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HARTMAN, LINDA MCCALL

A COMPARISON OF TRAINED AND UNTRAINED CAREGIVERS'
BEHAVIORS WITH VARIED INFANT-ADULT RATIOS

The University of North Carolina at Greensboro

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A COMPARISON OF TRAINED AND UNTRAINED CAREGIVERS'

BEHAVIORS WITH VARIED INFANT-ADULT RATIOS

by

Linda McCall Hartman

A Thesis Submitted to
the Faculty of the Graduate School at
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Approved by


Dissertation Adviser

APPROVAL PAGE

This dissertation has been approved by the following committee of the Faculty of the Graduate School at The University of North Carolina at Greensboro.

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HARTMAN, LINDA MCCALL. A Comparison of Trained and Untrained Caregivers' Behaviors With Varied Infant-Adult Ratios. (1980)
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It was the purpose of this study to compare two trained and two untrained caregivers as they cared for groups of infants under 18 months. Each caregiver worked in a one adult to five infant ratio and a one adult to eight infant ratio. The trained and untrained caregivers were compared in six behavioral areas as reflected by the following goals: (1) facilitation of language, (2) positive social-emotional behaviors with infants, (3) adult negative social-emotional behaviors with infants, (4) providing caregiving functions such as feeding and diapering, (5) performing necessary housekeeping tasks, and (6) providing motoric and kinesthetic experiences for infants (Honig & Lally, 1973).

The subjects were 16 infants under 18 months of age and their four caregivers. The study took place in two locations. Eight infants and their two caregivers were observed at Creative World, Inc., located in Wilmington, North Carolina. The comparison group of eight infants and their two caregivers were observed at The Infant Care Center in the Department of Child Development and Family Relations in the School of Home Economics at The University of North Carolina at Greensboro, North Carolina.

The data were collected, using a modified form of Honig and Lally's (1973) ABC-I. Two-way analyses of variance were performed for the 32 items and the six categories of the ABC-I checklist. The significance level was set at the .05 critical value.

The research findings are presented below:

1. A significant interaction for Training x Ratios ($PR > F = .0211$, $p < .05$) was noted in the Language Facilitation scores. The trained caregivers scored higher in the Lanugage Facilitation category when the ratio of adults to infants was 1:8 than when the ratio was 1:5. The untrained caregivers scored higher in the Language Facilitation category when the ratio of adults to infants was 1:5 than when the ratio was 1:8.

2. A significant interaction for Training x Ratios ($PR > F = .0031$, $p < .05$) was noted for the Social-Emotional: Positive category. The trained caregivers scored higher in the Social-Emotional Positive category when the ratio of adults to infants was 1:5 than when the ratio was 1:8. The untrained caregivers scored higher in the Social-Emotional Positive category when the ratio of adults to infants was 1:8 than when the ratio was 1:5.

3. A significant interaction for Training x Ratios ($PR > F = .007$, $p < .05$) was noted in the Social-Emotional: Negative category. The trained caregivers scored higher in the Social-Emotional Negative category when the ratio of adults to infants was 1:8 than when the ratio was 1:5. The untrained caregivers had no Social-Emotional Negative score in either the 1:8 or the 1:5 ratio of adults to infants.

4. The results of the two-way analysis of variance of the Caregiving: Child category supported the hypothesis that the quantity of trained and untrained caregivers' behaviors would not be significantly different in the 1:8 and 1:5 ratios of caregivers to infants.

5. A significant interaction for Training x Ratios ($PR > F = .0134$, $p < .05$) was noted in the Caregiving: Room category. The trained caregivers scored higher in the Caregiving: Room category when the ratio of adults to infants was 1:8 than when the ratio was 1:5. The untrained caregivers scored higher in the Caregiving: Room category when the ratio of adults to infants was 1:5 than when the ratio was 1:8.

6. A significant interaction for Training x Ratios ($PR > F = .0031$, $p < .05$) was noted in the Physical Development category. The trained caregivers scored higher in the Physical Development category when the ratio of adults to infants was 1:5 than when the ratio was 1:8. The untrained caregivers scored higher in the Physical Development category when the ratio of adults to infants was 1:8 than when the ratio was 1:5.

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CHAPTER I
THE PROBLEM

In July 1971, the General Assembly of North Carolina enacted a new article of legislation to protect children through licensing of day-care facilities. For facilities caring for 30 or more children, the ratio of staff members to number of infants from 0 to 2 years is 1:8, with no more than 25 infants in a group.

On the other hand, programs which expect to receive children for whom federal social services funds are used must be certified by the State Division of Social Services. There is a difference between licensing and certification standards. Certification standards mandate a staff-to-child ratio of 1:5, with no more than five in the group. Therefore, a licensed center can operate with one caretaker for eight infants, while a certified center must have two caretakers for eight infants.

Although there is a staff-to-child ratio difference between licensing and certification standards, the importance of individualized care for infants is recognized. Each infant needs the kind of care that warm, friendly adults provide. These adults build on the infant's health, motor skills, competence, language, and social interests. Without this kind of attention, infants may not develop the sense of trust established by close ties with one person. The infant's growth and learning may be delayed, and the infant's health and safety may be endangered.

As economics, the women's movement, boredom, and many other reasons continue to send new mothers into the working world in greater numbers and more quickly after giving birth than ever before, the number of infants cared for in day-care centers is rapidly growing. These infants have a right to individualized care, whether the ratio of adults to children is one to eight or one to five.

Background for the Study

A review of current literature and research revealed a lack of information on the comparison of ratios as required by licensing with ratios as required by certification. The lack of a readily available comparison, the importance of the problem of individualized day-care for infants, and professional concern about infants who are cared for in the one to eight ratio of adults to infants prompted the present study.

Purpose

The purpose of the present study was to compare two trained and two untrained caregivers as they cared for groups of infants under 18 months. The comparison described the quantity and quality of caregiving acts received by infants in the following four situations:

1. Five infants receiving care from one trained caregiver.
2. Eight infants receiving care from one trained caregiver.
3. Five infants receiving care from one untrained caregiver.
4. Eight infants receiving care from one untrained caregiver.

Definitions

Trained caregiver. A day-care worker who has attended workshops, lectures, or classes in child care as part of the job training.

Untrained caregiver. A day-care worker who has had only job experience with no formal workshops or training classes.

Infants. Children 18-months-old or younger.

Quantity of caregiving acts. The actual number of caregiving acts performed in all of the observed behavioral areas.

Quality of caregiving acts. The actual number of caregiving acts performed in the following behavioral areas: (1) language facilitation, (2) positive social-emotional behaviors, and (3) negative social-emotional behaviors.

Hypotheses

For the present study the following hypotheses will be employed:

1. The quantity of trained and untrained caregivers' behaviors will not be significantly different in the 1:8 and 1:5 ratios of caregivers to infants in the quality area of Language Facilitation.
2. The quantity of trained and untrained caregivers' behaviors will not be significantly different in the 1:8 and 1:5 ratios of caregivers to infants in the quality area of Social-Emotional: Positive.

3. The quantity of trained and untrained caregivers' behaviors will not be significantly different in the 1:8 and 1:5 ratios of caregivers to infants in the quality area of Social-Emotional: Negative.
4. The quantity of trained and untrained caregivers' behaviors will not be significantly different in the 1:8 and 1:5 ratios of caregivers to infants in the area of Caregiving: Child.
5. The quantity of trained and untrained caregivers' behaviors will not be significantly different in the 1:8 and 1:5 ratios of caregivers to infants in the area of Caregiving: Room.
6. The quantity of trained and untrained caregivers' behaviors will not be significantly different in the 1:8 and 1:5 ratios of caregivers to infants in the area of Physical Development.

CHAPTER II

REVIEW OF THE LITERATURE

An abundance of literature is available relative to the requirements for quality care of infants and the importance of individualized care as related to growth and development. Although there is a staff-to-infant ratio difference between certification and licensing standards for day-care centers in North Carolina, there has been little research conducted on the quantity and quality of caregiving acts performed for infants in the one-adult-to-five infants ratio and the one-adult-to-eight-infants ratio.

The certification and licensing information for the State of North Carolina day-care centers will be reviewed. Also a brief overall view of quality care of infants will be cited along with those studies directly related to adult-to-infants ratios necessary for quality care.

Certification and Licensing Information

Prior to 1971, according to North Carolina Department of Human Resources (1979), the State Division of Social Services was charged by legislation with the protection of children who received care from a source outside their homes for a portion of the twenty-four-hour day. Although North Carolina had no mandatory licensing for day-care during that time, minimum requirements for protecting children in day-care were established, and licenses were issued to day-care facilities which met those requirements and asked for licensing.

In July 1971, the North Carolina Legislature enacted a mandatory day-care licensing law and established a board authorized to administer the law. Under provisions of the Reorganization Act of 1975, the Child Day-Care Licensing Board became a commission. Any person other than the child's parents, grandparents, guardians, or full-time custodians who cares for more than one child regularly for more than four hours per day is required to register with the commission and must meet certain requirements (NCDHR, 1979).

Though the State Division of Social Services is no longer licensing day-care facilities, it retained responsibility for certifying day-care programs according to standards set by the State Social Services Commission until July 1, 1979. The certification function was then transferred to the Department of Human Resources, Division of Plans and Operations. Certification makes it possible for a day-care program to receive payment from federal funds for day-care provided to those families and children who are eligible under certain federal and state regulations. These funds are usually used by county departments of social services to purchase or provide services and by nonprofit groups who provide services under contract with the county department of social services or the State Department of Human Resources (NCDHR, 1979).

The State Department of Human Resources, Division of Plans and Operations provides day-care specialists who assess centers for compliance with standards for certification. In the course of completing this assessment, the consultant may provide technical assistance to help programs achieve and maintain compliance with standards.

Certification is a formal written declaration issued by the Division of Plans and Operations, Department of Human Resources, that a day-care program has been evaluated and found to be in satisfactory compliance with standards adopted by the State Social Services Commission (NCDHR, 1979).

According to North Carolina Department of Human Resources (1979), the certification requirements for group sizes and ratios of staff to children shall not be exceeded in any size day-care center. A group of children is defined as a certain number of children within the care of an assigned adult, or adults. There is no tolerance allowed in the group size as can be seen in Table 1.

Table 1
Group Sizes and Ratios of Staff to Children
For Certification*

Age	Staff	Number of Children	Group Size	Staff
Birth to 12 months	1	5	5	1
1 to 2 years	1	6	6	1
2 to 3 years	1	7	7	1
3 to 4 years	1	10	18	2
4 to 5 years	1	12	20	2
5 to 6 years	1	15	25	2
6 and older (normal, healthy children)	1	20	25	2
6 or older (children with special problems)	2	20		

*According to NCDHR, 1979, p. 21.

According to North Carolina Department of Human Resources (1979), special caregiving activities for infants shall comply with the following:

1. Adults shall talk to, sing to, pat and cuddle, and play with infants frequently, especially when direct child-caring tasks are being performed.
2. When infants are in care, toys and equipment shall include crib toys, toys for active play, manipulative toys, and books.
3. During the day, infants shall have variety and change in what they see, hear, play with and feel. Infants shall not be confined to playpens or cribs and shall have their positions and locations changed often during the day; i.e., back to tummy, propped, placed in a jump seat or walker, placed on the floor, a blanket, or a rug.
4. Older infants having locomotor skills shall have freedom to move about the room to explore the environment and practice locomotor skills.
5. Sleeping, eating, toileting, diaper changing, and playing shall be adapted to the individual infant's needs, shall occur with some regularity, shall change as the infant's needs change, and shall bear some relationship to his home schedule.
6. Infants shall be fed when they are hungry. Small infants shall be held in an adult's arms for bottle feeding. Older infants shall be held or fed in safe high chairs or at baby feeding tables.
7. Diapers shall be changed promptly when they are soiled or wet.
8. Toilet training shall be coordinated in the day-care facility with the parent's toilet-training program. Toilet training shall begin when the parents and caregivers see evidence that the infant is ready to be trained.

9. Children shall be toilet trained according to their own rate. Rewards for success shall be emphasized rather than penalties for failure. (pp. 31-32)

According to North Carolina Office of Child Day-Care Licensing (1976), the Child Day-Care Licensing Board was created by the 1971 State of North Carolina legislation as a separate agency for the purpose of coordinating the licensing and inspection procedures and developing the policies for implementing the law. By virtue of the Reorganization Act of 1975, the board became a commission consisting of 15 members, five of whom are state officials, and ten of whom are day-care owners, operators, and parents of preschool children. The director and the staff of licensing representatives in the Office of Child Day-Care Licensing help with the interpretation of regulations, in the establishment of licensed facilities, and in the approval of license applications.

The manual of Operating Standards and Licensing Procedures for Child Day-Care Facilities includes standards developed by specialists in the fields of education, public health, mental health, medicine, nutrition, social work, engineering construction, fire prevention, and child development. The standards in this manual were developed to promote safer child care in North Carolina (NCOCDCL, 1976).

According to North Carolina of Child Day-Care Licensing (1976), special health standards for infants must be met as follows:

Infants and young children need attention and individual stimulation for development of good mental and emotional health. They shall be kept in a space separate from the older children that is bright and colorful. These children should be cared for by caregivers who smile, talk, and play with them so that the

children hear happy, pleasant sounds. The room should be interesting with things to look at, play with, bang, handle, and make sounds. They should be exposed to new things to do, play with, or look at.

Young infants shall be held and cuddled while being fed. Propped bottles can cause ear infections, strangulation, and an insufficient food intake. Formula and juice served in a bottle shall be prepared, packaged and identified for the individual child at the child's home and provided to the facility by the child's parents. The facility may provide the formula and juice if this method of provision or any other method is approved by the local health director as specified in the sanitation standards. Infants shall not share bottles.

Drinking water shall be offered at frequent intervals to infants and toddlers. Water bottles for the children shall be prepared, packaged and identified for each individual child. Drinking water in baby bottles must be stored and handled to protect against contamination as stated in the sanitation standards.

Diapers shall be changed while the child is in his own crib or on a surface either provided with a clean covering after each change or cleaned after each usage. An adequate supply of clean diapers should be available at all times. The diapers shall be changed when they become soiled or wet and not on a shift basis. Diaper rash and infections are the results of not changing diapers often enough and not thoroughly cleaning the child when changing. Lavatories with hot and cold running water, soap, and individual towels shall be provided in diaper-changing areas so the staff can wash their hands after feeding or changing each child. Toilets shall be either in the diaper-changing area or conveniently adjacent. (p. 30)

Table 2
Group Sizes and Ratios of Staff to Children
For Licensing*

Ages of Children	Number of Children	Staff Members	Number of Children Including 20% Tolerance
0 to 2 years	8	1	9
2 to 3 years	12	1	14
3 to 4 years	15	1	18
4 to 5 years	20	1	24
5 or more	25	1	No Tolerance

*NCOCDCCL, 1976, p. 46.

