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EMPATHY, GENDER, AND TRAINING AS FACTORS IN

THE IDENTIFICATION OF CRY-SIGNAL

PATTERNS OF INFANTS

by

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Infant/caregiver attachment is a developmental process that depends on the caregiver's ability to recognize and correctly respond to the needs of an infant. One of the primary ways an infant expresses needs is through its cry-signal. Wasz-Hockert et al. (1964a) have identified four infant cry-signals (birth, hunger, pain, and pleasure). They have constructed a checklist method for scoring the responses of adults to these cry-signals, plus an overall cry-signal (the total score of the four cry-signals). Wasz-Hockert et al. (1964a, 1964b) found that experienced males and females could recognize cry-signals more accurately than their inexperienced counterparts. However, these studies did not consider the subject's background apart from exper-ience in child care. The present study was an effort to determine how various factors, namely empathy, gender and training, affect a person's ability to correctly identify cry-signals.

A comparison was made between two groups of community college students (N=89), drawn from a larger subject pool of social science students (N=340) at Rockingham Community College. All were judged low in experience as infant care-givers (less than two weeks as a primary caregiver for an infant 0-2 years of age during the past five years). Half of

the subjects were judged high in empathy (one standard deviation above the subject pool mean on the Hogan Empathy Scale) and half were judged low in empathy (one standard deviation below the subject pool mean). Half of the high empathy subjects were randomly assigned to a training group where they listened to a 15-minute training tape on how to recognize four infant cry-signals defined by Wasz-Hockert et al. (1964a). After this training and at the same session, these subjects were asked to identify 24 infant cry-signals from a tape prepared by Wasz-Hockert et al. (1964a). The other half of the high empathy subjects were randomly assigned to a group where they were simply asked to listen to 24 taped infant cry-signals and identify them. Both groups were divided approximately equally as to males and females. All subjects were 18 to 30 years of age. The same procedure was followed with low empathy subjects.

Statistical tests (an analysis of variance and a multivariate analysis of variance) on the data found that low empathy subjects were significantly better than high empathy subjects in recognizing the birth cry-signal. It was found that gender did not significantly affect the ability to recognize infant cry-signals. Finally, it was found that training made a significant difference in the ability to recognize cry-signals. Subjects with training scored significantly higher on all of the cry-signals, except the pleasure cry-signal, which was the easiest to identify.

Training was most significant in helping subjects recognize the hunger cry-signal. There was one interaction effect between empathy, gender, and training on the hunger cry-signal. This was believed to be a carryover from the strong effect of training on this cry-signal.

The results of this study indicated that brief training of fifteen minutes can significantly increase infant cry-signal recognition scores of young adults low in infant/caregiver experience. The present study also indicated that gender was not a crucial variable in infant cry-signal recognition, perhaps because of the androgynous nature of the subjects involved. Finally, the results pointed to the fact that empathy is not a factor in cry-signal recognition, except for the most primitive cry-signal--the birth cry-signal.

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CHAPTER I

INTRODUCTION

Crying behavior in infants is a means of communication. The infant's cry-signal is the basis from which all further communication develops. Its correct interpretation by others has a direct effect on later child/caregiver behavior. Bowlby (1958) stated that crying, along with sucking, clinging, following and smiling, are the five basic responses that tie infants and caregivers together. It was Bowlby's belief that crying and smiling are especially important in the development of attachment behavior. The caregiver's response, or lack of response, to smiling and crying is a means whereby the infant learns the extent to which it has any control over its environment. Thus, the study of infant cry-signals and caregiver ability to discriminate between these signals has warranted attention. Initial and future physical and mental health of the individual depends upon this discriminative behavior.

Infant cry-signals can readily be distinguished from one another (Wasz-Hockert et al., 1964a; Wolff, 1969). Wasz-Hockert et al. (1964a, 1968) have identified four distinct cry-signals: (a) hunger, (b) pain, (c) pleasure, and (d) birth. These researchers reported that the ability to identify a cry-signal accurately is influenced by experience.

This ability was found to be further mediated by the gender of the caregiver.

