, R.P., Amish, P.L., & Smith, J.K. (1987). Social problem-solving training: A skills-based approach to prevention and treatment. In C.A. Maher & Zins, J.E. (Eds.), Psychoeducational interventions in the schools: Methods and procedures for enhancing student competence, 26-45. New York: Pergamon Press.

Gittelsohn, J. (1991). Opening the box: Intrahousehold food allocation in rural Nepal. Social Science and Medicine, 33, 1141-1154.

Glatthaar, I.I., Fehrsen, G.S., Irwig, L.M., & Reinach, S.G. (1986). Protein-energy malnutrition: The role of nutrition education in rehabilitation. Human Nutrition: Clinical Nutrition, 40C, 271-285.

Gomez, F., Ramos, R., Frenk, S., Cravioto, J., Chavez, R., & Vazquez, J. (1956). Mortality in second and third degree malnutrition. Journal of Tropical Pediatrics, 2, 77.

Goodburn, E., Ebrahim, G., & Senapati, S. (1990). Strategies educated mothers use to ensure the health of their children. Journal of Tropical Pediatrics, 36, 235-239.

Gottman, J.M. (1983). How children become friends. Monographs of the Society for Research in Child Development, 48, 1-81.

Grantham-McGregor, S.M., Powell, C.A., Walker, S.P., & Himes, J.H. (1991). Nutritional supplementation, psychosocial stimulation, and mental development of stunted children: the Jamaican Study. Lancet, 338, 1-5.

Guldan, G., Zeitlin, M., Beiser, A., Super, C., Gershoff, S., & Datta, S. (1993). Maternal education and child feeding practices in rural Bangladesh. Social Science and Medicine, 36, 925-935.

Guptill, K.S., Esrey, S.A., Oni, G.A., & Brown, K.H. (1993). Evaluation of a face-to-face weaning food intervention in Kwara State, Nigeria: knowledge, trial, and adoption of a home-prepared weaning food. Social Science and Medicine, 36, 665-672.

Gussler, J.D. & Mock, N. (1983). A comparative description of infant feeding practices in Zaire, the Philippines and St. Kitts-Nevis. Ecology of Food and Nutrition, 13, 75-85.

Gussow, J.D. & Contento, I. (1984). Nutrition education in a changing world. In G.H. Bourne (Ed.), World Review of Nutrition and Dietetics, 44, 1-56.

Guthrie, G.M., Guthrie, H.A., Fernandez, T.L., & Estrera, N. (1980). Maintenance and termination of breast feeding in rural and urban Philippine communities. Ecology of Food and Nutrition, 10, 35-43.

Harkins, (1987). Social loafing and social facilitation. Journal of Experimental Social Psychology, 23, 1-18.

Hartup, W.H. (1983). Peer relations. In P.H. Mussen (Ed.), Handbook of child psychology, 4, 103-196. New York: John Wiley & Sons.

Health and Welfare Canada (1986). How to feed your baby. Ottawa: Canadian Government Publishing Centre.

Heppner, P.P. & Krauskopf, C.J. (1987). An information-processing approach to personal problem solving. The Counseling Psychologist, 15, 371-447.

Hill, G.W. (1982). Group versus individual performance: Are N + 1 heads better than one? Psychological Bulletin, 91, 517-539.

Hubley, J. (1993). Communicating health. London: The Macmillan Press, Ltd.

Jelliffe, D.B. (1968). Infant nutrition in the subtropics and tropics. Geneva: World Health Organization.

Johnson, D., Johnson, R., & Skon, L. (1979). Student achievement on different types of tasks under cooperative, competitive, and individualistic conditions. Contemporary Educational Psychology, 4, 99-106.

Johnson, D.W., Johnson, R.T., Stanne, M.B., & Garibaldi, A. (1989). Impact of group processing on achievement in cooperative groups. Journal of Social Psychology, 130, 507-516.

Johnson, D.W., Johnson, R.T., & Taylor, B. (1993). Impact of cooperative and individualistic learning on high-ability students' achievement, self-esteem, and social acceptance. Journal of Social Psychology, 133, 839-844.

Keller, W. & Fillmore, C.M. (1983). Prevalence of protein-energy malnutrition, World Health Statistics Quarterly, 36, 129-167.

Krasnor, and Rubin, (1983). Preschool social problem solving: Attempts and outcomes in naturalistic interaction. Child Development, 54, 1545-1558.

Ladd, G. & Emerson, E. (1984). Shared knowledge in children's friendships. Developmental Psychology, 20, 932-940.

Lambert-Lagace, L. (1982). Feeding your child. Toronto: General Publishing.

_____ (1991). Feeding your baby. Chicago, Illinois: Surrey Books.

Latham, M.C. (1983). The control of Vitamin A deficiency and xerophthalmia in the Philippines. In D.S. McLaren (Ed.,) Nutrition in the community. New York: John Wiley & Sons Ltd.

Laughlin, P.R. & Jaccard, J.J. (1975). Social facilitation and observational learning of individuals and cooperative pairs. Journal of Personality and Social Psychology, 32, 873-879.

McCann, M.F. & Bender, D.E. (1992). Maternal and infant feeding practices in rural Bolivia. Bulletin of the Pan American Health Organization, 26, 148-156.

Meacham, J., & Emont, N. (1989). The interpersonal basis of everyday problem solving. In J. Sinnott (Ed.), Everyday problem solving. New York: Praeger.

Mugny, G. & Doise (1978). Socio-cognitive conflict and structure of individual and collective performances. European Journal of Social Psychology, 8, 181-192.

Nadler, A. Fisher, J.D., and Itzhak, S.B. (1983). With a little help from my friend: Effect of single or multiple act aid as a function of donor and task characteristics. Journal of Personality and Social Psychology, 44, 310-321.

Nelson & Aboud, F.A. (1985). The resolution of social conflict between friends. Child Development, 56, 1009-1017.

Newell, A. & Simon, H. (1972). Human problem solving. Englewood Cliffs, New Jersey: Prentice-Hall.

O'Donnell, A.M. & Dansereau, D.F. (1992). Scripted cooperation in student dyads: A method for analyzing and enhancing academic learning and performance. In R. Hertz-Lazarowitz & N. Miller (Eds.,), Interaction in cooperative groups. Cambridge University Press.

Oni, G., Brown, K., Bentley, M., Dickin, K., Kayode, B. & Alade, I. (1991). Feeding practices and prevalence of hand-feeding of infants and young children in Kwara State, Nigeria. Ecology of Food and Nutrition, 25, 209-219.

Osborn, A.F. (1963). Applied imagination: Principles and procedures of creative problem-solving. New York: Scribner's.

Paulus, P.B., Dzindolet, M.T., Poletes, G., & Camacho, L.M. (1993). Perception of performance in group brainstorming: The illusion of group productivity. Personality and Social Psychology Bulletin, 19, 78-89.

Phelps, E. & Damon, W. (1989). Problem solving with equals: Peer collaboration as a context for learning mathematics and spatial concepts. Journal of Educational Psychology, 81, 639-646.

Philippine Department of Health (1992). Weight-for-age table: Preschool children, both sexes (for rapid screening). Reprinted from Weight and height growth tables and charts for Filipino children. FNRI-PPS Reference Standards by the Nutrition Service.