Quality Care of Infants

Working mothers are demanding day care for infants. Moreover, those concerned about infants' healthy development must demand quality day care. In the eighties, "the rights of infants" must be extended to include these rights in a day-care setting as well as in a home setting. "Quality day care" must be defined more quantitatively if centers are to provide care which meets the special needs of infants (Saunders, 1972).

Honig and Lally (1973) stated that recent increases in the number of working mothers has resulted in a proliferation of a wide variety of caregiving services for children under three years of age. This rapid service growth in conjunction with few efforts to assess the

educational and affective outcomes of such experiences for the children lends urgency to the need for reliable and easy-to-learn systems to monitor the quality of such programs and the effectiveness of teachers responsible for infant care and education.

The American Academy of Pediatrics (1971) developed basic standards for quality day care for children under three years of age. The availability of day care provides a mother with the choice of group day care as one of the ways of providing for her children. Options should include full-time or part-time day care under a variety of sponsorships and in a variety of locations. The main purpose of day care should be to offer a sound basis for promoting learning and further development of the young infant and support and encouragement for the mother in her efforts to care for her infant. Parent involvement is seen as essential in the day-care center.

Several excellent guides are available which define quality care for infants. One such guide has been prepared by the North Carolina Department of Human Resources (1973). The guide suggests outlines for quality care of infants in the areas of qualifications and numbers of staff, program of caregiving, daily schedule, toys, and activities, health and safety, food and nutrition, toilet training, and clothing.

Mazyck, Harris, Hawkins, and Keister (date unknown) wrote about quality in an arrangement for infant care. The topics discussed were (1) involvement with parents, home, and family; (2) easing the separation from the home and family; (3) attention to health, safety, and physical well-being; (4) workable plans for times of illness; (5) adults with continuing contact with a small number of babies; (6)

necessity of playtime; (7) necessity of talking; (8) richness in the surroundings, variety, and new experiences; (9) freedom to explore and to use new skills; (10) some time alone for "moments of peace;" (11) limits and some frustrations and help in coping with them; (12) order and consistency, color and action, encouragement and praise; and (13) respect for individuality.

Elardo (1973) explored some of the attributes of quality day-care programs for infants, age 0 to 30 months. Positive developmental outcomes for infants resulted from high-quality interactions with adults. The day-care environment should be rich with stimulating experiences that help infants develop satisfactorily. Critical factors in adult behavior are values and attitudes, particularly interpretations of good and bad behavior, methods of discipline, use of materials, and the degree to which daily housekeeping chores interfere with constructive adult-infant interaction.

According to publications of the Department of Human Resources, a chief concern is that infants receive individualized care rather than "assembly line" attention. Care that safeguards health, builds trust in the world and competence to cope with learning, develops language and motor skills, and fosters social interests is of tremendous importance. Day care of infants under two years of age presents special hazards, requires special safeguards, and demands sensitive, imaginative planning with continued evaluation of the experience for each baby and his family. The caregiver must be sensitive to a baby's response to daily routines and, therefore, must sense when a baby is

hungry, sleepy, bored, or is wanting comfort or would enjoy intimate physical contact, Care should be taken that not all the time is spent caring for physical needs, but that some time is spent playing with the children. Also, health care and prevention of infectious disease must rest directly on those caregivers entrusted with minute-to-minute care of a young infant (North Carolina Department of Human Resources, 1973).

Although individualized care is a chief concern of those people interested in developmental child care, there are some guiding principles of infant care that must be respected in any setting. The characteristics of an environment that seem most likely to enhance a child's development are set forth by Huntington, Provence, and Parker (1972) as follows:

1. Adequate nourishment from the time of conception onward.
2. Protection from and prompt care of physical disorders and disease; support in overcoming vulnerabilities; physical safety and relative comfort.
3. A relatively small number of adults having continuing, focused, and affectively meaningful relationships with the child; adults who encourage reciprocal interactions.
4. Frequent contacts with adults and other children, contacts that are predominantly gratifying, expressive and warm.
5. Verbal interaction; a "speaking partner." Sound alone does not stimulate speech development; verbal exchanges do. Free and open verbal communication is essential.
6. The support of an adult who helps the child learn controls--what is permissible and what is not, prohibitions that channel and foster growth; an adult who helps the child learn to become competent and effective himself; and adult who has a relative sense of competence in handling the child's behavior.

7. Adults who are examples of relative success, who show the child what it is to be proud and have high self-esteem; adults who are models for the child to imitate and with whom he forms positive identifications; adults with a relative degree of satisfaction with themselves and their lives and a relative freedom from depression and a sense of powerlessness.
8. Adults who respect the child as an individual and who respect his family and ethnic identity.
9. Adults who are sensitive to and respect each child's different style of development and his uniqueness. Babies are different and all caregiving activities must be organized around an acceptance of that difference in tempo, style and approach.
10. Relative consistency, regularity, and order in the physical and interpersonal situation--regularity of mealtimes, bedtimes, in the arrangement of furniture; stability of adults involved with the child.
11. Variety, flexibility, and change in the physical environment, within the structure of continuity.
12. Responses that are dependent on and directly related to the child's behavior; responses that reward and reinforce rather than responses that are random and unrelated to what the child does.
13. Learning conditions conducive to the acquiring and practicing of skills; opportunities for action, and objects to manipulate, explore and master; opportunities to utilize emerging skills and support right from the beginning for the baby's use of his own abilities.
14. Protection from overwhelming emotional states such as anxiety and terror; freedom to express feelings and attitudes.
15. A balance of more gratification than frustration; of more rewards and pleasure than pain, failure and frustration.
16. Freedom to be interested, challenged by and curious about what goes on around him.
17. Sensory, affective and social stimulation appropriate to the child's developmental stage, and individual needs; physical handling to aid in the formation of

body image and motor skills; an environment rich enough in appropriate stimuli to serve as a foundation for the development, expansion and extension of thought processes.

18. Adults who allow and expect a child to contribute to family life and the community, according to his development capacities. (p. 9)

No matter how good a list of guiding principles may seem to child development experts, the curious caregiver will wonder why these endless lists of characteristics of quality care are necessary. What are the goals to be reached by following these principles? Huntington, Provence, and Parker (1972) set forth the following developmental goals for a child from birth to age three:

1. Gaining increasing control over his body systems; development of regulatory physiologic mechanisms; gross and fine motor development and coordination.
2. Increasing awareness of the self as a separate identity; a sense of self involving who and what he is.
3. A sense of effectiveness and competence; a sense of controlling his destiny at least to a limited extent--the opposite of powerlessness and sense that no matter what he does it makes no difference.
4. The ability to communicate needs, wants, feelings and ideas; the use of verbal and nonverbal methods of communication; the development of a sense of being understood.
5. The ability to take initiative, to be curious and exploratory, the ability to act.
6. To have hope and faith and a belief that the world is, by and large, a good place.
7. The ability to trust others and be trustworthy; to develop a sense of responsibility.
8. The ability to give and receive from other people; to be appropriately dependent and appropriately independent; to cooperate with others and to respect others.

9. The ability to be flexible and open to new ideas, new feelings and new people.
10. The ability to think, to remember, to order, to perceive, to categorize, to learn, to be creative in intellectual processes, to attend, to observe, to inspect and investigate, to reflect.
11. The development of skills, and techniques for gaining skills.
12. To be motivated to broaden knowledge of self, others, the inanimate world and the world of ideas; to explore and to discover.
13. The ability to control impulses when appropriate or to express them when appropriate; to be able to affirm and negate; to exclude; to postpone; to hold on and let go; to follow rules and to believe in their importance. (p. 16)

Therefore, quality care may be understood as characterized by individualized care for the infant, guided by principles of child development, leading to developmental goals appropriate to the age level of the child. Research has confirmed that quality care is possible in group settings.

American Institutes for Research in the Behavioral Sciences (1970) prepared a descriptive booklet about The Infant Care Center, Greensboro, North Carolina, which was established in 1967 to create a quality day-care program that could be replicated elsewhere, to define the components of quality care for infants, and to help the State of North Carolina develop standards for infant care. The center models itself on a well-functioning home environment. No structured attempt is made to accelerate cognitive or motor development, but the staff members strive to provide a warm, healthy, and stimulating environment for each child in the program, ranging in age from two and one-half months to three years.

A grant was made to The University of North Carolina at Greensboro by Children's Bureau, under the program of Child Welfare Research and Demonstration Grants, to answer the following questions posed by Keister (1969):

Can this possibly lead to a "bright new world" for our very youngest citizens? Is warm, affectionate, individualized mothering for an infant possible in a group setting? Can the beneficent intimacies of home life be replicated when infants and toddlers are cared for in groups? Can adequate protection of physical health be assured to babies who are daily taken outside their own homes? Can constructive social relationships be formed and appropriate intellectual stimulation be offered to children under the age of three whose mothers arrange for their care in a group? What is the cost of care that provides as fully as possible for the needs of babies away from home? (p. 6)

To study the effects of day care on babies, a comparison was made with a nonnursery control group. Almost no differences were found in the areas of physical-medical, mental-motor-sensory, social, and emotional-personality development. The very low rate of illness and absenteeism and the general satisfaction of the parents seemed to indicate the lack of negative effects on young children in day care. The important concept is quality care, reproducing as much as possible the home environment and the best features of the "establishment," well-functioning nursery school. Quality is emphasized in relationships, play experiences, and health care (by means of a Sick Bay) (Keister, 1969).

Doyle (1975) conducted a study to compare the intellectual development, attachment to mother, peer interaction, and physical health of day-care and maternal home-care children. The results indicated that very young children who participated in high quality group day care differed little from home-reared children.

Fowler and Kahn (1978) conducted a five-year study which included comparisons between day-care participants' development from six months to five years of age and the development of a similar group of children reared at home. Receiving moderate levels of interpersonal care and cognitive stimulation, the day-care infants thrived at least as well as the home-reared children on measures of motivation and socio-emotional development. The day-care infants thrived better than the home-reared children on cognitive measures. However, children in group day care did less well than home-reared children past age three.

Caldwell (1969) wrote that a group of 41 children from lower-class families were examined for differences in child-mother and mother-child attachment patterns at 30 months of age. Twenty-three children were cared for by their mothers from birth until 30 months of age, and 18 were cared for in a day-care center for at least one year. Data sources were an intensive semistructured interview to rate mother-child interaction, a home stimulation inventory scored on the basis of a home visit, and developmental testing using the Stanford-Binet or Cattell Infant Intelligence Scale. No significant differences in child-mother or mother-child attachment were found between children reared at home and day-care children. In respect to child-mother attachment, better developed infants tended to be more positively related to their mothers and came from homes where a high quality and quantity of stimulation were provided. It was concluded that infant day-care programs can contribute positively to the cognitive, social, and emotional development of the child without doing harm to the child's emotional attachment to the mother.

Fowler and Kahn (1976) outlined the design and outcomes of an investigation comparing a day-care program and home-rearing of infants and preschool children, and discussed at length some issues involved in day-care research. The study developed and evaluated a program at a Toronto municipal day-care center which accepted infants, and compared the children's development over a five-year span with a sample of home-reared children matched in pairs on selected characteristics. A total sample of approximately 60 infants was studied for varying periods. Day-care infants ranged from six to eighteen months when they entered the program. These day-care infants were from predominantly single-parent working-mother families of limited income, high school education, multiple ethnicity, and recent immigrant status. The home-reared families were mainly intact. The comparison program consisted of (1) the day-care component, with caregiver and curriculum development; and (2) a parent guidance component, with a parent guidance worker visiting homes from one to three more times a month. The four main activities defined were basic care routines, play, planned teacher activities, and excursions. Children and parents were assessed at six-month intervals on a battery of measures. Findings focused on quantitative outcomes of the children's competence development. The findings suggest that multiple adult-child and peer relations in day care facilitate development as well or better than home care alone, particularly during infancy.

Fowler (1971) highlighted one infant education project as a successful example of a general, pervasive approach to stimulation in a group setting. The Ontario Institute and Canadian Mothercraft

Society have completed the first year of their three-year day-care project for advantaged and disadvantaged infants from three to thirty months of age. The program was designed to facilitate infants' cognitive, personality, and social development through personalized adult-child interaction, guided learning experiences, free play, and specialized care. Infants made significant gains over the first year in mental, social, and language development, especially for younger versus older infants compared with home-reared infants. Measures of caretaker and parent functioning also showed positive results. It is suggested that involvement, enthusiasm, and coordination of parent care and teaching activities played a big part in the project's success. The importance of warm, sensitive relations with babies in both teaching and nonteaching situations is pointed out. The magnitude of gains for both advantaged and disadvantaged children suggests a wide range of potential.

Honig and Lally (1974) investigated characteristics of experienced teachers of infants in terms of the kinds of adult-child interactions that occur. Two measurement devices were developed so that teacher-infant relationships could be studied objectively. Assessing the Behavior of Caregivers (ABC), I and II, are checklists for use with infants (0-18 months), and toddlers (18-36 months). Data recorders observed adult-child interactions in terms of the behaviorally defined categories of the ABC instruments during various aspects of infant day-care programs. Subjects were two teachers who worked with infants, and two teachers who worked with toddlers. Both forms of the checklist were found to be effective in monitoring child

day-care programs. The kinds and frequencies of behaviors emitted by the teachers demonstrated well the social-emotional and cognitive goals of a developmental day-care program for younger and older infants.

Adult to Infant Ratios

A most critical condition in group care for infants is the ratio of caring adults to children. According to Pizzo (1973), a child can get lost in the crowd if there are more than four infants to a caregiver. She suggests that the best infant centers further protect the child by "attachment grouping"--they assign four children (generally on the basis of mutual liking for one another) to each adult, and expect that adult to be chiefly responsible for the care of these children. The child has an emotional anchor in the room, while allowing him to make other attachments as well. It allows the caregiver to be closely involved in the development of all four children, rather than just superficially involved with all of the children. Also, it encourages greater accountability to the parent. The parent knows whom to go to for information or explanations involving her child. The caregivers know they will only be responsible to these four parents. More personal teacher-parent relationships can develop.

Agreeing with Pizzo, Kempf (1971) indicated that the human baby is very helpless, more so than almost any other newborn creature. There must be adults to care for the baby, or he will die. He is totally dependent as a baby, and he will always need other people.

Without them he will either not develop or he will develop in odd, incomplete, and distorted ways. Therefore, quality infant-care centers maintain consistent, warm, mothering people for the children-- the caretakers. The ideal ratio, according to Kempf, is one caretaker to four babies with an assistant for peak periods. The caretaker knows and cares for the child as an individual. She has an awareness of ways to foster emotional, social, and intellectual development. She is able to cuddle the child to give him the needed warmth and closeness to a special person. Indeed, she can appreciate and enjoy the individual growth of each child in her care.

Although the ideal ratio, according to Pizzo and Kempf, is one caretaker to four babies, Kempf (1971) determined that such care is truly expensive. The cost can range from \$2,000 to \$4,500 per child per year. This cost is very high due to the provision of individualized care of the babies, and the fact that personnel costs will continue to rise. Kempf believes that parents alone cannot afford these prices.