In their research, Wasz-Hockert et al. (1964b) played recordings of cry-signals to an experienced and inexperienced group of males and females, who ranged in age from 17 to 50 years. Although they found that a person's previous training was an important variable in identifying infant cry-signals, they made no attempt in their research to train any of their participants. Rather, they assumed that training was the result of having "looked after" or "handled" children. Wasz-Hockert et al. (1964b) also did not consider a subject's background other than experience in child care.

This lack of specific training in recognizing cry-signal patterns is an important area that the present study concentrated on by providing training tapes of cry-signals for all subjects in the experimental group of the research. The present study also focused on subjects' backgrounds, which included age and experience with children. In addition to age and experience with children, level of empathy was included. Rogers (1962) considered empathy to be an essential link in effective communication. The inclusion of this factor in the present research added an important background trait never before explored in infant/caregiver interaction.

Significance

If it can be demonstrated in this study that males who score as high as females in trait empathy are equal to them

in infant cry-signal recognition, then understanding of the biological and psychological natures of human beings is enhanced. In a time of shifting sex roles, it is important to know more about the stability of traits relevant to care-giving and the extent to which they can be modified through experience and training. Furthermore, if it can be demonstrated that training in recognizing infant cry-signal patterns has the effect of improving this recognition ability in both males and females, then an important lead as to possible parental training techniques may be contributed. It is also vital in the area of preventing child abuse (Kempe & Helfer, 1972) to understand the relationship in both males and females between empathy, training, and ability to recognize cry-signal patterns.

Research Questions and Hypotheses

The present study proposed the following research questions:

(a) Are there differences in the cry-signal recognition abilities of males and females classified as high or low in empathy who are equal in infant-care experience?

(b) What is the effect of training on the cry-signal recognition ability of males and females classified as high or low in empathy who are equal in infant care experience?

From the literature (Wasz-Hockert et al., 1964b) it would be expected that training would have a positive effect on the ability of subjects to correctly identify certain infant cry-signals. Wasz-Hockert et al. (1964b) found that males with

training scored significantly higher than their counterparts
in recognizing the hunger cry-signal. Females with training
scored significantly higher than females without training on
the overall cry-signal score. Females with training also
scored higher than their counterparts at correctly identify-
ing the pain cry-signal.

The following hypotheses were proposed:

Hypothesis I. There will be no significant difference
in mean scores on the Infant Cry-Signal Recognition Checklist
between subjects who score high and those who score low in
trait empathy.

Hypothesis II. There will be no significant difference
in the mean scores on the Infant Cry-Signal Recognition
Checklist between adult males and adult females.

Hypothesis III. There will be a significant difference
in the mean scores on the Infant Cry-Signal Recognition
Checklist between those subjects who have been trained and
those who have not.

Hypothesis IV. There will be no significant interaction
effect.

Definition of Terms

Trait Empathy. A measured score on the Hogan Empathy
Scale (Hogan, 1969, Appendix A). High scores are indicative
of high personality trait empathy. Low scores are indica-
tive of low personality trait empathy. The average score
reported by Hogan for males and females in college (all

levels) is 39.1 and 40.7 respectively. High scores (one standard deviation above the mean) are 43.8 and above for males and 46.6 and above for females. Low scores (one standard deviation below the mean) are 34.4 and below for males and 34.8 and below for females.

Typical Birth Cry-signal. The typical birth cry-signal is obtained within five minutes after the child has been delivered. It is relatively short in length, (about one second), and its melody is usually flat or falling. The cry-signal is almost always voiceless and is tense (Wasz-Hockert et al., 1968).

Typical Pain Cry-signal. The typical pain cry-signal is rather extended in length (usually between two and four seconds). The melody form of this cry-signal is usually falling. The pitch of the pain cry-signal tends to be high and is usually tense. It was recorded when the baby was having a vaccination or after pinching the skin over the infant's biceps (Wasz-Hockert et al., 1968).

Typical Hunger Cry-signal. Most hunger cry-signals have a very characteristic melody form. This form tends to be rising and falling in nature. The pitch of the hunger cry-signal is not very characteristic, although the maximum pitch of the hunger cry-signal is lower than the pain cry-signal. The length of this cry-signal is about one to two seconds. The cry-signal was recorded about four hours after the baby's previous meal when the infant was crying steadily

and all other motives for discontent had been excluded as far as possible (Wasz-Hockert et al., 1968).