Philippine National Nutrition Council. (1976). Nutrition Fact Sheets. Metro Manila: Nutrition Center of the Philippines.

_____ (1992). Nutrition interventions. Metro Manila: National Nutrition Council.

Pipes, P.L. (1977). Nutrition in infancy and childhood. St. Louis: The C.V. Mosby Company.

Raman Kutty, V. (1989). Women's education and its influence on attitudes to aspects of child-care in a village community in Kerala. Social Science & Medicine, 29, 1299-1303.

Rankins, J., Maloney, M.A., Rainford, K., & Hopkins, M. (1990). A comparative report on rehabilitation interventions and undernutrition outcomes in 12-35 month olds in Jamaica. Journal of Nutrition Education, 22, 39-46.

Ruel, M.T., Habicht, J.P., Pinstrup-Andersen, P., & Grohn, Y. (1992). The mediating effect of maternal nutrition knowledge on the association between maternal schooling and child nutritional status in Lesotho. American Journal of Epidemiology, 135, 904-914.

Shure, M.B. and Spivack, G. (1978). Problem-solving techniques in childrearing. San Francisco: Jossey-Bass.

Sigman, M., Neumann, C., Baksh, M., Bwibo, N., & McDonald, M.A. (1989). Relationship between nutrition and development in Kenyan toddlers. Journal of Pediatrics, 357-364.

Simon, H.A. (1956). Rational choice and the structure of the environment. Psychological Review, 63, 129-138.

_____ (1973). The structure of ill structured problems. Artificial Intelligence, 4, 181-201.

Sivaramakrishnan, M. & Patel, V.L. (1993). Relationship between childhood diseases and food avoidances in rural South India. Ecology of Food and Nutrition, 31, 101-114.

Slavin, R.E. (1990). Cooperative learning: Theory, research and practice. Englewood Cliffs, New Jersey: Prentice Hall.

Spock, B. (1976). Baby and child care. New York: Pocket Books.

Super, C.M., Herrera, M.G., Mora, J.O. (1990). Long-term effects of food supplementation and psychosocial intervention on the physical growth of Colombian infants at risk of malnutrition. Child Development, 61, 29-49.

Tabachnick, B.G. & Fidell, L.S. (1989). Using multivariate statistics. New York: Harper Collins, Publishers.

Thornburg, T.H. (1991). Group size and member diversity influence on creative performance. Journal of Creative Behavior, 25, 324-333.

Torrance, E.P. (1970). Influence of dyadic interaction on creative functioning. Psychological Reports, 26, 391-394.

Tudge, J.R.H. (1992). Processes and consequences of peer collaboration: A Vygotskian analysis. Child Development, 63, 1364-1379.

UNESCO (1986). Health education intervention: An annotated bibliography. Nutrition education series. Issue 13. Paris: United Nations Education Program.

UNICEF (1989). Facts for life. New York: UNICEF House.

_____ (1993). Progress of Nations. New York: UNICEF House.

_____ (1994). State of the World's Children, 1993. London: Oxford University Press.

Valenzuela, M. (1990). Attachment in chronically underweight young children. Child Development, 61, 1984-1996.

Wachs, T., Sigman, M., Bishry, Z., Moussa, W., Jerome, N., Neumann, C., Bwibo, N., & McDonald, A. (1992). Caregiver child interaction patterns in two cultures in relation to nutritional intake. International Journal of Behavioral Development, 15, 18.

Wallerstein, N. & Bernstein, E. (1994). Introduction to community empowerment, participatory education, and health. Health Education Quarterly, 21, 141-148.

Waterlow, J.C. (1992). Protein energy malnutrition. London: Edward Arnold.

Werner, D. & Bower, B. (1991). Helping health workers learn. Palo Alto, California: Hesperian Foundation

WHO (1978). A growth chart for international use in maternal and child health care. Guidelines for primary health care personnel. Geneva: World Health Organization.

_____ (1983). Measuring change in nutritional status. Geneva: World Health Organization.

_____ (1988). Education for health:A manual on health education in primary health care. Geneva.

Winikoff, B. & Laukaran, V. (1989). Breast feeding and bottle feeding controversies in the developing world: Evidence from a study in four countries. Social Science and Medicine, 29, 859-868.

Wright, P. (1991). The Acquaintance Description Form. Unpublished manuscript. University of North Dakota.

Vasquez, B., Johnson, D.W., Johnson, R.T. (1993). The impact of cooperative learning on the performance and retention of U.S. Navy air traffic controller trainees. Journal of Social Psychology, 133, 769-783.

Yager, S., Johnson, D.W., & Johnson, R.T. (1985). Oral discussion, group-to-individual transfer, and achievement in cooperative learning groups. Journal of Educational Psychology, 77, 60-66.

Appendix A

Ten Nutrition Problems

1. What is to be done if you find breastfeeding difficult and inconvenient?
2. What should you do when your child asks for more food and you have none left to give them?
3. What is the thing to do if your child frets and won't eat during meals?
4. What should you do if you give food to your child that others say are not nutritious?
5. What is the thing to do if your child is sick and needs medical help but you are advised by your elders to use traditional/folk medicine?
7. What should you do when your child asks for junk food and you have no nutritious alternative to offer?
8. What should you do if your child is old enough to feed him/herself but refuses to do so?
9. What is to be done if you want to grow vegetables in your backyard but your husband does not support your idea?
10. What should you do if other family members are bothered by your child's fussy behavior during meals?

Appendix B

Mean Number (and Standard Deviations) of Solutions Pre- and Post-Discussion for Odd-numbered Subsample (n=37)

Item/Time	Mutual	Unilateral	Total
AGREE ITEM	1.9 (0.7)	1.5 (0.8)	1.7 (0.8)
Pre	1.4 (0.7)	1.3 (0.8)	1.3 (0.7)
Post	2.5 (1.3)	1.8 (1.0)	2.1 (1.2)
DISAGREE ITEM	1.8 (0.7)	1.4 (0.5)	1.6 (0.6)
Pre	1.6 (0.8)	1.2 (0.6)	1.4 (0.7)
Post	2.1 (0.9)	1.7 (0.8)	1.9 (0.8)
MEAN PER ITEM	1.9 (0.4)	1.5 (0.5)	1.7 (0.5)
Pre	1.5 (0.5)	1.2 (0.5)	1.4 (0.5)
Post	2.3 (0.8)	1.8 (0.7)	2.0 (0.8)

Appendix C

Mean Number (and Standard Deviations) of Solutions Pre- and Post-Discussion for Even-numbered Subsample (n=37)

	Mutual	Unilateral	Total
AGREE ITEM	1.9 (0.7)	1.3 (0.7)	1.7 (0.8)
Pre	1.4 (0.8)	1.3 (0.9)	1.3 (0.9)
Post	2.6 (1.4)	1.4 (0.8)	1.9 (1.3)
DISAGREE	1.6 (0.5)	1.4 (0.5)	1.5 (0.5)
Pre	1.4 (0.8)	1.2 (0.6)	1.3 (0.7)
Post	1.8 (0.6)	1.7 (0.6)	1.8 (0.6)
BOTH ITEMS	1.8 (0.4)	1.4 (0.5)	1.6 (0.5)
Pre	1.4 (0.6)	1.2 (0.6)	1.3 (0.6)
Post	2.2 (0.8)	1.5 (0.5)	1.9 (0.7)