Because most parents cannot afford the high cost of one to four ratios in private day-care settings, some experts are not quite as rigid in setting numbers necessary for quality. For example, Elardo (1973) suggested that the baby should have a "major caregiver" who is assigned to him and "perhaps" three other infants. He believes that the maintenance of high-quality interactions between adults and children is probably the most important factor in providing quality care. A center could provide its children with proper safety, nutrition, sanitation, and space, but with a low adult-child ratio, still be unsatisfactory.

Hollomon (1976) found that adult-infant ratios in day-care centers are based largely on the premise that a low number of infants per adult should result in greater interaction between the adults and the infants. The increased interaction should result in better infant care. Support for this premise is based on three main sources: (1) research conducted on animals and institutionalized infants; (2) studies which show that small numbers of children per adult can result in increased IQ's and cognitive functions; and (3) statistical reports which show high infant mortality rates, particularly among children of low-social-status parents. The conclusion is that the polemics over staff-infant ratios in day-care centers can only be resolved by scientific research into day-care center conditions. Quality day care, rather than ratios, is the point to be emphasized.

As Keister (1969) wrote, more important than the number of caretakers per number of children is the attitude and general philosophy of the adult.

If she does not believe that cuddling, talking to, loving, spending special time with each infant by a specially assigned child care worker is important, then no matter how many people she has, they will not be giving the babies the kind of attention they need. (p. 33)

CHAPTER III

PROCEDURE

The primary purpose of the study is to compare two trained and two untrained caregivers as they care for groups of infants under 18 months. Each caregiver will work in a one-adult-to-five-infant ratio. These trained and untrained caregivers will be compared in six behavioral areas as reflected by the following goals:

1. Facilitation of language.
2. Positive social-emotional behaviors with infants.
3. Adult negative social-emotional behaviors with infants. (It is hoped that the frequencies in this category will be minimal.)
4. Provision of caregiving routines such as feeding and diapering.
5. Performance of necessary housekeeping tasks.
6. Provision of motoric and kinesthetic experiences for infants. (Honig & Lally, 1973)

There are 33 caregiving acts to be observed. The data will provide frequency distributions of teacher behaviors that can be compared in number and quality. Number comparisons will be made on a percentage basis, while quality comparisons will be made on the basis of language facilitation, positive and negative social-emotional behaviors.

Research Design

The research design of this study is intended to discover some possible causes for the number and quality of caregiving acts received by infants in a one-adult-to-five-infants ratio compared to a one-adult-to-eight-infants ratio with trained and untrained caregivers. The research design is only used to explore causal relationships, not confirm them. However, the causal-comparative method can be used to identify possible causes, and thus, give direction to later experimental studies. Although mainly used to search for possible causes, the causal-comparative method can also be used for descriptive purposes. A gap between the descriptive research studies and experimental studies can be bridged by a causal-comparative study that identifies characteristics of one group and studies them in comparison with another group.

The Instruments

Honig and Lally (1973) stated that day-care program evaluation experts have provided evidence that child output measures alone, particularly when they consist of IQ scores or other purely cognitive measures, do not properly reflect program efficacy. Measures must be developed which will reflect caregiving and learning environments that will ensure the quality of experience provided for young infants.

ABC-I, according to Honig and Lally, is (1) brief, economical, easy to apply in the classroom, with high interobserver reliability of 84 percent; (2) provides a way of assessing whether the infant

program actually provides the inputs that have been stated as program goals; and (3) provides a reliable means of monitoring infant programs.

It will be necessary to modify the ABC-I slightly for this study. The section pertaining to Piagetian tasks will be omitted, because the tasks involve specific training skills which caregivers had in the Syracuse University Children's Center training program. The untrained caregivers would not be able to score in this category without highly specialized training.

The modified form to be used in observing and recording care-taking acts is found in the appendix. This instrument was designed to assess infant environments by studying the behaviors of caregivers. The following observational variables are included in this instrument:

1. Language facilitation.
2. Social-emotional: Positive.
3. Social-emotional: Negative.
4. Caregiving: Child
5. Caregiving: Room
6. Physical development.
7. Does nothing. (Honig & Lally, 1973)

Method of Selecting Sample and Control Group

Facilities of Creative World, Inc., located in Wilmington, North Carolina, and the Infant Care Center, located in Greensboro, North Carolina, will be utilized in this study. Creative World, Inc., is a

privately owned day-care center licensed for 148 children by the State of North Carolina. The "baby room" is large and brightly decorated with yellow walls and colorful tile in primary colors. There are interesting wall hangings, crib mobiles for young infants, colorful printed crib sheets, and thirty toys in very good condition. There is a dutch door that stays open so that infants have many adult contacts from the door each day. Two untrained caretakers work in the room with ten infants, complying with state licensing requirements of one adult to eight infants. There are currently ten infants enrolled in the "baby room." Their parents pay \$35 per week for this service.

The Infant Care Center in the Department of Child Development and Family Relations in the School of Home Economics at The University of North Carolina at Greensboro, North Carolina, will be utilized in this study. The Infant Care Center is operated for research, demonstration, and training purposes. There are five infants under twelve months cared for by one trained caretaker in a small room. The atmosphere is homelike with a rocking chair and soothing decor. An estimated cost of the operation is approximately eighty dollars per week. The parents pay \$40 per week. The Infant Care Center receives funding from the Department of Human Resources to help cover the costs because emphasis is being placed on handicapped children.

Detail of Method of Collecting and Recording Data

According to Honig and Lally (1973), the ABC scale is administered by having an observer in the caretaking room. The observer

tallies the first clear example of any ABC scale behavior that a designated caregiver emits during a two-minute rating period. The tally is repeated for three more two-minute periods. Then the observer rests for two minutes, and rates again for four more two-minute periods. This same ten-minute cycle is repeated three times in a half-hour of recording behaviors of a single caregiver. The procedure allows for a maximum of 12 tallies for any given behavioral item during the half-hour rating session.

The study will extend over a four-week period. The observations will be recorded systematically from 9:00 a.m. to 12:00 noon across all five days of the week. Two weeks of observations will have a 1:5 ratio, while the last two weeks will have a 1:8 ratio of adults to infants. A total of four weeks of observations will include two weeks per caregiver with two caregivers in Greensboro and two caregivers in Wilmington. The two caregivers from UNC-G Infant Care Center will represent the trained caregivers, while the two caregivers from Wilmington will represent the untrained caregivers. The four weeks of observations will take place in the two locations simultaneously.

Proposals for Analyzing and Synthesizing the Data

The ABC data provided frequency distributions of the various teacher behaviors. Caregiving acts were then compared on the proportion of tallies recorded per total number possible.

Each half-hour recording period consisted of 12 two-minute observations and three two-minute rest periods. There were 32 items on the

checklist. Therefore, 384 tallies (12 x 32) were theoretically possible for one half-hour time period. The percentage of tallies for each item observed in one half-hour could then be averaged as a mean percentage of the total number of observation periods. Analyses of variance were performed to compare the mean percentages for trained and untrained caregivers, for 1:8 and 1:5 ratios of caregivers to infants, and for the interaction of training and ratios.

Another type of analysis assessed the division of the teachers' total behavioral repertoire. The 32 items on the checklist were grouped into six categories. The percentage of tallies for each category observed in one half-hour could then be averaged as a mean percentage of the total number of observation periods. Analyses of variance were performed to compare the mean percentages for trained and untrained caregivers, for 1:8 and 1:5 ratios of caregivers to infants, and for the interaction of training and ratios.

CHAPTER IV
RESULTS AND DISCUSSIONS

This chapter was arranged in terms of the findings in regard to the comparison of two trained and two untrained caregivers as they cared for groups of infants under 18 months. The discussion concerned the findings and results of the quantity and quality of caregiving acts received by infants in the following four situations:

1. Five infants receiving care from one trained caregiver.
2. Eight infants receiving care from one trained caregiver.
3. Five infants receiving care from one untrained caregiver.
4. Eight infants receiving care from one untrained caregiver.

Analyses of Variance

Analyses of variance were performed for six categories including 32 subdivisions. The form listing the 32 subdivisions is found in the appendix. The six categories are: (1) Language Facilitation, (2) Social-Emotional Positive, (3) Social-Emotional Negative, (4) Caregiving: Child, (5) Caregiving: Room, and (6) Physical Development.

The research findings are presented below:

1. A significant interaction for Training x Ratios ($PR > F = .0211$, $p < .05$) was noted in the Language Facilitation scores. The mean percentages for the trained caregivers were 46.96 in the 1:8

ratio and 39.86 in the 1:5 ratio. The trained caregivers scored higher in the Language Facilitation category when the ratio of adults to infants was 1:8 than when the ratio was 1:5. The mean percentages for the untrained caregivers were 39.17 in the 1:8 ratio and 41.70 in the 1:5 ratio. The untrained caregivers scored higher in the Language Facilitation category when the ratio of adults to infants was 1:5 than when the ratio was 1:8.

2. A significant interaction for Training x Ratios ($PR > F = .0031$, $p < .05$) was noted for the Social-Emotional: Positive category. The mean percentages for the trained caregivers were 20.03 in the 1:8 ratio and 27.42 in the 1:5 ratio. The trained caregivers scored higher in the Social-Emotional Positive category when the ratio of adults to infants was 1:5 than when the ratio was 1:8. The mean percentages for the untrained caregivers were 27.40 in the 1:8 ratio and 25.58 in the 1:5 ratio. The untrained caregivers scored higher in the Social-Emotional Positive category when the ratio of adults to infants was 1:8 than when the ratio was 1:5.

3. A significant interaction for Training x Ratios ($PR > F = .007$, $p < .05$) was noted in the Social-Emotional Negative category. The mean percentages for the trained caregivers were .42 in the 1:8 ratio and .00 in the 1:5 ratio. The trained caregivers scored higher in the Social-Emotional Negative category when the ratio of adults to infants was 1:8 than when the ratio was 1:5. The mean percentages for the untrained caregivers were .00 in the 1:8 and the 1:5 ratios. The untrained caregivers had no Social-Emotional Negative score in either the 1:8 or the 1:5 ratio of adults to infants.

4. The results of the two-way analysis of variance of the Caregiving: Child category supported the hypothesis that the quantity of trained and untrained caregivers' behaviors would not be significantly different in the 1:8 and 1:5 ratios of caregivers to infants.

5. A significant interaction for Training x Ratios ($PR > F = .0134$, $p < .05$) was noted in the Caregiving: Room category. The mean percentages for the trained caregivers were 7.46 in the 1:8 ratio and 5.11 in the 1:5 ratio. The trained caregivers scored higher in the Caregiving: Room category when the ratio of adults to infants was 1:8 than when the ratio was 1:5. The mean percentages for the untrained caregivers were 5.94 in the 1:8 ratio and 8.76 in the 1:5 ratio. The untrained caregivers scored higher in the Caregiving: Room category when the ratio of adults to infants was 1:5 than when the ratio was 1:8.

6. A significant interaction for Training x Ratios ($PR > F = .0031$, $p < .05$) was noted in the Physical Development category. The mean percentages for the trained caregivers were .69 in the 1:8 ratio and 2.49 in the 1:5 ratio. The trained caregivers scored higher in the Physical Development category when the ratio of adults to infants was 1:5 than when the ratio was 1:8. The mean percentages for the untrained caregivers were 3.05 in the 1:8 ratio and 2.31 in the 1:5 ratio. The untrained caregivers scored higher in the Physical Development category when the ratio of adults to infants was 1:8 than when the ratio was 1:5.

Language Facilitation Category:Quantity and Quality

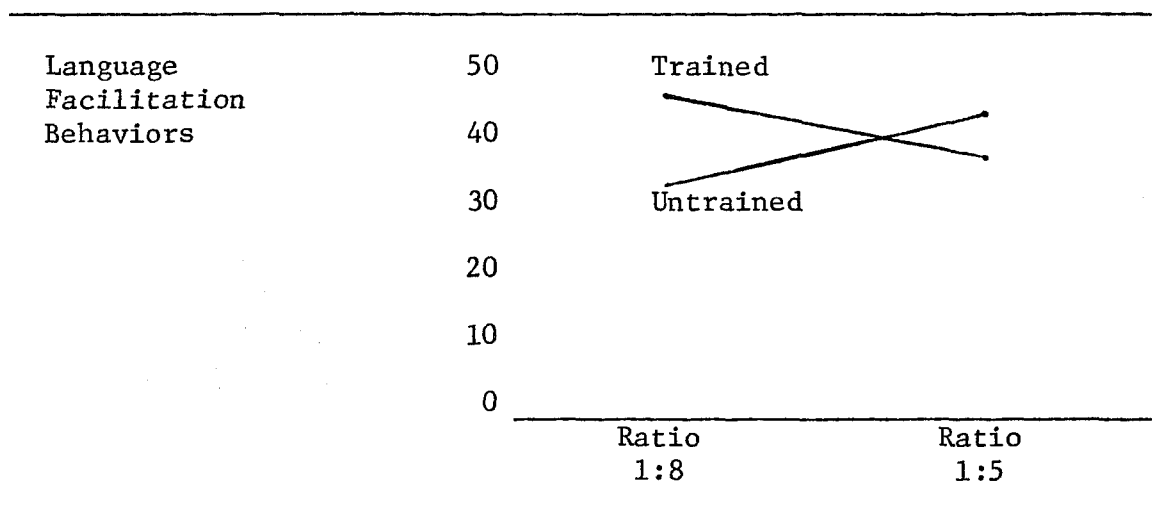
The results of the two-way analysis of variance of the Language Facilitation category were shown in Table 3. It can be noted in Figure 1 that there was a significant interaction for Training x Ratios ($PR > F = .0211$, $p < .05$). The treatment effect was dependent upon the concomitant influence of the two independent variables.

Table 3
Analysis of Variance of the Language
Facilitation Category

Source	DF	Type I SS	F-Value	PR > F	p
Training	1	0.00885522	2.22	0.1451	
Ratio	1	0.00522345	1.31	0.2602	
Training x Ratio	1	0.02323601	5.82	0.0211	<.05
Error	36	0.14372080			
Total	39	0.18103548			

	Trained	Untrained	Trained	Untrained
	1:8	1:8	1:5	1:5
Means	46.96	39.17	39.86	41.70

Figure 1
Language Facilitation Behaviors
By Training and Ratio



The mean percentages for the trained caregivers were 46.96 in the 1:8 ratio and 39.86 in the 1:5 ratio. The trained caregivers scored higher in the Language Facilitation category when the ratio of adults to infants was 1:8 than when the ratio was 1:5.

The mean percentages for the untrained caregivers were 39.17 in the 1:8 ratio and 41.70 in the 1:5 ratio. The untrained caregivers scored higher in the Language Facilitation category when the ratio of adults to infants was 1:5 than when the ratio was 1:8.

Honig and Lally (1973) stated that language facilitation is an important aspect of the child's curriculum. Trained teachers learn techniques of eliciting and responding to infant vocalizations. Caregivers are trained to label objects, qualities, actions, and people for the infants in their care. Training includes praise as a preferred technique to encourage and shape more mature behaviors in babies.