Newman-Keuls post hoc results:	Q	p
Mutual-Agree-Pre vs. Mutual-Agree-Post	6.4	.01
Unilateral-Agree-Pre vs. Unilateral-Agree-Post		ns
Mutual-Disagree-Pre vs. Mutual-Disagree-Post		ns
Unilateral-Disagree-Pre vs. Unilateral-Disagree-Post		ns

Appendix D

Mean Number (and Standard Deviations) of Final Best Solutions by Time Source (top) and Person Source (bottom) for Odd-Numbered Mothers

Item/Time	Mutual	Unilateral	Total
AGREE ITEM	2.5 (1.3)	1.8 (1.0)	2.1 (1.2)
Before	0.8 (0.8)	0.6 (0.8)	0.7 (0.8)
During	1.0 (1.3)	0.6 (0.8)	0.8 (1.1)
After	0.6 (1.0)	0.6 (0.8)	0.6 (0.9)
DISAGREE ITEM	2.1 (0.9)	1.7 (0.8)	1.9 (0.8)
Before	0.8 (0.8)	0.5 (0.5)	0.6 (0.7)
During	0.7 (0.8)	0.7 (0.6)	0.7 (0.7)
After	0.6 (0.6)	0.6 (0.7)	0.6 (0.6)
MEAN PER ITEM	2.3 (0.8)	1.8 (0.7)	2.0 (0.8)
Before	0.8 (0.6)	0.6 (0.5)	0.7 (0.6)
During	0.9 (0.8)	0.6 (0.6)	0.8 (0.7)
After	0.6 (0.5)	0.6 (0.6)	0.6 (0.5)
AGREE: Self	2.0 (1.0)	1.7 (1.0)	1.8 (1.0)
Partner	0.5 (1.0)	0.1 (0.2)	0.3 (0.8)
DISAGREE: Self	0.9 (0.7)	1.1 (0.8)	1.0 (0.8)
Partner	0.5 (0.6)	0.1 (0.3)	0.3 (0.5)
BOTH ITEMS			
Self	1.4 (0.5)	1.4 (0.7)	1.4 (0.6)
Partner	0.5 (0.6)	0.1 (0.3)	0.3 (0.5)

Appendix E

Mean Number (and Standard Deviations) of Final Best Solutions by Time Source (top) and Person Source (bottom) for Even-Numbered Mothers

	Mutual	Unilateral	Total
AGREE ITEM	2.6 (1.4)	1.4 (0.8)	2.0 (1.2)
Before	0.6 (0.7)	0.5 (0.6)	0.5 (0.6)
During	1.2 (0.9)	0.4 (0.5)	0.8 (0.8)
After	0.8 (0.9)	0.5 (0.7)	0.6 (0.8)
DISAGREE ITEM	1.8 (0.6)	1.7 (0.6)	1.8 (0.6
Before	0.6 (0.7)	0.3 (0.5)	0.5 (0.6)
During	0.8 (0.9)	0.9 (0.5)	0.9 (0.7)
After	0.3 (0.6)	0.4 (0.8)	0.4 (0.7)
BOTH ITEMS	2.2 (0.8)	1.5 (0.6)	1.9 (0.7)
Before	0.6 (0.6)	0.4 (0.4)	0.5 (0.5)
During	1.0 (0.8)	0.7 (0.4)	0.8 (0.7)
After	0.6 (0.5)	0.5 (0.6)	0.5 (0.6)
AGREE: Self	2.3 (1.1)	1.3 (0.9)	1.8 (1.1)
Partner	0.3 (0.7)	0.1 (0.3)	0.2 (0.6)
DISAGREE: Self	1.6 (0.7)	1.2 (0.7)	1.4 (0.7)
Partner	0.2 (0.4)	0.4 (0.5)	0.3 (0.5)
BOTH ITEMS			
Self	2.0 (0.6)	1.2 (0.6)	1.6 (0.7)
Partner	0.2 (0.4)	0.3 (0.3)	0.3 (0.4)

Appendix F

Mean Frequencies of 18 Discussion Codes

Agree item

Variable	Mean	SD	Range	F Value	Group	
					Mutual	Unilateral
Number of solutions	3.0		0-15	5.25*	3.5	2.4
Solutions in response to questions	.1		0-4	2.44	.2	.0
Own solutions repeated	.4		0-3	4.45*	.6	.2
Other's solutions repeated	.4		0-3	2.20	.5	.2
Elaborations of own solutions	2.2		0-11	.04	2.3	2.3
Elaborations of other's solutions	.7		0-7	1.88	.9	.5
Elaborations in reponse to questions	.04		0-1	.40	.03	.06
Repetition of own elaborations	.1		0-	24.71*	.2	0
Repetition of other's elaborations	.1		0-2	0.5	.1	.2
Positive evaluation	.6		0-10	1.0	.8	.4
Agreement in response to questions	0	0	0	0	0	0
Negative evaluation	.05		0-1	0	.05	.1
Disagreement in response to questions	.01		0-1	.95	.03	0

Appendix F (continued)
Mean Frequencies of 18 Discussion Codes

Variable	Mean	SD	Range	F Value	Group	
					Mutual	Unilateral
Information-seeking questions	.3		0-6	2.84	.40	.1
Agreement-seeking questions	.03		0-1	1.95	.05	0
Restated problems	.1		0-1	3.20	.03	.1
Elaborated problems	.9		0-9	2.75	1.2	.5
Denied problems	.05		0-1	1.16	.03	.1

Disagree Item

Variable	Mean	SD	Range	F Value	Group	
					Mut.	Uni.
Number of solutions	2.7		0-18	0.84	2.8	2.47
Solutions in response to questions	0.14		0-3	1.58	0.21	0.06
Own solutions repeated	0.78		0-7	7.63**	1.21	0.33
Other's solutions repeated	0.68		0-3	0.01	0.68	0.67
Elaborations of own solutions	2.16		0-10	0.05	2.21	2.11
Elaborations of other's solutions	0.88		0-5	0.22	0.82	0.94
Elaborations in response to questions	0.01		0-1	1.06	0	0.03
Repetition of own elaborations	0.19		0-5	0.06	0.21	0.17

Appendix F (continued)
Mean Frequencies of 18 Discussion Codes
Disagree Item

Variable	Mean	SD	Range	F Value	Group	
					Mut.	Uni.
Rèpetition of other's elaboration	0.15		0-2	0.80	0.10	0.19
Positive evaluation	0.54		0-3	1.17	0.63	0.44
Agreement in response to question	0.01		0-1	1.06	0	.03
Negative evaluation	0.05		0-1	0.93	0.34	0.03
Disagreement in response to question	0		0	0	0	0
Information-seeking question	0.23		0-4	6.13*	0.39	0.06
Agreement-seeking question	0.08		0-2	1.54	0.13	0.03
Restated problem	0.16		0-3	0.66	0.21	0.11
Elaboration of restated problem	0.90		0-8	0.52	1.05	0.75
Denial or problem	0.27		0-5	1.13	0.37	0.17

Appendix G
Nutrition Knowledge Test

Name _____
Residence _____
Date _____

1. What nutrient is provided to your children by
   - rice _____
   - fish _____
   - meat _____
   - vegetables _____
   - fruits _____
   - root crops _____
   - milk _____
   - oils _____

2. What health problems arise if you don't eat each?
   - rice _____
   - fish _____
   - meat _____
   - vegetables _____
   - fruits _____
   - root crops _____
   - milk _____
   - oils _____

3. List 3 signals that tell you your child is hungry/full.

	Hungry	Full
1)	_____	_____
2)	_____	_____
3)	_____	_____

4. How should you respond to your child's signals of hunger or fullness?

	Response to hungry child	Response to full child
1)	_____	_____
2)	_____	_____
3)	_____	_____

5. What is your child's
   - weight _____
   - height _____
   - arm circumference _____

6. What benefits do you and your child derive from preparing/eating home-made snacks?

	You	Your child
1)	_____	_____
2)	_____	_____
3)	_____	_____

7. Should children below 3 be allowed to eat by themselves?
   Yes _____ No _____
   Why?_____
   Why not?_____

8. List 3 things that you should do to train your child to eat by him/herself.
   1) _____
   2) _____
   3) _____

9. What benefits could your child derive by being allowed to eat by him/herself?

10. List 3 ways to encourage your child to eat vegetables, fruits, and root crops.
    1) _____
    2) _____
    3) _____

11. How do you know if a fussy eater is sick and what would you do?

Appendix H
Materials for Four Nutrition Education Sessions: Problem-Solving, Quiz, Self-Report of Practices, and Information

MEALS
PROBLEM-SOLVING SHEET

INSTRUCTIONS: Today you and your partner will discuss the topic on MEALS. Below are three problems that may be relevant to you, your partner, or to both of you. Please read each one carefully. Write down <u>your</u> specific problem in your own words. Write the initials of the partner(s) who has this problem, and then discuss and write down how you think you could solve the problem. If you and your partner can identify a problem that is not listed here, you may discuss it as well. There is enough space on this sheet for you to write down your specific problems and their corresponding solutions.

A. Suggested Problems

1. What problems do you have with giving nutritious food that you can easily find and/or pay for?

2. What problems do you have with giving nutritious food that adults will like and children will like?

3. Are there foods that you like to give to your child but which other people say are not nutritious?

PROBLEMS	WHOSE PROBLEM	SOLUTIONS
1.		
2.		
3.		

* Is there any way by which one or both of you could help the other in bringing about the solutions?

MEALS
SELF-REPORT SHEET

INSTRUCTIONS: Please fill in the necessary information every day for one week. You are to fill this up on your own. We will get it back from you a week from today.

Every other day, please indicate the number of times that you have given each of these to your child:

MILK (day after tomorrow)

Day 2 _____

Day 4 _____

Day 6 _____

RICE (day after tomorrow)

Day 2 _____

Day 4 _____

Day 6 _____

FISH & MEAT (day after tomorrow)

Day 2 _____

Day 4 _____

Day 6 _____

VEGETABLES, FRUITS, ROOT CROPS (day after tomorrow)

Day 2 _____

Day 4 _____

Day 6 _____

MEALS
QUIZ SHEET

INSTRUCTIONS: Please answer these questions as soon as you and your partner have discussed the problems on meals. We will get this back the day after your meeting.

1. What did your child eat/drink at yesterday's lunch? How many bowls/cups did your child eat?

rice ____	fish ____	chicken ___
milk ____	meat ____	vegetables ___
fruits ____	eggs ____	

2. How did you procure food for yesterday's lunch? (If other, please specify).

1) Rice
   a. bought ___
   b. cultivated ___
   c. given ___
   d. borrowed (?) ___

2) Fish
   a. bought ___
   b. cultured ___
   c. given ___
   d. caught ___

3) Meat
   a. bought ___
   b. raised ___
   c. given ___

4) Vegetables
   a. bought ___
   b. grown ___
   c. given ___
   d. asked for ___

5) Fruits
   a. bought ___
   b. grown ___
   c. given ___
   d. asked for ___

6) Root crops
   a. bought ___
   b. grown ___
   c. given ___
   d. asked for ___

7) Milk

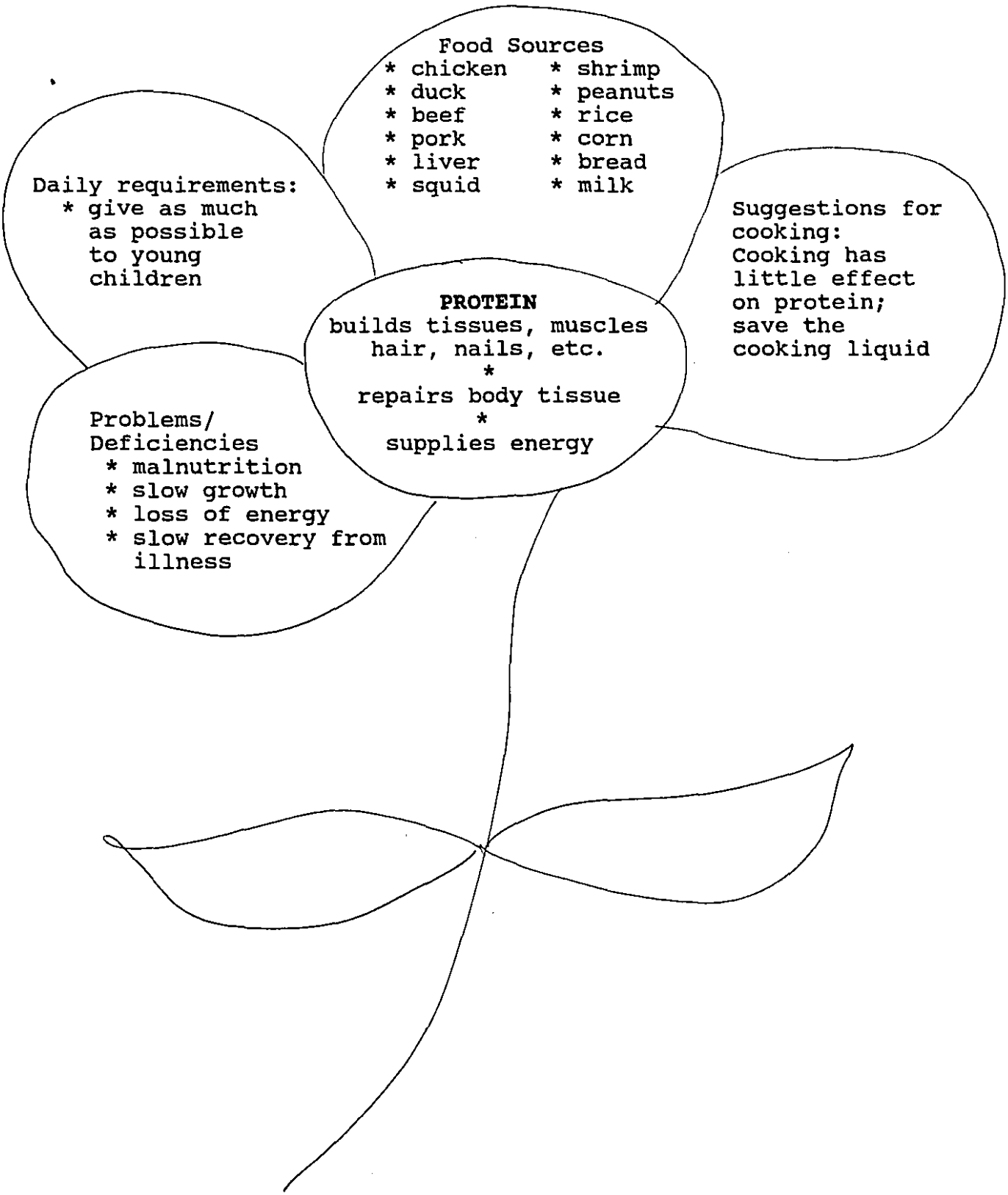
a. bought ___
b. given ___
c. asked for ___