The training of caregivers had a marked influence on the quantity of language facilitation efforts made in adult-infant ratios of 1:8 and 1:5. The trained caregiver had more elaborate skills that facilitated language development in infants. These skills, however, seemed to be used most effectively in larger groups of infants. The trained caregivers scored higher in the Language Facilitation category when the ratio of adults to infants was 1:8 than when the ratio was 1:5. It is possible that the trained caregivers became bored with only five infants. The challenge of caring for eight infants was apparently stimulating enough for the trained caregivers to exercise all their skill and perform much higher in the category of Language Facilitation.

The untrained caregivers scored higher in the Language Facilitation category when the ratio of adults to infants was 1:5 than when the ratio was 1:8. It is possible that untrained caregivers were working at their best level when the adult-infant ratio was 1:5. The trained caregiver that could be a little bored did not score as high as the untrained caregiver in the 1:5 ratio. However, the untrained caregiver became less competent as the adult-infant ratio changed to 1:8. Apparently training was essential as the number of infants in the group was increased to eight. The trained caregivers had a larger quantity of responses in the adult-infant ratio of 1:8 in the Language Facilitation category.

Language Facilitation Subdivisions

The Language Facilitation category was composed of nine subdivisions which were listed in Table 4. The mean percentages for the training effects were given for each of the subdivisions. The trained group was significantly higher ($p < .05$) than the untrained group in the following subdivisions: Elicits Vocalization, Converses With Child, Gives Information or Culture Rules, and Reads or Shows Pictures to Child. The fact that the trained caregivers scored significantly higher in these subdivisions was what one might expect from those who had been taught those specific skills.

There was no significant difference ($p < .05$) between the trained and the untrained caregivers in the following subdivisions: Praises, Encourages Verbally; Inquires of Child or Makes Requests; and Sings to or Plays Music for Child. These subdivisions did not require training. A warm, loving caregiver who was responsive to infants could do as well as a trained caregiver in these three subdivisions.

The analysis of variance shown in Table 5 and in Figure 2 for the subdivision, Offers Help or Solicitous Remarks, indicated that there was a significant interaction for Training x Ratios ($PR > F = .0008$, $p < .05$). The mean percentages for the trained caregivers were 5.03 in the 1:8 ratio and 2.00 in the 1:5 ratio. The trained caregivers scored higher in the Offers Help or Solicitous Remarks subdivision when the ratio of adults to infants was 1:8 than when the ratio was 1:5.

Table 4
 Mean Percentages of the Nine Subdivisions Composing
 The Language Facilitation Category

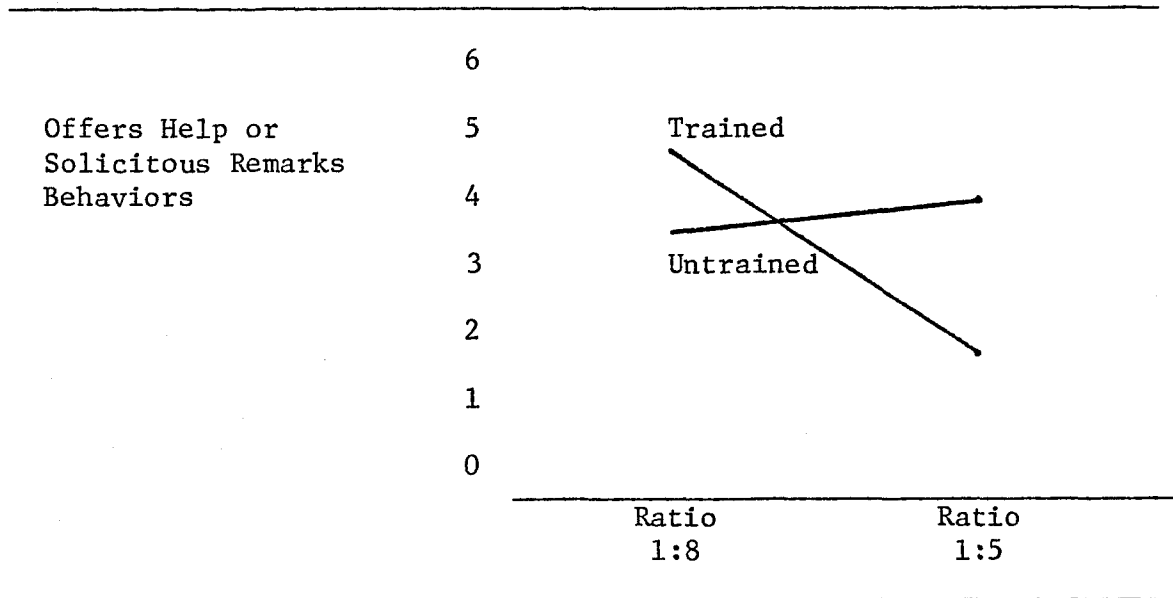
Subdivisions	Trained	Untrained
1. Elicits Vocalization	7.98	2.80
2. Converses With Child	14.32	11.58
3. Praises	1.46	2.02
4. Offers Help or Solicitous Remarks	3.52	3.60
5. Gives Information	1.59	5.37
6. Provides and Labels Sensory Experience	4.54	3.21
7. Inquires or Makes Requests	6.36	7.72
8. Reads or Shows Pictures	.68	.04
9. Sings or Plays Music	2.97	4.09

Table 5
 Analysis of Variance of the Offers Help or
 Solicitous Remarks Subdivision

Source	DF	Type I SS	F-Value	PR>F	p
Training	1	0.00000728	0.04	0.8387	
Ratio	1	0.00226349	13.07	0.0009	
Training x Ratio	1	0.00232866	13.44	0.0008	<.05
Error	36	0.00623546			
Total	39	0.01083489			

	Trained	Untrained	Trained	Untrained
	1:8	1:8	1:5	1:5
Means	5.03	3.59	2.00	3.62

Figure 2
Offers Help or Solicitous Remarks
Behaviors by Training and Ratio



The mean percentages for the untrained caregivers were 3.59 in the 1:8 ratio and 3.62 in the 1:5 ratio. The untrained caregivers scored the same in the Offers Help or Solicitous Remarks subdivision when the ratio of adults to infants was 1:8 and 1:5.

The trained caregivers' skills in the Offers Help or Solicitous Remarks subdivision seemed to be used most effectively in larger groups of infants. The challenge of caring for eight infants was stimulating enough for the trained caregivers to exercise their skills and perform higher in the Offers Help or Solicitous Remarks subdivision.

However, the untrained caregivers made more comments in the Offers Help or Solicitous Remarks subdivision when the ratio of

adults to infants was 1:5. It appeared that the untrained caregivers did very well with a 1:5 ratio. The trained caregivers probably scored lower than the untrained caregivers in this ratio, because they were very skillful and competent with a group of infants. The 1:5 ratio seemed to be a very comfortable number for the trained caregivers. However, these trained caregivers were not only capable, but did much better when they were stimulated with the challenge of caring for eight infants. On the other hand, the untrained caregivers did not seem to have surplus skills for an increased number of infants. In the Offers Help or Solicitous Remarks subdivision, the untrained caregivers made the same quantity of comments to the 1:8 and 1:5 ratios.

The analysis of variance shown in Table 6 and in Figure 3 for the subdivision Provides and Labels Sensory Experience, indicated that there was a significant interaction for Training x Ratios ($PR > F = .0011$, $p < .05$). The mean percentages for the trained caregivers were 6.77 in the 1:8 ratio and 2.30 in the 1:5 ratio. The trained caregivers scored higher in the Provides and Labels Sensory Experience subdivision when the ratio of adults to infants was 1:8 than when the ratio was 1:5.

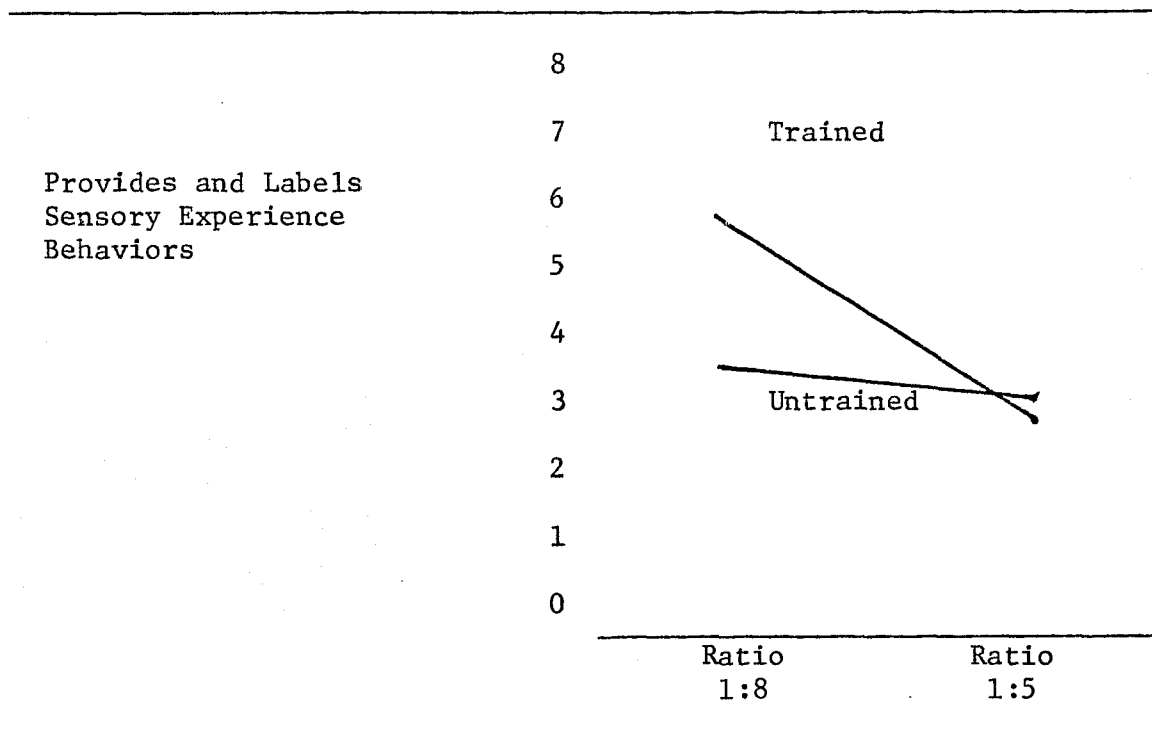
The mean percentages for the untrained caregivers were 3.51 in the 1:8 ratio and 2.91 in the 1:5 ratio. The untrained caregivers scored higher in the Provides and Labels Sensory Experience subdivision when the ratio of adults to infants was 1:8 than when the ratio was 1:5.

Table 6
 Analysis of Variance of the Provides and Labels
 Sensory Experience Subdivision

Source	DF	Type I SS	F-Value	PR > F	p
Training	1	0.00174836	5.86	0.0207	
Ratio	1	0.00642270	21.52	0.0001	
Training x Ratio	1	0.00374297	12.54	0.0011	<.05
Error	36	0.01074331			
Total	39	0.02265734			

	Trained	Untrained	Trained	Untrained
	1:8	1:8	1:5	1:5
Means	6.77	3.51	2.30	2.91

Figure 3
Provides and Labels Sensory Experience
Behaviors by Training and Ratio



Both the trained and untrained caregivers' skills in the Provides and Labels Sensory Experience subdivision seemed to be used most effectively in larger groups of infants. It is likely that more infants simply require more caregiver comments of a sensory nature. It is very natural to entice an infant to eat, for example, by commenting on the smell and taste of the food. Even though the trained caregivers scored higher, both the trained and untrained caregivers made more remarks in the Provides and Labels Sensory Experience subdivision when the number of infants was increased.

However, the untrained caregivers made more comments than the trained caregivers in the Provides and Labels Sensory Experience

subdivision when the ratio of adults to infants was 1:5. It is possible that the untrained caregivers were working at their best level when the adult-infant ratio was 1:5, while the trained caregiver may have been a little bored. It is also possible that the untrained caregiver worked harder than the trained caregiver in the 1:5 ratio, while the trained caregiver obviously worked much harder in the 1:8 ratio. The untrained caregiver had to make more comments to more infants in this particular subdivision, because of having more infants to feed.

Social-Emotional Positive Category:

Quantity and Quality

The results of the two-way analysis of variance of the Social-Emotional Positive category were shown in Table 7. It was noted in Figure 4 that there was a significant interaction for Training x Ratios ($PR > F = .0031$, $p < .05$). The treatment effect was dependent upon the concomitant influence of the two independent variables.

The mean percentages for the trained caregivers were 20.03 in the 1:8 ratio and 27.42 in the 1:5 ratio. The trained caregivers scored higher in the Social-Emotional Positive category when the ratio of adults to infants was 1:5 than when the ratio was 1:8.

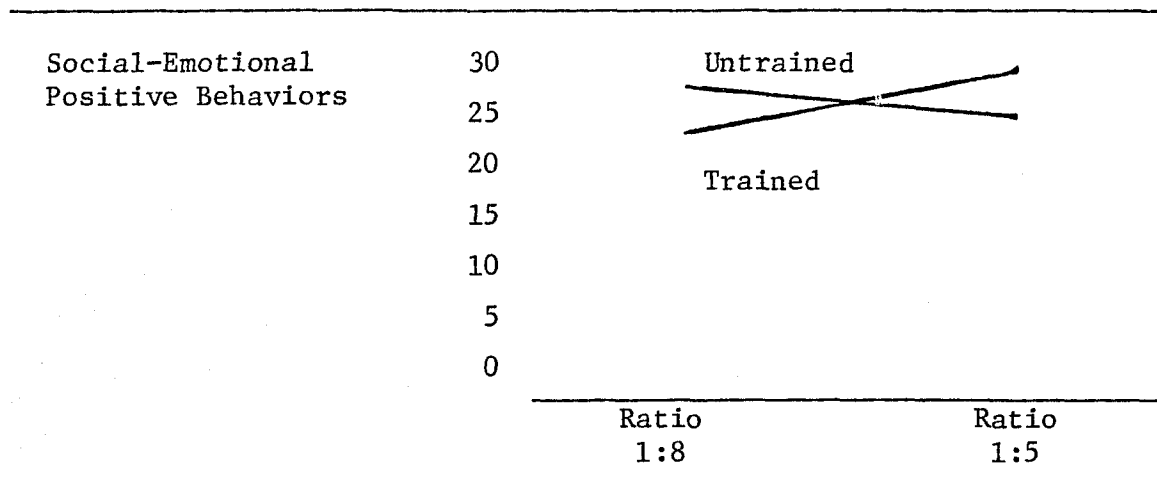
The mean percentages for the untrained caregivers were 27.40 in the 1:8 ratio and 25.58 in the 1:5 ratio. The untrained caregivers scored higher in the Social-Emotional Positive category when the ratio of adults to infants was 1:8 than when the ratio was 1:5

Table 7
 Analysis of Variance of the Social-
 Emotional Positive Category

Source	DF	Type I SS	F-Value	PR > F	p
Training	1	0.00765280	3.63	0.0648	
Ratio	1	0.00776097	3.68	0.0630	
Training x Ratio	1	0.02119673	10.05	0.0031	<.05
Error	36	0.07593145			
Total	39	0.11254195			

	Trained	Untrained	Trained	Untrained
	1:8	1:8	1:5	1:5
Means	20.03	27.40	27.42	25.58

Figure 4
 Social-Emotional Positive Behaviors
 By Training and Ratio



Honig and Lally (1974) stated that teachers of younger infants provided frequent positive social inputs. Master teachers smiled a great deal and provided physical loving contacts. Younger babies received about the same amount of positive social interactions in the morning and afternoon.