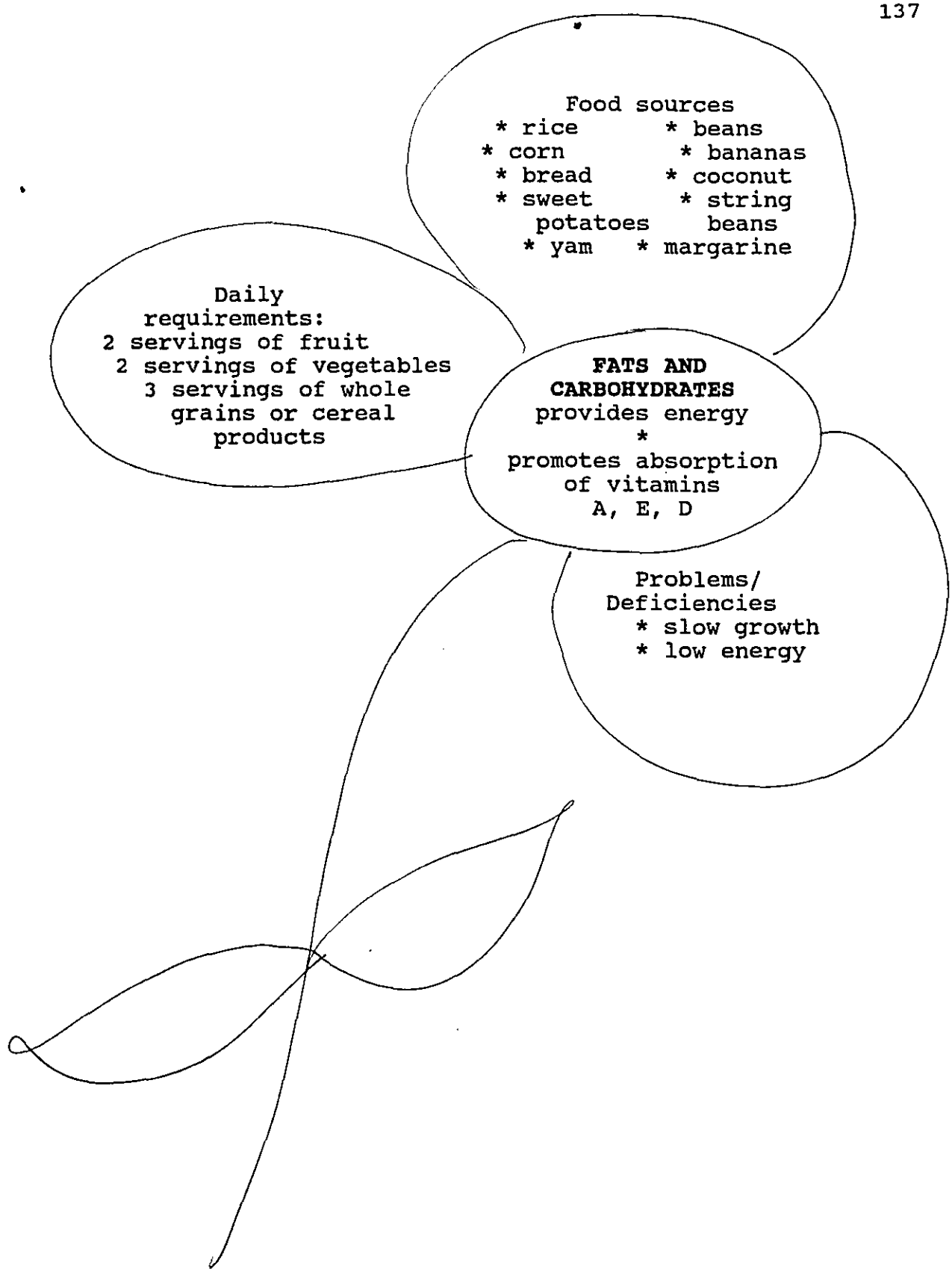
6. What types of food or food additives can you add or eliminate from your child's diet?

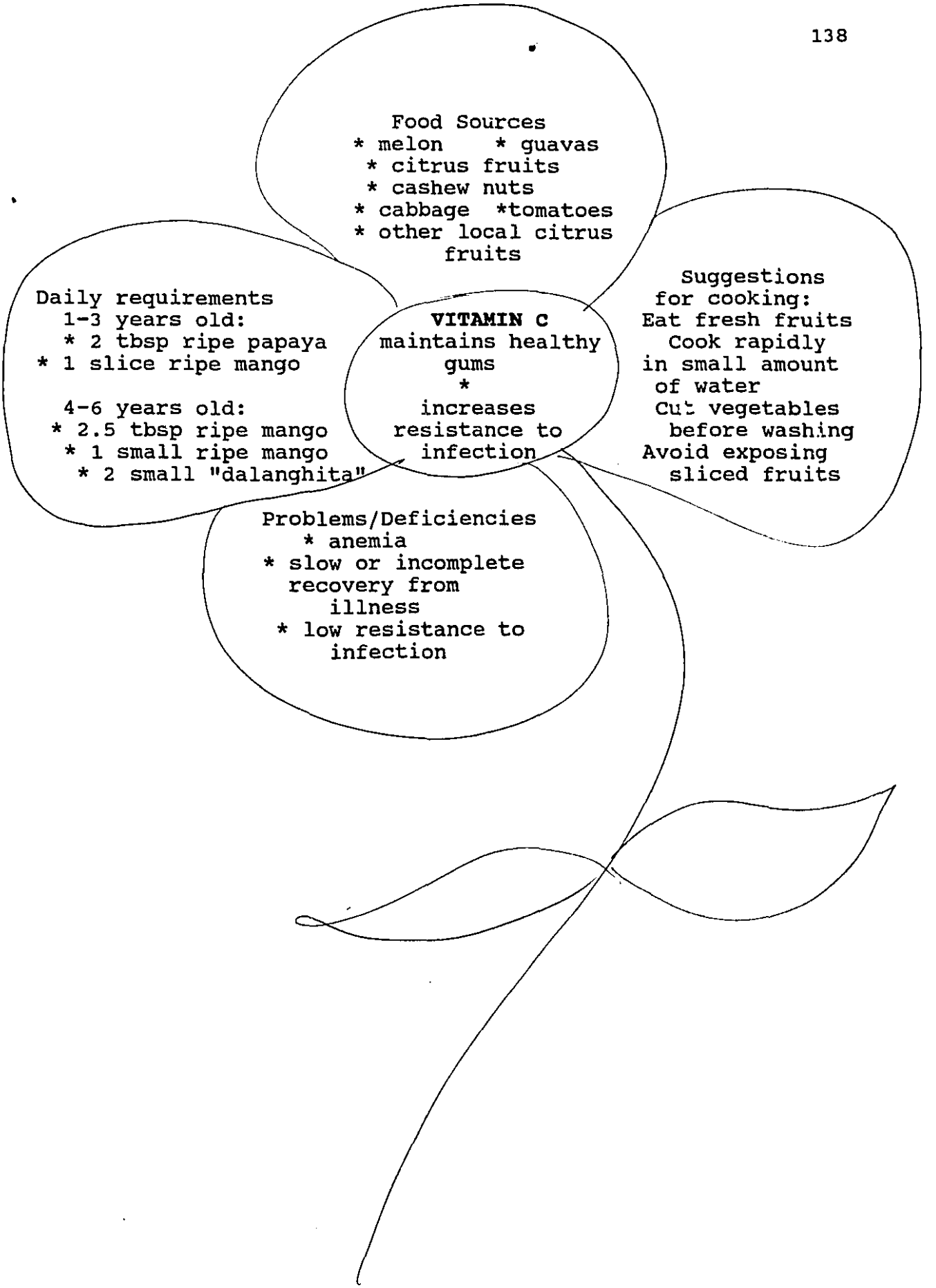
7. What nutrients do your child get from each of these foods? What problems are prevented when your child eats these foods?

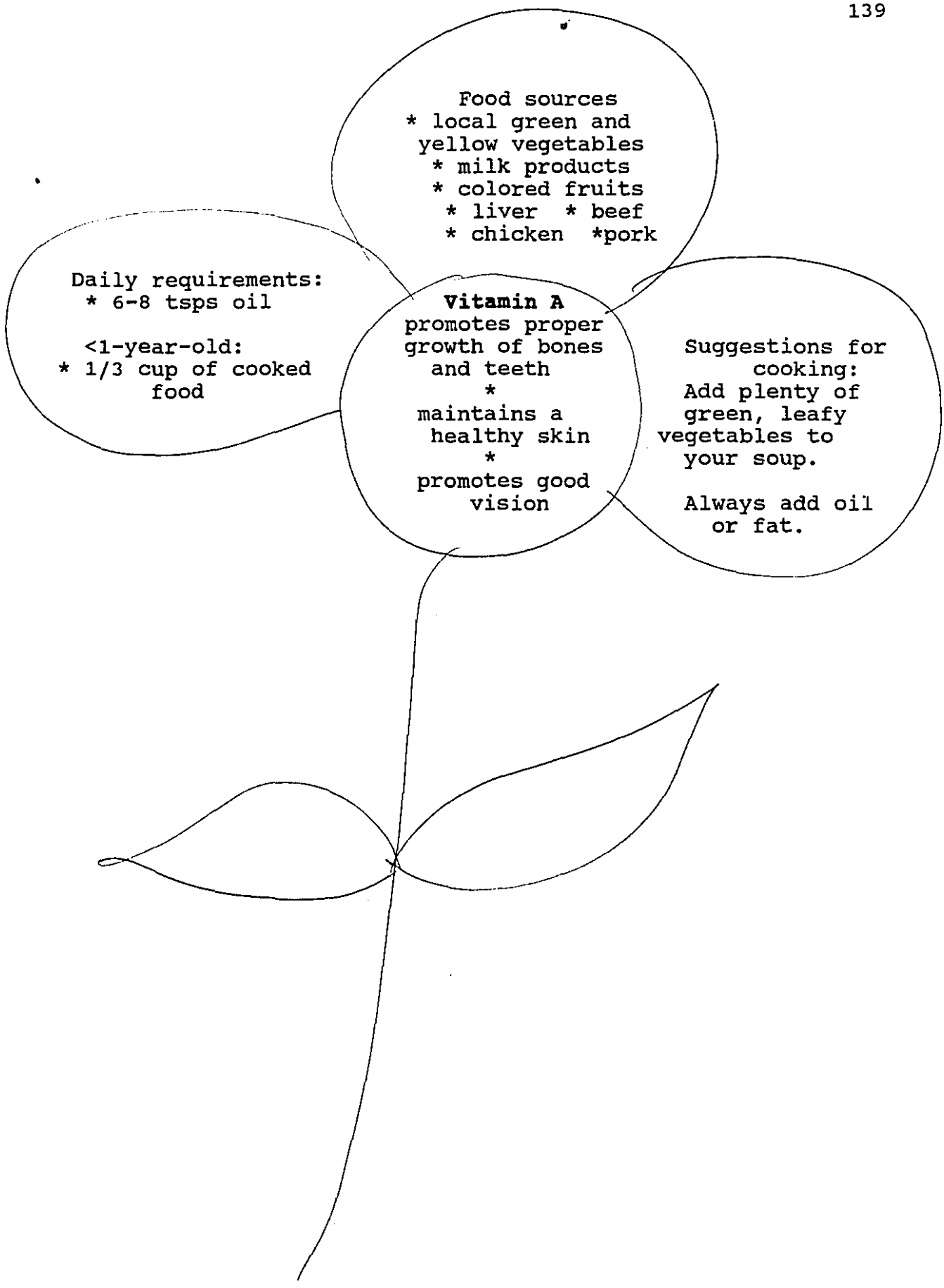
	Nutrients	Problems Prevented
Rice		
Fish		
Milk		
Fruits		
Vegetables		
Oil		

MEALS
INFORMATION SHEET




Food sources
* rice
* beans
* corn
* bananas
* bread
* coconut
* sweet potatoes
* string beans
* yam
* margarine
Daily requirements:
2 servings of fruit
2 servings of vegetables
3 servings of whole grains or cereal products
FATS AND CARBOHYDRATES
provides energy
*
promotes absorption of vitamins
A, E, D
Problems/ Deficiencies
* slow growth
* low energy


Food Sources
* melon * guavas
* citrus fruits
* cashew nuts
* cabbage *tomatoes
* other local citrus fruits
Daily requirements
1-3 years old:
* 2 tbsp ripe papaya
* 1 slice ripe mango
4-6 years old:
* 2.5 tbsp ripe mango
* 1 small ripe mango
* 2 small "dalanghita"
VITAMIN C
maintains healthy gums
*
increases resistance to infection
Suggestions for cooking:
Eat fresh fruits
Cook rapidly in small amount of water
Cut vegetables before washing
Avoid exposing sliced fruits
Problems/Deficiencies
* anemia
* slow or incomplete recovery from illness
* low resistance to infection


Food sources
* local green and yellow vegetables
* milk products
* colored fruits
* liver * beef
* chicken *pork
Daily requirements:
* 6-8 tsps oil
<1-year-old:
* 1/3 cup of cooked food
Vitamin A
promotes proper growth of bones and teeth
*
maintains a healthy skin
*
promotes good vision
Suggestions for cooking:
Add plenty of green, leafy vegetables to your soup.
Always add oil or fat.

SNACKS
PROBLEM-SOLVING SHEET

INSTRUCTIONS: Today you will discuss the problems you have had in giving your children snacks and how you were able to find solutions for them. You are to discuss at least one problem and if there are others which worry you but are not found in the set of questions below, please feel free to take them up in this session. This sheet will be collected the day after your meeting.