The training of caregivers had a marked influence on the quantity of Social-Emotional Positive efforts made in the adult-infant ratios of 1:8 and 1:5. The trained caregiver had more elaborate skills that facilitated infant development. These skills, however, seemed to be used differently as the group size changed. The trained caregivers scored higher in the Social-Emotional Positive category when the ratio of adults to infants was 1:5 than when the ratio was 1:8. It is possible that trained caregivers increased their Social-Emotional Positive category skills in a different manner as the group size

increased. Considering the importance given by Erikson (1963) to the development of autonomy and of initiative in toddlers, it is possible that trained teachers were more sensitive to a young child's increasing needs for independence, especially in larger groups. The trained teachers may have felt that more importance should be placed on fostering independence in the infants that were cared for in the 1:8 ratio.

The untrained caregivers scored higher in the Social-Emotional Positive category when the ratio of adults to infants was 1:8 than when the ratio was 1:5. The untrained caregivers simply increased the quantity of Social-Emotional Positive inputs as the number of infants increased. These caregivers would not be aware of Erikson's theory about the development of autonomy and of initiative in the toddler. The untrained caregivers seemed to have natural instincts that served them well in the Social-Emotional Positive category.

Social-Emotional Positive Subdivisions

The Social-Emotional Positive category is composed of the following five subdivisions:

1. Smiles at Child.
2. Uses Raised, Loving, Reassuring Tones.
3. Provides Physical, Loving Contact.
4. Plays Social Games With Child.
5. Eye Contact to Draw Child's Attention.

There was no significant difference ($p < .05$) in trained and untrained caregivers or 1:8 and 1:5 ratios of adults to infants in

the first subdivision, Smiles at Child. Apparently the caregivers were all pleasant and warm in smiling at the infants regardless of the ratio.

The untrained group was significantly higher ($p < .05$) than the trained group in the following subdivisions: Uses Raised, Loving, Reassuring Tones, and Plays Social Games With Child. The fact that the untrained caregivers scored significantly higher than the trained caregivers in these subdivisions would indicate that the untrained group was instinctively caring for the infants in a positive, warm manner. The trained caregivers may have changed the number of inputs in these two subdivisions to foster more independence in the infants.

The analysis of variance shown in Table 8 and in Figure 5 for the subdivision, Provides Physical, Loving Contact, indicated that there was a significant interaction for Training x Ratios ($PR > F = .0194$, $p < .05$). The mean percentages for the trained caregivers were 9.67 in the 1:8 ratio and 11.71 in the 1:5 ratio. The trained caregivers scored higher in the Provides Physical, Loving Contact subdivision when the ratio of adults to infants was 1:5 than when the ratio was 1:8.

The mean percentages for the untrained caregivers were 7.20 in the 1:8 ratio and 5.65 in the 1:5 ratio. The untrained caregivers scored higher in the Provides Physical, Loving Contact subdivision when the ratio of adults to infants was 1:8.

The analysis of variance shown in Table 9 and in Figure 6 for the subdivision, Eye Contact to Draw Child's Attention, indicated

Table 8
 Analysis of Variance of the Provides Physical
 Loving Contact Subdivision

Source	DF	Type ISS	F-Value	PR >F	p
Training	1	0.01820019	33.94	0.0001	
Ratio	1	0.00006107	0.11	0.7377	
Training x Ratio	1	0.00321289	5.99	0.0194	<.05
Error	36	0.01930373			
Total	39	0.04077787			

	Trained	Untrained	Trained	Untrained
	1:8	1:8	1:5	1:5
Means	9.67	7.20	11.71	5.65

Figure 5

Provides Physical Loving Contact Behaviors

By Training and Ratio

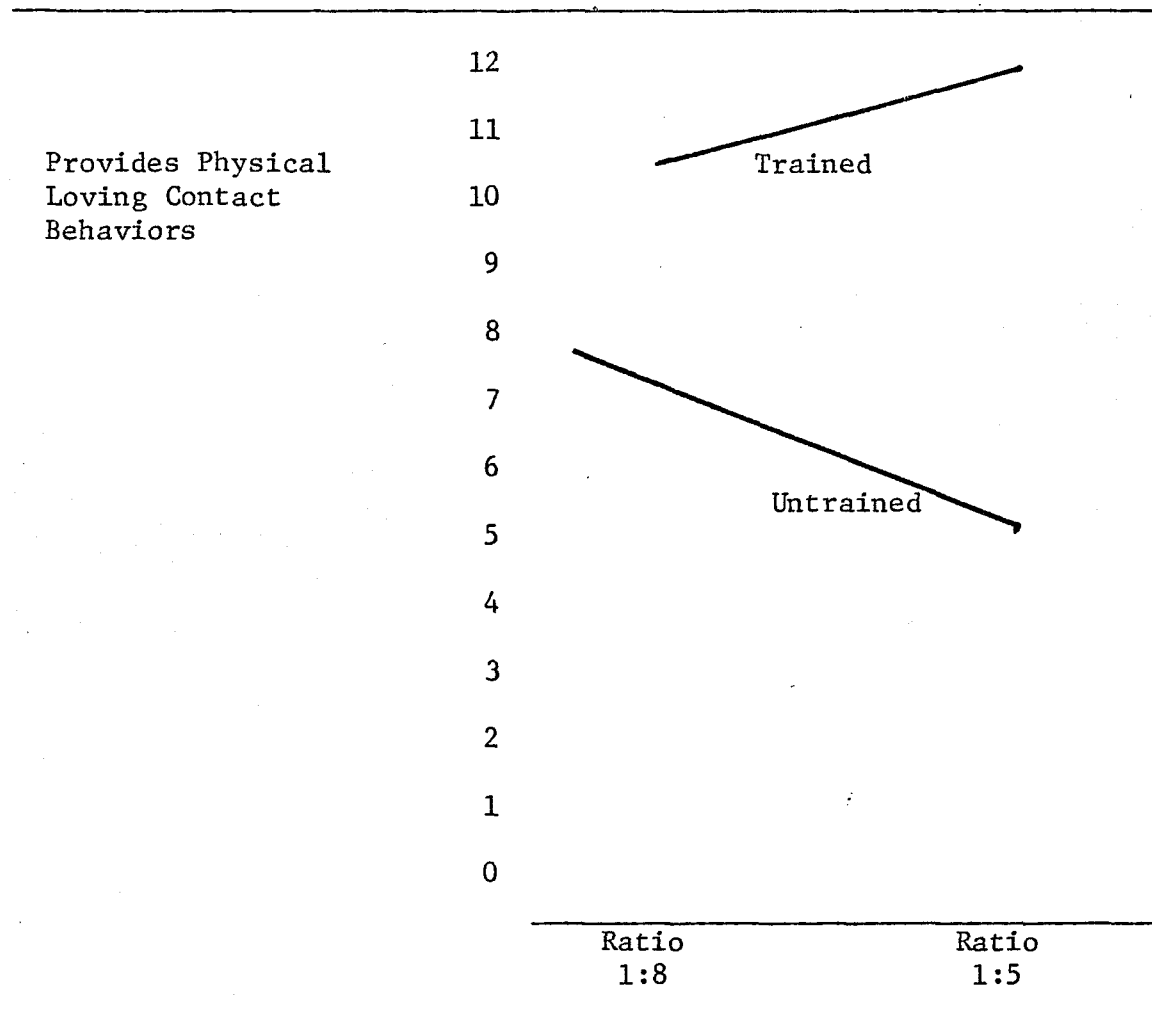
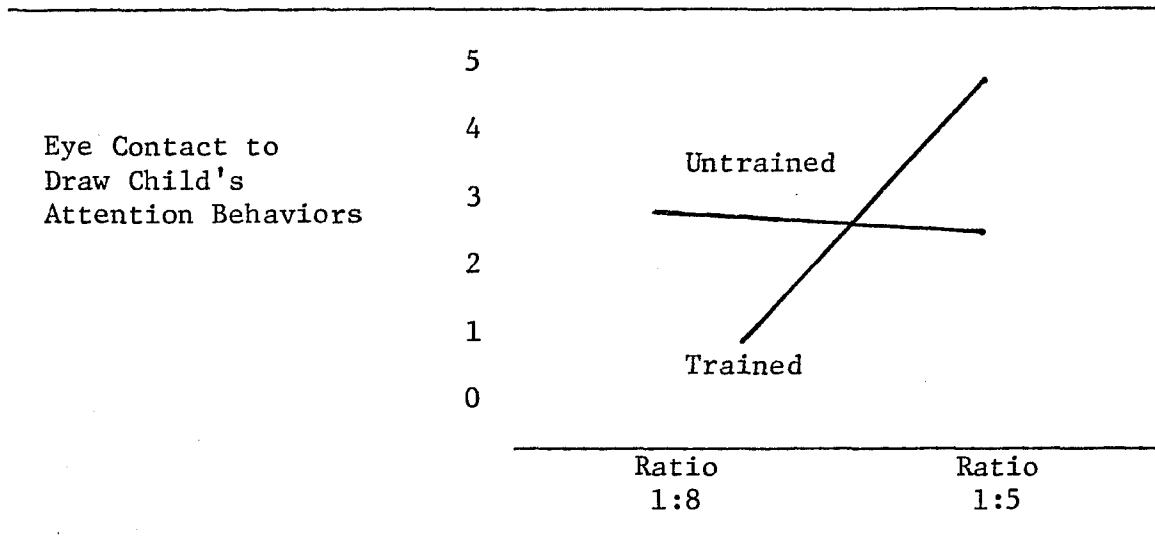


Table 9
 Analysis of Variance of the Eye Contact to
 Draw Child's Attention Subdivision

Source	DF	Type ISS	F-Value	PR > F	p
Training	1	0.00005263	0.09	0.7646	
Ratio	1	0.00152901	2.65	0.1126	
Training x Ratio	1	0.00254161	4.40	0.0431	<.05
Error	36	0.02080540			
Total	39	0.02492864			

	Trained	Untrained	Trained	Untrained
	1:8	1:8	1:5	1:5
Means	1.18	2.54	4.01	2.18

Figure 6
 Eye Contact to Draw Child's Attention
 Behaviors by Training and Ratio



that there was a significant interaction for Training x Ratios ($PR > F = .0431$, $p < .05$). The mean percentages for the trained caregivers were 1.18 in the 1:8 ratio and 4.01 in the 1:5 ratio. The trained caregivers scored higher in the Eye Contact to Draw Child's Attention subdivision when the ratio of adults to infants was 1:5 than when the ratio was 1:8.

The mean percentages for the untrained caregivers were 2.54 in the 1:8 ratio and 2.18 in the 1:5 ratio. The untrained caregivers scored higher in the Eye Contact to Draw Child's Attention subdivision when the ratio of adults to infants was 1:8 than when the ratio was 1:5.

The trained caregivers scored higher in both subdivisions, Provides Physical, Loving Contact, and Eye Contact to Draw Child's

Attention, when the ratio of adults to infants was 1:5 rather than 1:8. It is possible that trained teachers were more sensitive to a young child's increasing needs for independence, especially in larger groups.

The untrained caregivers scored higher in both subdivisions, Provides Physical, Loving Contact, and Eye Contact to Draw Child's Attention, when the ratio of adults to infants was 1:8 rather than 1:5. These caregivers increased the quantity of inputs as the number of infants increased. The untrained caregivers seemed to possess a warm instinct for the infants that increased as the ratio increased.

Social-Emotional Negative Category:

Quantity and Quality

The results of the two-way analysis of variance of the Social-Emotional Negative category were shown in Table 10. It can be noted in Figure 7 that there was a significant interaction for Training x Ratios ($F = .0007$, $p < .05$). The treatment effect was dependent upon the concomitant influence of the two independent variables.

The mean percentages for the trained caregivers were .42 in the 1:8 ratio and .00 in the 1:5 ratio. The trained caregivers scored higher in the Social-Emotional Negative category when the ratio of adults to infants was 1:8 than when the ratio was 1:5.

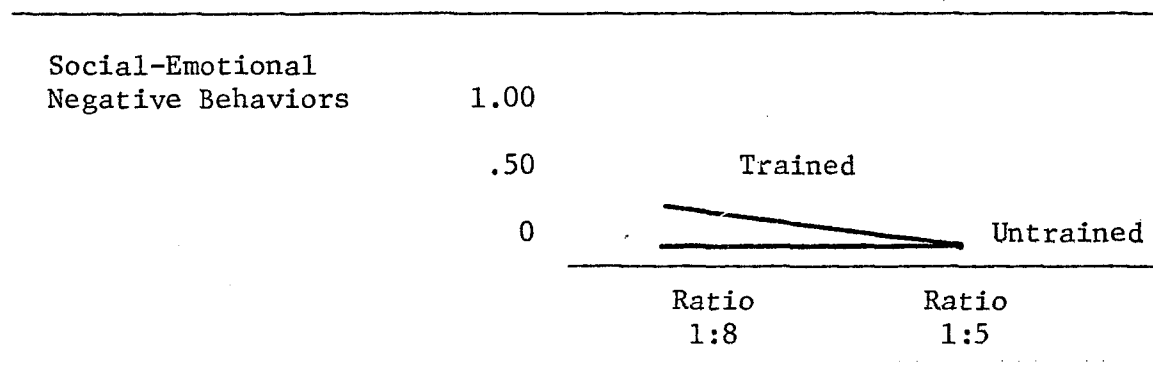
The mean percentages for the untrained caregivers were .00 in the 1:8 and the 1:5 ratios. The untrained caregivers had no Social-Emotional Negative score in either the 1:8 or the 1:5 ratio of adults to infants.

Table 10
 Analysis of Variance of the Social-
 Emotional Negative Category

Source	DF	Type I SS	F-Value	PR > F	p
Training	1	0.00765280	3.63	0.0648	
Ratio	1	0.00776097	3.68	0.0630	
Training x Ratio	1	0.02119673	10.05	0.0031	<.05
Error	36	0.07593145			
Total	39	0.11254195			

	Trained	Untrained	Trained	Untrained
	1:8	1:8	1:5	1:5
Means	.42	.00	.00	.00

Figure 7
Social-Emotional Negative Behaviors
By Training and Ratio



Honig and Lally (1974) stated that negative social inputs to younger babies are quite rare with trained caregivers. However, there is a slight increase in negative inputs in the afternoons, as opposed to mornings; in older infants, as opposed to younger infants; and in the lunch area, as opposed to other areas.