Suggested Problems:

1. Is it a problem for you to get nutritious food that your child will like?

2. Is it a problem to make or produce snacks easily without spending money or buying them?

3. Is it a problem to prepare snacks that will not take up a lot of time?

4. Is it a problem for you and your child to be at home for snacks at the right time (i.e., midway between meals)?

5. Is there a problem in leaving snacks for your child if you must leave home temporarily?

	PROBLEMS	WHOSE PROBLEM	SOLUTIONS
1.			
2.			
3.			

* Is there any way that one or both of you can help the other solve these problems?

SNACKS
SELF-REPORT SHEET

INSTRUCTIONS: Please note down the snacks which you have prepared for your children next week and observe your children's behavior during snack time. We will get this sheet from you during the assessment period.

1. Draw up a list of home-made snacks prepared for the week. Please write the nutritious snacks you gave to your child that were home-made and store-bought. Check the ones that are nutritious.

WEEK 1	HOME-MADE	STORE-BOUGHT
Day 2	_____	_____
Day 4	_____	_____
Day 6	_____	_____

2. Does your child eat by him/herself during snack time or do you have to feed him/her?

SNACKS
QUIZ SHEET

INSTRUCTIONS: Please answer the following questions after you have discussed the topic on "Snacks" with your partner. We will collect this sheet from you the day after your meeting.

1. What snacks did you give your child yesterday?

2. What fruits, vegetables, and root crops are good materials for home-made snacks? What preparation is required for each?

		Preparation
Fruits	_____	_____
	_____	_____
	_____	_____
Vegetables	_____	_____
	_____	_____
	_____	_____
Root crops	_____	_____
	_____	_____
	_____	_____

3. What is one new snack that you have not made before but that you can try this week?

4. What time of the day did you give a snack to your child yesterday?

5. What benefits do you get when you prepare home-made snacks as opposed to buying them from the variety store?

6. What benefits do your children derive from eating home-made snacks?

SENSITIVITY AND COMMUNICATION
PROBLEM-SOLVING SHEET

INSTRUCTIONS: Today's topic concerns being sensitive to your child's needs during meals. Please discuss any or all of the following questions. Enough space is provided so you can list down the problems and solutions that you have identified. Remember to write the initial(s) of the partner(s) who experiences the problem.

A. Suggested Problems

1. How do you know the right amount of food for your children?

2. Can you give seconds to your child? How do you know when to give seconds to your children? How much do you give?

3. How much do you and your child talk about food? What are the problems that arise when your child talks to you in the middle of a meal?
   a. Does your child request for food?
   b. Do you ask your child questions such as, "Do you want more?"
   c. What are your problems in talking to your child about food? Do they ask for more and you prefer otherwise?

PROBLEMS	WHOSE PROBLEM	SOLUTIONS
1.		
2.		
3.		

* Is there any way by which one or both of you could help the other in talking to your child about food and understanding your child's wishes about food?

SENSITIVITY AND COMMUNICATION
SELF-REPORT SHEET

INSTRUCTIONS: Please tick off the behaviors which you and your child will engage in for this week. We will get this sheet from you a week from today.

DID YOUR CHILD FEED HIM/HERSELF TODAY?

	No. of times
Day 1	_____
Day 2	_____
Day 3	_____
Day 4	_____
Day 5	_____
Day 6	_____

DID YOU QUESTION YOUR CHILD FOR MORE FOOD?

	No. of times
Day 1	_____
Day 2	_____
Day 3	_____
Day 4	_____
Day 5	_____
Day 6	_____

DID YOUR CHILD REQUEST FOR MORE FOOD?

	No. of times
Day 1	_____
Day 2	_____
Day 3	_____
Day 4	_____
Day 5	_____
Day 6	_____

WHAT HAPPENED WHEN YOUR CHILD WANTED MORE FOOD?

	Response	
	# of times you gave your child	# times you didn't give
Day 1	_____	_____
Day 2	_____	_____
Day 3	_____	_____
Day 4	_____	_____
Day 5	_____	_____
Day 6	_____	_____

SENSITIVITY AND COMMUNICATION
QUIZ SHEET

INSTRUCTIONS: Please answer this sheet as soon as you and your partner have discussed your problems and solutions on the topic, "Sensitivity and Communication."

1. How do you know that your child is hungry?

2. How do you know that your child is full?

3. How can you tell when your child is not eating well?

4. Where is the child seated during meals?

5. Does the child feed him/herself or is he/she fed by an adult or an older sibling?

6. What are the signals the the child gives off when he/she wants food?

7. How do you respond to your child's signals for food?

8. What are the steps that you can take to read your children's signals better or to respond more quicly to them?

9. What can you do or say
   to a child who is not eating any of the meal? _____
   to a child who eats only some of the meal? _____
   to a child who has finished his bowlful? _____

SIMPLIFIED INFO SHEET
SENSITIVITY AND COMMUNICATION

- HOW MUCH FOOD SHOULD I SERVE MY CHILD?
  - It has been found over the years that it is always wise to serve a child less than he or she may eat rather than more.
  - When children are presented with less than they want, they are allowed to accomplish the goal that the adult has set; they can then ask for a second helping.

- WHAT SHOULD I DO IF MY CHILD CANNOT EAT ALL THE FOOD THAT I HAVE GIVEN TO HIM/HER?
  - Allow your child to set his/her own limit. It shows that you respect his/her choice as well as making him/her feel that he/she has been successful.
  - However, when any child restricts his/her food intake to much less than expected over a number of days, this merits investigating.

- HOW DO I KNOW WHEN MY CHILD IS FULL?
  - You will know that your child is full when he/she:
    1. starts to climb and play instead of eat.
    2. refuses to open his/her mouth.
    3. plays with food or utensils.
    4. averts his/her gaze, looks down or turns away during feeding.
    5. actively resists food that you offer.
    6. demonstrates satisfaction at the end of feeding through sleep facial expressions, decreased muscle tone, arms extended along side, vocalizations or change in activity level or mood.

  - Among babies, feeding can be considered adequate if:
    1. The infant is satisfied at the end of 15-20 minutes' feeding time.
    2. He falls asleep promptly after each feeding and sleeps for three to four hours.
    3. He gains weight satisfactorily from week to week: 150-240 grams per week in the first five months, 120-150 grams per week for the remainder of the year.

- WHAT ARE SOME INDICATIONS THAT MY CHILD IS NOT EATING WELL?
  - He/she cannot finish his/her usual portion.
  - He/she loses weight.
  - He/she is less energetic.

- WHERE DO I SEAT MY CHILD DURING MEALS?
  - In order to best observe how your child eats or reacts to hunger and satiety cues, it is suggested that you seat your child where you can see him/her. The face-to-face position can be foster better feeding behavior since you are able to see your child's actions.
  - If you seat your child on your lap, make sure that you are seated close enough to the table so your child can reach out for food that he/she wants.
  - While it is alright to make sure that your child is seated securely on your lap, you must allow him/her to move his/her arms so he/she can self-feed.

- HOW DO I KNOW IF MY CHILD WANTS FOOD OR A SECOND HELPING?
  - An older child may ask for food, may demand a second helping, or complain that he/she is hungry.
  - When a younger child is hungry, he/she may engage in any of these:
    - cries
    - frets
    - looks in the direction of table
    - shows change in level of motor activity within 5 seconds of being handled or repositioned by parent
    - does not turn away or avert gaze from parent during the first half of feeding.

- HOW DO I RESPOND TO MY CHILD'S SIGNALS FOR FOOD?
  - Serve small portion at the start of the meal.
  - Give seconds on demand.
  - Praise child for eating well.
  - No bribes.

- WHAT CAN I DO IF MY CHILD IS NOT EATING ANY OF THE MEAL OR WHO EATS ONLY SOME OF THE MEAL?
  - Serve small portions at the hungriest time of day.
  - If he/she has a really small appetite, serve her miniature portions: 1 teaspoonful of meat, 1 teaspoonful of vegetable, 1 teaspoonful of rice. When she finishes, don't say, "Do you want some more?" Let her ask, even if it takes several days of miniature portions to give her the idea.
  - If your child refuses to eat, take the food away after some time but give him/her the chance to decide whether to eat or not.
  - Observe your child's physical well-being and daily habits. Poor appetite may be due to infections, lack of brisk exercise in the open air and sleep, or an irregular diet pattern.

- Provide a stimulating environment for your child.
- Healthy, hungry children will eat well if they are given a calm atmosphere in which to eat.

- WHAT CAN I DO IF MY CHILD FINISHES HIS/HER MEAL?
  - Reward the child:
    - praise
    - allow extra time for play
    - avoid giving sweets as reward

SELF-FEEDING
PROBLEM-SOLVING SHEET

INSTRUCTIONS: Today's topic is on self-feeding (how children learn to eat by themselves). There are 5 problems that you can discuss with your partner. Choose at least one and remember to write down your specific problems and their solutions in the space provided below. We will get this sheet from you the day after your discussion.

Suggested Problems:

1. How can you tell when a child is ready to feed him/herself without waiting till he/she is 3 years old?

2. What steps can you take to get them to feed themselves more and more before 3 years and after?

3. How can you minimize waste while training your child to eat by him/herself?

4. How can you train a child to eat rice?

5. How would you react to your child who asks to be fed even if he/she is old enough to feed him/herself?

PROBLEMS	WHOSE PROBLEM	SOLUTIONS
1.		
2.		
3.		

* Is there a way that one or both of you can help the other to solve these problems?

SELF-FEEDING
QUIZ SHEET

INSTRUCTIONS: Please answer these questions on "Self-feeding" as soon as you have finished discussing your problems and solutions. We will get this from you the day after your meeting.

1. At what age can a child begin to feed him/herself? At what age do you expect your children to feed themselves?

2. What benefits do mothers derive from training children to eat by themselves?

3. What benefits do children derive from learning to eat by themselves?

4. What steps must be taken to ensure that food is not wasted by children under 5?

5. What types of food make it easy for your child to learn to eat by him/herself?

SELF-FEEDING
SELF-REPORT SHEET

INSTRUCTIONS: Thi.s is the monitoring sheet for the topic on "Self-feeding." Please observe your child's behavior during the main meal and record them here. We will get this sheet from you one week after your discussion on "Self-feeding."

1. What did your child do during lunch today?
   a. Ate by him/herself.
   b. Asked to be fed.
   c. Played with food.
   d. Passively sat while being fed.

2. How satisfied were you with what happened?
   a. Very satisfied
   b. Satisfied
   c. Neutral
   d. Not satisfied
   e. Very dissatisfied

	CHILD'S BEHAVIOR	YOUR SATISFACTION OR DISSATISFACTION
Day 1	_____	_____
Day 2	_____	_____
Day 3	_____	_____
Day 4	_____	_____
Day 5	_____	_____
Day 6	_____	_____

SELF-FEEDING
SIMPLIFIED INFORMATION SHEET

- WHY SHOULD I ENCOURAGE MY CHILD TO FEED HIMSELF?
  - Self-feeding is a means by which your child learns the following:
    a. independence
    b. manual dexterity
    c. exploration
    d. sensory stimulation
    e. how to listen to its body needs -- it eats when hungry and stops when full.

- HOW DO I ENCOURAGE SELF-FEEDING IN MY CHILD?
  - Allow the infant to spend time feeling the food before tasting. You must be patient and accept this messy feeding phase.
  - Provide finger foods at every meal.
  - Serve him his favorite foods meal after meal and day after day. When you set the dish before him, go back to the kitchen or into the next room for a minute or two, as if you had forgotten something. Come back and feed him cheerfully with no comments, whether or not he has taken anything himself.

- WHEN CAN MY CHILD START TO FEED HIMSELF?
  - At 12 months your child can use his/her hands to eat solid food.
  - At 18 months he/she can drink well from a cup.

- WHAT ARE SAFE FINGER FOODS FOR MY CHILD?
  - bread crusts
  - unsalted soda crackers
  - cooked vegetable pieces
  - pieces of soft ripe fruit such as the banana & papaya
  - pieces of cooked fruit
  - pieces of cooked meat and poultry & fish
  - rice rolled into small balls

- WHAT STEPS DO I TAKE TO AVOID WASTING FOOD WHILE TRAINING MY CHILD TO SELF-FEED?
  1. Seat your child close to the table so he can reach food. Solids that fall on the table can be put back on his plate.
  2. Prepare finger foods.
  3. Serve soup/liquids in a small cup for your child to drink.
  4. Cover the table with plastic/paper so food can be retrieved easily.
  5. Arrange physical facilities
     a) well-balanced chair
     b) face-to-face position with child
     c) give unbreakable utensils

- WHAT BENEFITS DO I GET IF I TRAIN MY CHILD TO FEED HIMSELF?
  1. You can allot more time for
     a. household chores
     b. other family members
     c. your own leisure
  2. Saves energy. You don't have to supervise or feed your child the whole time during the meal.
  3. Encourages motor and social development of your child.
  4. Allows your child to be independent at an early age.

Appendix I
Group x Time ANOVA Results of 11 Raw Scores

Topics	Time (df=1,107)	Group (df=2,107)	Mean Time 1	Mean Time 2	Maximum score
Benefits	Pre < Post F= 57.51**	-	4.5	6.8	16
Deficiencies	Pre < Post F= 20.63**	Mut=Uni > C F= 6.78**	2.4	3.5	16
Hungry signals & responses	Pre < Post F= 6.07**	Mut=Uni > C F= 3.31*	3.9	4.3	10
Full signals & responses	-	Mut=Uni > C F= 4.62**	3.9	3.4	10
Sick signals & responses	-	-	2.3	2.5	10
Snacks	-	-	3.2	3.0	10
Self-feeding	Pre < Post F= 15.22**	-	4.7	5.4	10
Encourage vegetables	Pre < Post F= 47.55**	-	1.3	2.3	5
Estimate of wt &/or ht	Pre < Post F= 11.79**	-	0.3	0.5	1
Accuracy in wt estimate	Pre < Post F= 5.27*	-	0.1	0.3	1
Accuracy in ht estimate	Pre < Post F= 30.77**	-	0.0	0.3	1

* p< .05 ** p< .01

Note. None of the Group x Time interactions were significant.