The trained caregivers had a higher percentage of Social-Emotional Negative categorical behaviors than the untrained caregivers who had none. However, the negative behaviors in the 1:8 ratio only made up less than one-half of one percent of the inputs among the trained caregivers. This slight incidence of frowns, verbal, or gentle physical restraints could have been caused by either age, time, or place as Honig and Lally have suggested. The trained caregivers may have needed to forbid or make a negative demand in the lunch area as the ratio increased from 1:5 to 1:8.

Social-Emotional Negative Subdivisions

The Social-Emotional Negative category is composed of the following six subdivisions:

1. Criticizes Verbally, Scolds, Threatens.
2. Forbids, Negative Mands.
3. Frowns, Restrains Physically.
4. Punishes Physically.
5. Isolates Child Physically.
6. Ignores Child's Showing Need for Attention.

The analyses of variance shown in Table 11 and in Figure 8 for the six subdivisions in the Social-Emotional Negative category indicated a significant difference ($p < .05$) in training and ratios for only one subdivision, Forbids, Negative Mands. The analysis of variance for the Forbids; Negative Mands subdivision indicated that there was a significant interaction for Training x Ratios ($PR > F = .0007$, $p < .05$). The mean percentages for the trained caregivers were .42 in the 1:8 ratio and .00 in the 1:5 ratio. The trained caregivers scored higher in the Forbids, Negative Mands subdivision when the ratio of adults to infants was 1:8 rather than 1:5. The untrained caregivers had a mean percentage of .00 in the 1:8 and the 1:5 ratios.

Caregiving: Child Category

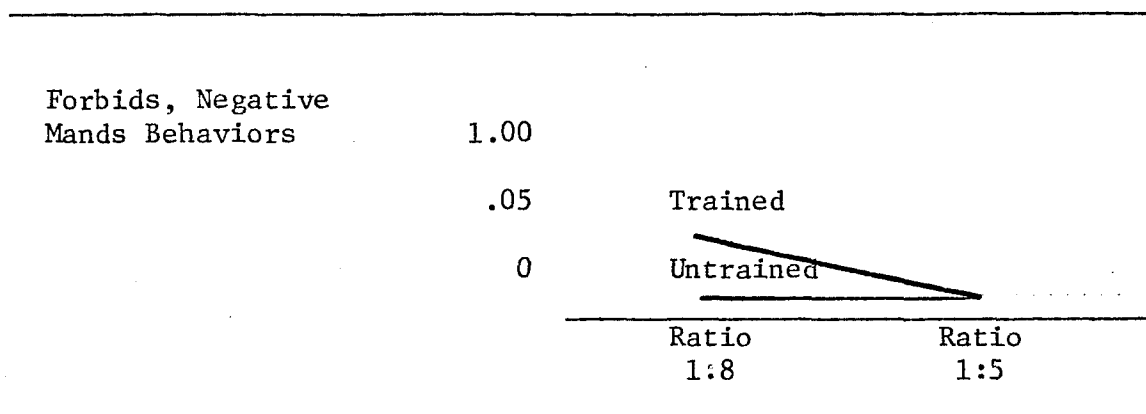
The results of the two-way analysis of variance of the Caregiving: Child category indicated no significant difference ($p < .05$) in trained and untrained caregivers or in 1:8 and 1:5 ratios of adults

Table 11
 Analysis of Variance of the Forbids,
 Negative Mands Subdivision

Source	DF	Type I SS	F-Value	PR > F	p
Training	1	0.00004382	13.93	0.0007	
Ratio	1	0.00004382	13.93	0.0007	
Training x Ratio	1	0.00004382	13.93	0.0007	<.05
Error	36	0.00011328			
Total	39	0.00024475			

	Trained	Untrained	Trained	Untrained
	1:8	1:8	1:5	1:5
Means	.42	.00	.00	.00

Figure 8
 Forbids, Negative Mands Behaviors
 By Training and Ratio



to infants. Apparently the essential caregiving activities were provided regardless of training and ratio.

Caregiving: Child Subdivisions

The Caregiving: Child category is composed of the following seven subdivisions:

1. Feeds.
2. Diapers or Toilets.
3. Dresses or Undresses.
4. Washes or Cleans Child.
5. Prepares Child for Sleep.
6. Physical Shepherding.
7. Eye Checks on Child's Well-Being.

The trained group was significantly higher ($p < .05$) than the untrained group in the Feeds and Dresses or Undresses subdivisions.

Apparently the trained caregivers had learned skills that facilitated the number of efforts made to feed and dress the infants.

The untrained group was significantly higher ($p < .05$) than the trained group in the Eye Checks on Child's Well-Being subdivision. Perhaps the trained caregivers were more comfortable with groups of infants and did less eye-checking than untrained caregivers. Apparently these subdivision activities were provided regardless of training and ratio.

The analysis of variance shown in Table 12 and in Figure 9 for the subdivision, Washes or Cleans Child, indicated that there was a significant interaction for Training x Ratios ($PR_{>F} = .0007$, $p < .05$). The mean percentages for the trained caregivers were 3.24 in the 1:8 ratio and 2.05 in the 1:5 ratio. The trained caregivers scored higher in the Washes or Cleans Child subdivision when the ratio of adults to infants was 1:8 than when the ratio was 1:5.

The mean percentages for the untrained caregivers were 1.76 in the 1:8 ratio and 2.18 in the 1:5 ratio. The untrained caregivers scored higher in the Washes or Cleans Child subdivision when the ratio of adults to infants was 1:5 than when the ratio was 1:8.

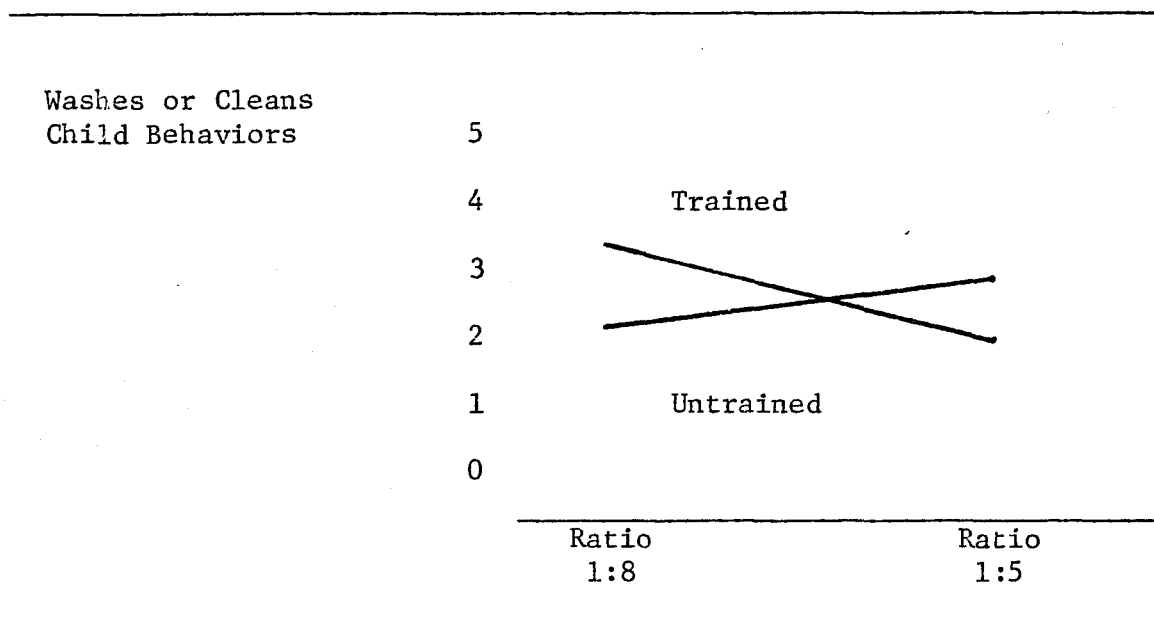
The trained caregivers scored higher than the untrained caregivers in the 1:8 ratio, while the untrained caregivers scored higher than the trained caregivers in the 1:5 ratio in the Washes or Cleans Child subdivision. Apparently the trained caregivers had learned skills that facilitated the number of efforts made in washing and cleaning larger groups of infants. The trained caregivers may have been more comfortable with five infants than with eight infants.

Table 12
 Analysis of Variance of the Washes
 Or Cleans Child Subdivision

Source	DF	Type I SS	F-Value	PR > F	p
Training	1	0.00044947	9.57	0.0038	
Ratio	1	0.00015144	3.22	0.0809	
Training x Ratio	1	0.00064240	13.68	0.0007	<.05
Error	36	0.00169056			
Total	39	0.00293388			

	Trained	Untrained	Trained	Untrained
	1:8	1:8	1:5	1:5
Means	3.24	1.76	2.05	2.18

Figure 9
 Washes or Cleans Child Behaviors
 By Training and Ratio



The untrained caregivers made more efforts to wash and clean the group of five infants than the trained caregivers.

The analysis of variance shown in Table 13 and in Figure 10 for the subdivision, Prepares Child for Sleep, indicated that there was a significant interaction for Training x Ratios ($PR > F = .0054$, $p < .05$). The mean percentages for the trained caregivers were .95 in the 1:8 ratio and 1.15 in the 1:5 ratio. The trained caregivers scored higher in the Prepares Child for Sleep subdivision when the ratio was 1:5 than when the ratio was 1:8.

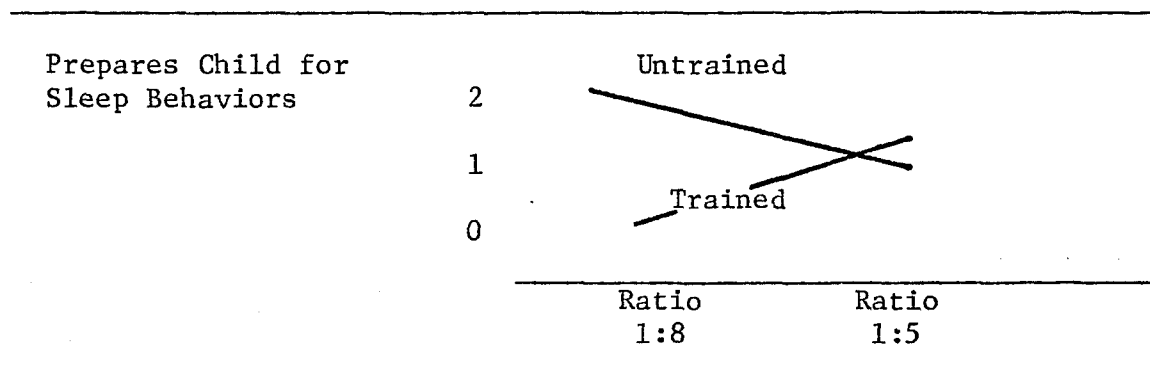
The mean percentages for the untrained caregivers were 2.12 in the 1:8 ratio and 1.04 in the 1:5 ratio. The untrained caregivers scored higher in the Parepares Child for Sleep subdivision when the ratio was 1:8 than when the ratio was 1:5.

Table 13
 Analysis of Variance of the Prepares
 Child for Sleep Subdivision

Source	DF	Type I SS	F-Value	PR > F	p
Training	1	0.00028647	6.19	0.0176	
Ratio	1	0.00019222	4.15	0.0490	
Training x Ratio	1	0.00040629	8.77	0.0054	<.05
Error	36	0.00166711			
Total	39	0.00255210			

	Trained	Untrained	Trained	Untrained
	1:8	1:8	1:5	1:5
Means	.95	2.12	1.15	1.04

Figure 10
Prepares Child for Sleep Behaviors
By Training and Ratio



The trained caregivers scored higher than the untrained caregivers in the 1:5 ratio, while the untrained caregivers scored higher than the trained caregivers in the 1:8 ratio in the Prepares Child for Sleep subdivision. Perhaps the trained caregivers were more comfortable with the larger group being awake and made fewer efforts to help them go to sleep.

Caregiving: Room Category

The results of the two-way analysis of variance of the Caregiving: Room category were shown in Table 14. It can be noted in Figure 11 that there was a significant interaction for Training x Ratios ($PR > F = .0134$, $p < .05$). The treatment effect was dependent upon the concomitant influence of the two independent variables.

The mean percentages for the trained caregivers were 7.46 in the 1:8 ratio and 5.11 in the 1:5 ratio. The trained caregivers

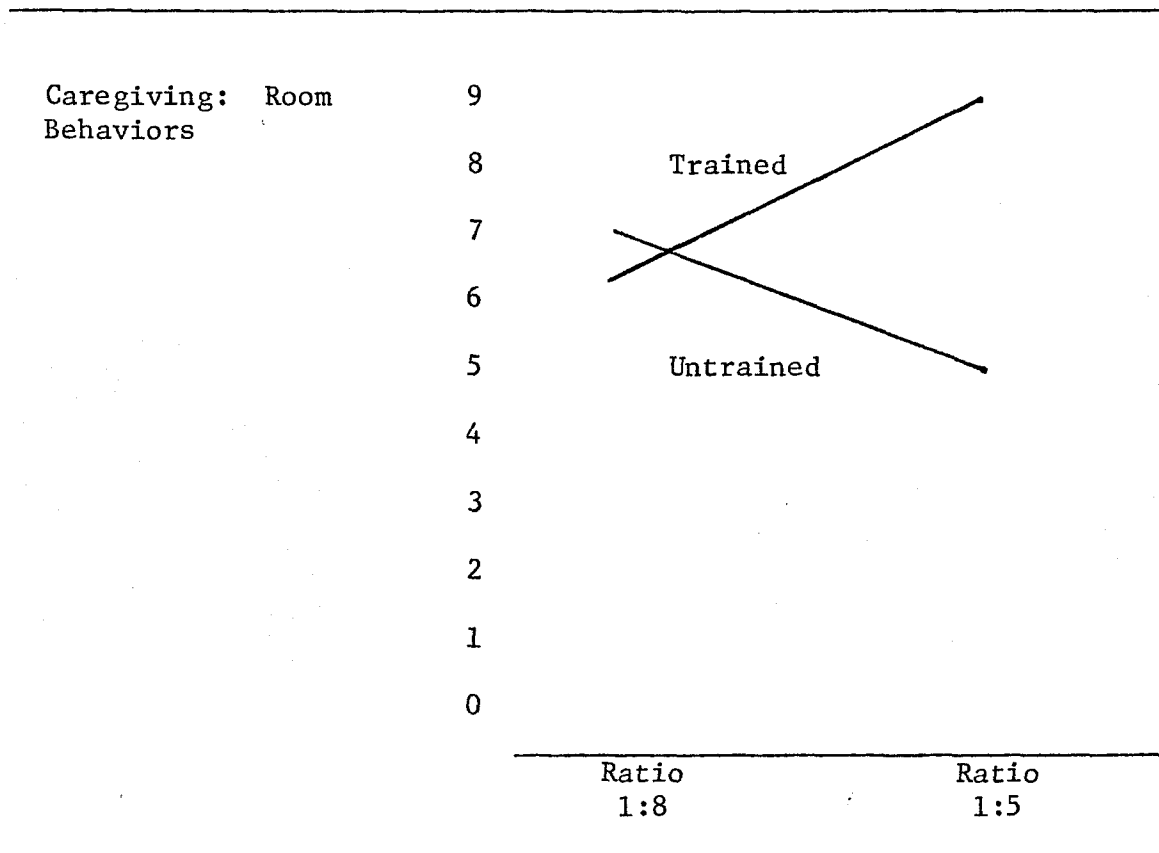
Table 14
 Analysis of Variance of the Caregiving:

Room Category

Source	DF	Type I SS	F-Value	PR > F	p
Training	1	0.00113919	1.15	0.2904	
Ratio	1	0.00005633	0.06	0.8128	
Training x Ratio	1	0.00669590	6.77	0.0134	<.05
Error	36	0.03561929			
Total	39	0.04351071			

	Trained	Untrained	Trained	Untrained
	1:8	1:8	1:5	1:5
Means	7.46	5.94	5.11	8.76

Figure 11
 Caregiving: Room Behaviors
 By Training and Ratio



scored higher in the Caregiving: Room category when the ratio of adults to infants was 1:8 than when the ratio was 1:5.

The mean percentages for the untrained caregivers were 5.94 in the 1:8 ratio and 8.76 in the 1:5 ratio. The untrained caregivers scored higher in the Caregiving: Room category when the ratio of adults to infants was 1:5 than when the ratio was 1:8.

Honig and Lally (1974) stated that teachers of younger children do quite a bit of room care. One-and-a-half times as much room

tidying was done by teachers of younger babies compared to their colleagues working with toddlers. However, the teachers in Honig and Lally's study were all trained.

The trained caregivers in the Caregiving: Room category scored higher in the 1:8 ratio than the untrained caregivers. The trained caregivers, on the other hand, scored lower in the 1:5 ratio than the untrained caregivers. The trained caregivers were very competent in the 1:8 ratio. They had skills to care for the infants and the environment as well. The untrained caregivers did not seem to be able to care for the infants or the environment in the 1:8 ratio as well as the trained caregivers could. However, again it was apparent that the untrained caregivers did very well in the 1:5 ratio with caregiving of the infants and the environment. The untrained caregivers simply seemed to be working at their peak level with the 1:5 ratio, while the trained caregivers were so comfortable with the smaller group of infants that they did less than they were capable of doing.

Caregiving: Room Subdivisions

The Caregiving: Room category is composed of the following three subdivisions:

1. Prepares Food.
2. Tidies Up Room.
3. Helps Other Caregiver.

There was no significant difference ($p < .05$) in trained and untrained caregivers or in 1:8 and 1:5 ratios of adults to infants in the first subdivision, Prepares Food. Preparing the food was one of the essentials of child care that had to be done regardless of training and ratio.

The analysis of variance shown in Table 15 and in Figure 12 for the subdivision, Tidies Up Room, indicated that there was a significant interaction for Training x Ratio ($\text{PR} > F = .0033, p < .05$). The mean percentages for the trained caregivers were 4.28 in the 1:8 ratio and 2.81 in the 1:5 ratio. The trained caregivers scored higher in the Tidies Up Room subdivision when the ratio was 1:8 than when the ratio was 1:5.

The mean percentages for the untrained caregivers were 3.07 in the 1:8 ratio and 5.84 in the 1:5 ratio. The untrained caregivers scored higher in the Tidies Up Room subdivision when the ratio was 1:5 than when the ratio was 1:8.

The analysis of variance shown in Table 16 and in Figure 13 for the subdivision, Helps Other Caregiver, indicated that there was a significant interaction for Training x Ratio ($\text{PR} > F = .0088, p < .05$). The mean percentages for the trained caregivers were .52 in the 1:8 ratio and .29 in the 1:5 ratio. The trained caregivers scored higher in the Helps Other Caregiver subdivision when the ratio was 1:8 than when the ratio was 1:5.

The mean percentages for the untrained caregivers were .85 in the 1:8 ratio and 1.67 in the 1:5 ratio. The untrained caregivers scored

Table 15
 Analysis of Variance of the Tidies
 Up Room Subdivision

Source	DF	Type I SS	F-Value	PR > F	p
Training	1	0.00082823	1.82	0.1856	
Ratio	1	0.00042285	0.93	0.3414	
Training x Ratio	1	0.00449360	9.88	0.0033	<.05
Error	36	0.01637528			
Total	39	0.02211997			

	Trained	Untrained	Trained	Untrained
	1:8	1:8	1:5	1:5
Means	4.28	3.07	2.81	5.84

Figure 12
Tidies Up Room Behaviors
By Training and Ratio

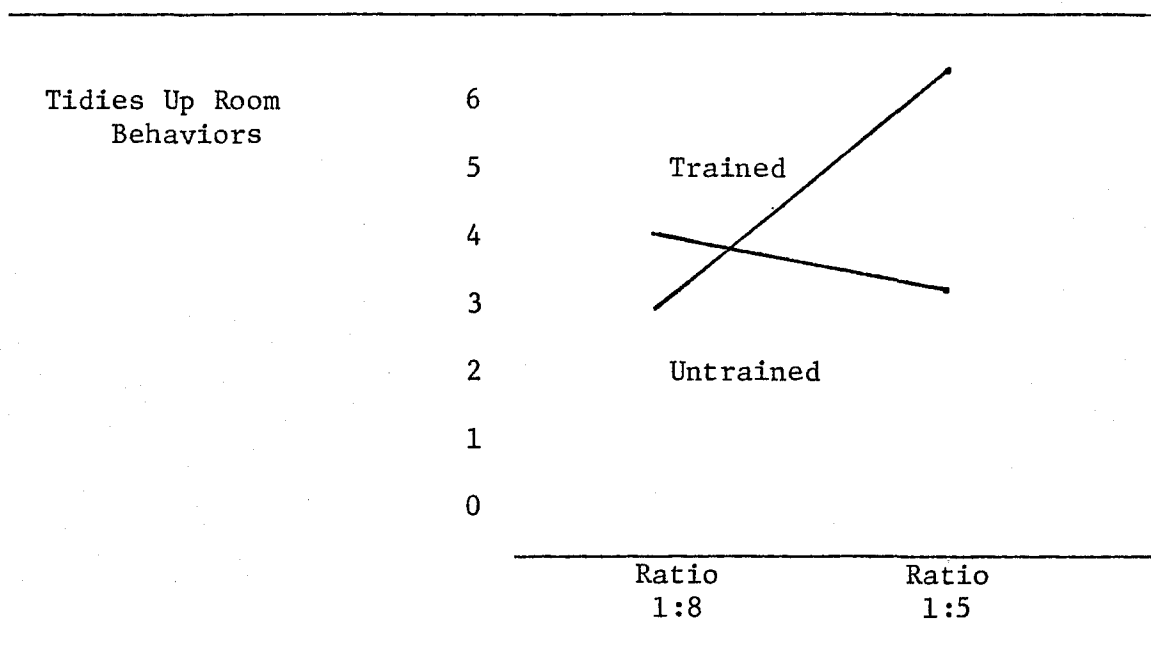
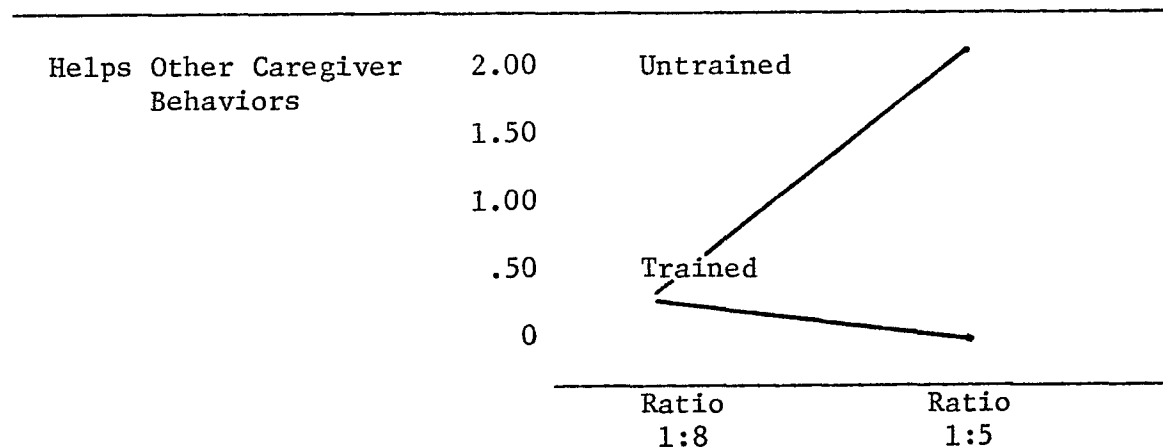


Table 16
 Analysis of Variance of the Helps
 Other Caregiver Subdivision

Source	DF	Type I SS	F-Value	PR > F	p
Training	1	0.00074062	20.78	0.0001	
Ratio	1	0.00008748	2.45	0.1260	
Training x Ratio	1	0.00027342	7.67	0.0088	<.05
Error	36	0.00128329			
Total	39	0.00238482			

	Trained	Untrained	Trained	Untrained
	1:8	1:8	1:5	1:5
Means	.52	.85	.29	1.67

Figure 13
 Helps Other Caregiver Behaviors
 By Training and Ratio



higher in the Helps Other Caregiver subdivision when the ratio was 1:5 than when the ratio was 1:8.

In the Tidies Up Room and Helps Other Caregiver subdivisions, the trained teachers used their skills very well and scored higher than the untrained teachers in the 1:8 ratio. However, the trained teachers were comfortable or bored with the smaller ratio of 1:5 infants. The untrained teachers did better in the 1:5 ratio than the trained teachers.

Physical Development Category

The results of the two-way analysis of variance of the Physical Development category were shown in Table 17. It can be noted in Figure 14 that there was a significant interaction for Training x Ratios ($PR > F = .0031$, $p < .05$). The treatment effect was dependent upon the concomitant influence of the two independent variables.

The mean percentages for the trained caregivers were .69 in the 1:8 ratio and 2.49 in the 1:5 ratio. The trained caregivers scored higher in the Physical Development category when the ratio of adults to infants was 1:5 than when the ratio was 1:8.

The mean percentages for the untrained caregivers were 3.05 in the 1:8 ratio and 2.31 in the 1:5 ratio. The untrained caregivers scored higher in the Physical Development category when the ratio of adults to infants was 1:8 than when the ratio was 1:5.

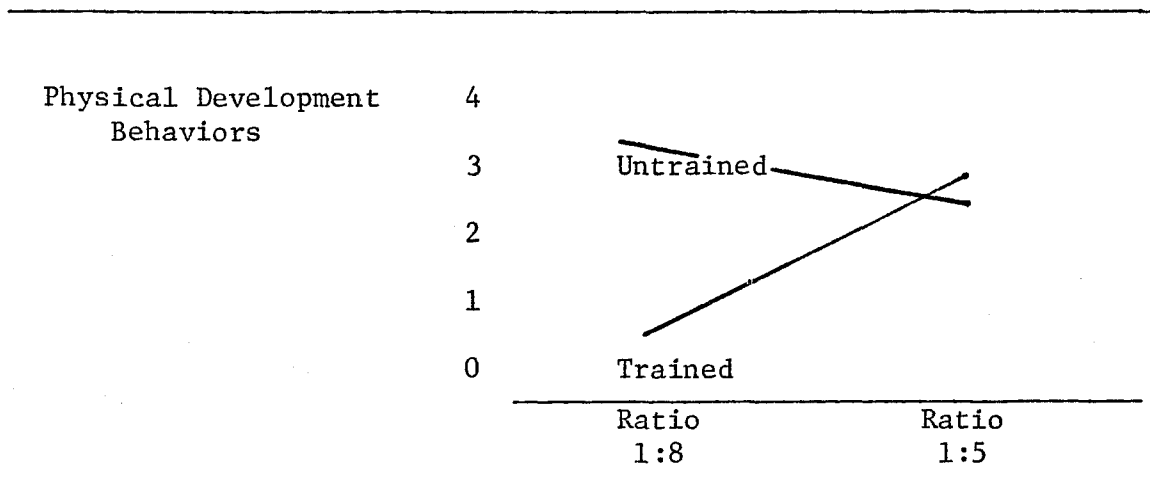
The untrained caregivers in the Physical Development category scored higher in the 1:8 ratio than the trained caregivers. The

Table 17
 Analysis of Variance of the Physical
 Development Category

Source	DF	Type I SS	F-Value	PR > F	p
Training	1	0.00118490	7.35	0.0102	
Ratio	1	0.00028350	1.76	0.1930	
Training x Ratio	1	0.00161486	10.02	0.0031	<.05
Error	36	0.00579969			
Total	39	0.00888294			

	Trained	Untrained	Trained	Untrained
	1:8	1:8	1:5	1:5
Means	.69	3.05	2.49	2.31

Figure 14
Physical Development Behaviors
By Training and Ratio



trained caregivers, on the other hand, scored higher in the 1:5 ratio than the untrained caregivers. The trained caregivers were very competent in the Physical Development category when the ratio was 1:5. Their performance went down to .69 percent in the 1:8 ratio. It is possible that the trained caregivers worked harder to foster independence in the infants when the group size increased. The untrained caregivers simply increased their inputs in this category as the number of infants increased.

Physical Development Subdivisions

The Physical Development category is composed of two subdivisions: Provides Kinesthetic Stimulation and Provides Large Muscle Play.

The analysis of variance shown in Table 18 and in Figure 15 for the subdivision, Provides Kinesthetic Stimulation, indicated that there was a significant interaction for Training x Ratio ($PR > F = .0073$, $p < .05$). The mean percentages for the trained caregivers were .48 in the 1:8 ratio and 1.64 in the 1:5 ratio. The trained caregivers scored higher in the Provides Kinesthetic Stimulation subdivision when the ratio was 1:5 than when the ratio was 1:8.

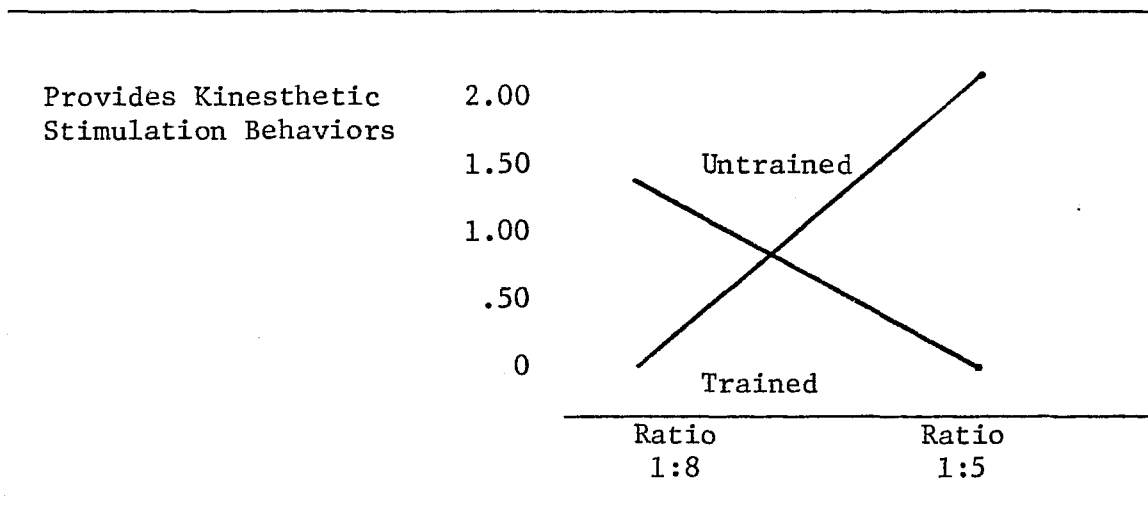
Table 18
Analysis of Variance of the Provides Kinesthetic
Stimulation Subdivision

Source	DF	Type I SS	F-Value	PR > F	p
Training	1	0.00006892	0.56	0.4572	
Ratio	1	0.00002603	0.21	0.6470	
Training x Ratio	1	0.00098729	8.09	0.0073	<.05
Error	36				
Total	39				

	Trained	Untrained	Trained	Untrained
	1:8	1:8	1:5	1:5
Means	.48	1.21	1.64	.38

The mean percentages for the untrained caregivers were 1.21 in the 1:8 ratio and .38 in the 1:5 ratio. The untrained caregivers scored higher in the Provides Kinesthetic Stimulation subdivision when the ratio was 1:8 than when the ratio was 1:5.

Figure 15
 Provides Kinesthetic Stimulation Behaviors
 By Training and Ratio



The untrained caregivers in the Provides Kinesthetic Stimulation subdivision scored higher in the 1:8 ratio than the trained caregivers. The trained caregivers scored higher in the 1:5 ratio than the untrained caregivers. The trained caregivers were very competent in the Provides Kinesthetic Stimulation subdivision when the ratio was 1:5. Their performance went down to .48 percent in the 1:8 ratio. It is possible that the trained caregivers worked harder to foster independence in the infants when the group size increased. The untrained caregivers simply increased their inputs in this category as the number of infants increased.

The untrained caregivers group was significantly higher ($p < .05$) than the trained caregivers group in the Provides Large Muscle Play subdivision. The trained caregivers may have wanted the infants to provide their own large muscle play, thus fostering more independence.

Does Nothing Category

Fortunately, there were no times that the caregivers, trained or untrained, 1:8 or 1:5 ratio, did nothing.

Summary of Quality Behavioral Repertoire

Analyses of variance were performed for six categories. The six categories provided the divisions of the teachers' total behavioral repertoire. Each category had a mean percentage which represented the quantity of inputs the caregivers scored in that category. By looking at all six categories in Table 19, it was possible to observe what the percentages of the total inputs were in the area of the following quality behaviors with infants:

1. Language Facilitation.
2. Social-Emotional: Positive.
3. Social-Emotional: Negative.

A gratifying finding from Table 19 was that Language Facilitation, one of the most important categories, made up more of the caregivers' inputs than any other area. The data showed that verbal encouragements were offered and that vocalizations were actively elicited in more than one-third of the periods sampled.

The caregivers provided frequent positive social inputs, making up approximately one-fourth of the periods sampled. It was encouraging to know that the infants experienced many smiles, pleasant voice tones, and much loving contact.

Table 19
 Mean Percentages of Six Divisions of the
 Caregivers' Total Behavioral
 Repertoire

Variables	Trained 1:8	Untrained 1:8	Trained 1:5	Untrained 1:5
1. Language Facilitation	46.96	39.17	39.86	41.70
2. Social-Emotional: Positive	20.03	27.40	27.42	25.58
3. Social-Emotional: Negative	0.42	0.00	0.00	0.00
4. Caregiving: Child	24.45	24.45	25.13	21.65
5. Caregiving: Room	7.46	5.94	5.11	8.76
6. Physical Development	0.69	3.05	2.49	2.31

The lack of negative social inputs was another gratifying finding. Criticism, frowns, and punishment were almost nonexistent among the caregivers.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to compare two trained and two untrained caregivers as they cared for groups of infants under 18 months. The comparison described the quantity and quality of caregiving acts received by infants in the following four situations:

1. Five infants receiving care from one trained caregiver.
2. Eight infants receiving care from one trained caregiver.
3. Five infants receiving care from one untrained caregiver.
4. Eight infants receiving care from one untrained caregiver.

The subjects in the study were 16 infants who were enrolled in day-care centers. Eight of the infants were enrolled in Creative World, Inc., located in Wilmington, North Carolina; and the remaining eight infants were enrolled in the Infant Care Center, located in Greensboro, North Carolina.

Honig and Lally's (1973) ABC-I was used to compare the two trained and two untrained caregivers as they cared for groups of five and eight infants. ABC-I was modified slightly for the study. This instrument was designed to assess infant environments by studying the behaviors of caregivers.

Data were collected on the following observational variables:

1. Language Facilitation.
2. Social-Emotional: Positive

3. Social-Emotional: Negative.
4. Caregiving: Child.
5. Caregiving: Room.
6. Physical Development.

The discussion in this chapter is conducted with reference to the hypotheses designed for this study.

1. The quantity of trained and untrained caregivers' behaviors will not be significantly different in the 1:8 and 1:5 ratios of caregivers to infants in the quality area of Language Facilitation. A significant interaction for Training x Ratios ($\underline{PR} > F = .0211$, $p < .05$) was noted in the Language Facilitation scores.

The training of caregivers had a significant influence on the quantity of language facilitation inputs made in caregiver-infant ratios of 1:8 and 1:5. The trained caregiver had more elaborate skills that facilitated language development in infants. These skills seemed to be used more effectively when the ratio of adults to infants was 1:8 rather than 1:5. The challenge of caring for eight infants seemed to be stimulating enough for the trained caregivers to exercise all their skill and perform higher than they did in the 1:5 ratio.

The untrained caregivers scored higher in the Language Facilitation category when the ratio of adults to infants was 1:5 than when the ratio was 1:8. The untrained caregiver even scored higher than the trained caregiver in the 1:5 ratio, perhaps indicating that the trained caregiver was bored or too comfortable with the smaller group of infants. Training only seemed to be essential as the number of

infants was increased from five to eight in the Language Facilitation category.

Hollomon (1976) found that adult-infant ratios in day-care centers are based largely on the premise that a low number of infants per adult should result in greater interaction between the adults and the infants. The increased interaction should result in better infant care. Support for this premise is based on three main sources: (1) research conducted on animals and institutionalized infants; (2) studies which show that small numbers of children per adult can result in increased IQ's and cognitive functions; and (3) statistical reports which show high infant mortality rate, particularly among children of low-social status parents. The conclusion is that the polemic over staff-infant ratios in day-care centers can only be resolved by scientific research in day-care center conditions. Quality day care, rather than ratios, is the point to be emphasized.

The present study was unique in that caregivers' behaviors had not been statistically analyzed in light of training and ratios in an infant-care setting. This was the type of scientific research that Hollomon called for in 1976. This was also the type of research needed by the North Carolina Department of Human Resources and the North Carolina Office of Child Day-Care Licensing.

In the area of Language Facilitation, which is a quality variable, the licensing standards should mandate a ratio of 1:8 with trained caregivers and a ratio of 1:5 with untrained caregivers. Day-care centers could offer quality care to eight infants with one caregiver, if the caregiver were trained.

2. The quantity of trained and untrained caregivers' behaviors will not be significantly different in the 1:8 and 1:5 ratios of caregivers to infants in the quality area of Social-Emotional: Positive. A significant interaction for Training x Ratios ($F = .0031$, $p < .05$) was noted in the Social-Emotional: Positive category.

The training of caregivers had a marked influence on the Social-Emotional: Positive inputs made in the adult-infant ratios of 1:8 and 1:5. The trained caregivers scored higher in the Social-Emotional: Positive category when the ratio was 1:5 than when the ratio was 1:8. The trained teachers may have felt that more importance should be placed on fostering independence in the infants that were cared for in the 1:8 ratio. Considering the importance given by Erikson (1963) to the development of autonomy and initiative in toddlers, it is possible that trained teachers were more sensitive to a young child's increasing needs for independence, especially in larger groups.

The untrained caregivers scored higher in the Social-Emotional: Positive category when the ratio of adults to infants was 1:8 than when the ratio was 1:5. They also scored higher than the trained caregivers when the ratio was 1:8. The untrained caregivers seemed to have natural instincts that served them well in the Social-Emotional: Positive category. These caregivers were probably not aware of Erikson's theory about the development of autonomy and of initiative in the toddler.

The Social-Emotional: Positive category is considered one of the quality indicators of the day-care program. As Keister (1969) wrote, more important than the number of caretakers per number of children is the attitude and general philosophy of the adult.

If she does not believe that cuddling, talking to loving, spending special time with each infant by a specially assigned child care worker is important, then no matter how many people she has, they will not be giving the babies the kind of attention they need. (p. 33)

The statistical implications of the present study were that trained caregivers offered more Social-Emotional: Positive inputs when the ratio was 1:5; however, untrained caregivers offered more inputs when the ratio was 1:8. As Keister suggested, the attitude and general philosophy of the adult is probably the most important aspect of Social-Emotional: Positive category.

All of the caregivers provided quality social inputs that made up approximately one-fourth of the periods sampled. It is important to know that the infants in the study had many smiles, pleasant voice tones, and much loving contact. The trained teachers probably made a little more effort than the untrained teachers to reduce the positive social inputs and to foster more independence as the group size increased.

3. The quantity of trained and untrained caregivers' behaviors will not be significantly different in the 1:8 and 1:5 ratios of caregivers to infants in the quality area of Social-Emotional: Negative. A significant interaction for Training x Ratios ($PR > F = .0007$, $p < .05$) was noted in the Social-Emotional: Negative category.

Huntington, Provence, and Parker (1972) stated that children need a balance of more gratification than frustration; of more rewards and pleasure than pain, failure, and frustration. It is rewarding that the infants in this study experienced few negative inputs from the caregivers.

The trained caregivers had a higher percentage of Social-Emotional: Negative categorical behaviors than the untrained caregivers who had none. However, the negative behaviors in the 1:8 ratio only made up less than one-half of one percent of the inputs among the trained caregivers. This slight incidence of frowns, verbal or gentle physical restraints could have been caused by either age, time, or place.

Honig and Lally (1974) stated that negative social inputs to younger babies are quite rare with trained caregivers. However, there is a slight increase in negative inputs in the afternoons, as opposed to mornings; in older infants, as opposed to younger infants; and in the lunch area, as opposed to other areas.

The Social-Emotional: Negative category is one of the indicators of a quality program. The incidence of these behaviors should be rare in a good program. It is rewarding that the quality was so high among both the trained and untrained caregivers in this study. Each infant needs the kind of care that warm, friendly adults provide, and it is pleasing that the study infants experienced that kind of quality.

4. The quantity of trained and untrained caregivers' behaviors will not be significantly different in the 1:8 and 1:5 ratios of caregivers to infants in the area of Caregiving: Child. The results of the two-way analysis of variance of the Caregiving: Child categorical variable supported the hypothesis. Apparently, the essential caregiving activities were provided regardless of training and ratio.

The lack of a readily available comparison, the importance of the problem of individualized day care for infants, and professional concern about infants who are cared for in the one-to-eight ratio of adults to infants prompted this study. Caregiver behaviors have simply never been studied scientifically to determine the significance of training and ratios.

The North Carolina Department of Human Resources and the North Carolina Office of Child Care Licensing should be interested in the fact that the quantity of caregiving activities is not significantly different ($p < .05$), whether the caregiver is trained or untrained or the ratio is 1:8 or 1:5. Working mothers with infants in licensed centers that offer 1:8 ratios should be very pleased that the caregiving activities can be accomplished regardless of ratio and caregiver training.

5. The quantity of trained and untrained caregivers' behaviors will not be significantly different in the 1:8 and 1:5 ratios of caregivers to infants in the area of Caregiving: Room. A significant interaction for Training x Ratios ($PR > F = .0134$, $p < .05$) was noted in the Caregiving: Room scores.

The trained caregivers in the Caregiving: Room category scored higher in the 1:8 ratio than the untrained caregivers. The trained caregivers, on the other hand, scored lower in the 1:5 ratio than the untrained caregivers. The trained caregivers were very competent in the 1:8 ratio. They had skills to care for the infants and the environment as well.

Elardo (1973) stated that the day-care environment should be rich with stimulating experiences that help infants develop satisfactorily. Critical factors in adult behavior are values and attitudes, particularly interpretations of good and bad behavior, methods of discipline, use of materials, and the degree to which daily housekeeping chores interfere with constructive adult-infant interaction. It is important that the caregivers' chores do not take away from the individual time each infant requires.

In the area of Caregiving: Room, the licensing standards should mandate a ratio of 1:8 with trained caregivers and a ratio of 1:5 with untrained caregivers. Day-care centers could insure quality care for infants and their room with a trained caregiver and a ratio of 1:8.

6. The quantity of trained and untrained caregivers' behaviors will not be significantly different in the 1:8 and 1:5 ratios of caregivers to infants in the area of Physical Development. A significant interaction for Training x Ratios ($\text{PR} > \text{F} = .0031$, $p < .05$) was noted in the Physical Development category.

The untrained caregivers in the Physical Development category scored higher in the 1:8 ratio than the trained caregivers. The trained caregivers, on the other hand, scored higher in the 1:5 ratio than the untrained caregivers. It is possible that the trained caregivers tried to foster more independence in physical development as the ratio increased.

Huntington, Provence, and Parker (1972) suggested that learning conditions should be conducive to the acquiring and practicing of skills; opportunities for action, and objects to manipulate, explore, and gain control over; opportunities to utilize emerging skills and support right from the beginning for the baby's use of his own abilities.

Apparently, the trained caregivers made more effort to help the baby use his own abilities when the ratio was 1:8 rather than 1:5. The implications for concerned professionals and parents in the Physical Development category are that untrained caregivers will probably assist the infants more than trained caregivers when the ratio is 1:8. Trained caregivers will probably foster more independence in the infants.

Recommendations for Further Research

The findings of this study offer promise for further research in the areas of caregiver behaviors with infants. Future investigations are needed for discovering the following developments:

1. The effects of different training practices on the caregivers' behaviors with the infants;
2. The effects of other ratios on the caregivers' inputs with the infants;
3. Additional studies that include statistical significance to substantiate the findings;
4. Replication of this study with different subjects and other day-care centers;

5. The effects of individual infants on the caregivers' behaviors;
6. The effects of changing the ratios of caregivers and infants for longer periods of time;
7. The effects of room size on caregiver behaviors as the number of infants increases; and
8. Specifications of skills, knowledge, and abilities to define the trained caregiver.

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APPENDIX