Typical Pleasure Cry-signal. Most pleasure cry-signals are flat in form. They often have a nasal quality. The melody form is usually rising and falling, somewhat like the hunger cry-signal. The typical pleasure cry-signal is never tense and never voiceless. It is short in length lasting between one and two seconds. The pitch of this cry is the most varied of the cry-signal patterns. The pleasure cry-signal does not develop until the baby is about three months old. The sound is associated with specific pleasure situations, such as the baby looking at an adult who may be stimulating the child with gentle movements or making soft noises (Wasz-Hockert et al., 1968).

Training. Training consisted of a fifteen-minute audio tape that subjects in the experimental group were asked to listen to. This tape explained and demonstrated all four of the cry-signals collected by Wasz-Hockert et al., (1968). It also provided six "practice" cry-signals that participants were asked to identify. The six practice cry-signals were identified after each one was played and the criteria for identifying that cry-signal were explained again.

High Experience with Infants. Individuals who had looked after a baby aged 0-2 years for a total time period of two weeks or more within the past five years.

Low Experience with Infants. Individuals who had not looked after a baby aged 0-2 years for a total time period of two weeks or more within the past five years.

Cry Recognition Ability. The ability to correctly identify the infant cry-signal vocalizations from hearing them on a tape. Identification of cries was recorded on a four-choice checklist. Each correct response was scored 1 and each incorrect response was scored 0. The total number of points for all cries was considered the overall cry-signal recognition ability.

Assumptions

A major assumption of this study was that the subjects were similar in their background with regard to child care, knowledge, and experience. It was also assumed that the psychological trait, empathy, was a reasonably stable personality characteristic and could be adequately measured by means of the Hogan Empathy Scale.

Limitations

The major limitation of this study was the use of a unidimensional measure of trait empathy--a self-report instrument. The study was also limited in asking for responses only to the Wasz-Hockert et al. (1964a, 1968) audio tapes and responses were not based on any viewing of adult/infant interaction. A limitation on the design involved obtaining equivalent groups of subjects on which to make comparisons.

Finally, the study was limited in terms of the population on which it was conducted and the generalizability of the findings.

CHAPTER II

REVIEW OF THE LITERATURE

The study of infant vocalization is a relatively young science. Not until the nineteenth century was serious attention given to the sounds of infancy (Ostwald, 1972). William Gardiner (1838) published the first book in the field. Charles Darwin (1855) was another early pioneer in the area, treating the topic of infant crying and screaming quite comprehensively. However, it was not until the present century that extensive research on infant cry-signal patterns was conducted.

The Infant Cry-Signal as Meaningless

Sherman (1927) was the leading pioneer in the twentieth century in researching the meaning of the infant cry-signal. His study on the differentiation of emotional responses in infants involved observers, who judged the emotional characteristics of the cry-signals of normal infants below twelve days of age. The observers were graduate students in psychology, second-and third-year medical students, and student nurses. Only the student nurses had had experience with infants. The four stimuli Sherman used to "call out" the infant reactions were: (1) hunger, (2) dropping, (3) restraint, and (4) sticking with a needle. Since the experiment was unstructured and the observers were not

allowed to see the infants, "twelve emotions were named by the group of 23 observers, and very little relationship was noted between the judgments and the qualitative nature of the stimuli" (p. 350). The most frequent "emotions" named were colic, hunger, pain, and fear.

Later texts, notably Miller (1951) and van Riper (1954), quoted Sherman's study and agreed with him that infant cry-signals were meaningless. Miller contended that parents who could distinguish from a baby's cry-signal what the baby wanted were doing so on the basis of their knowledge of the situation, not the baby's cry-signal. Van Riper supported this view. He stated that during the first two weeks of life, most of the infant's vocalization seemed to have no intent or meaning.

Other researchers (Gesell, 1941; Osgood, 1953; Spitz & Cobliner, 1965) described infant cry-signal patterns basically as Miller, van Riper, and Sherman had. Terms such as "random", "non-expressive", and "diffuse", were used by these investigators in characterizing the utterances of babies.

Maternal Recognition of the Infant's Cry-Signals

Allied to the question of the meaning of infant cry-signal patterns was the question of the maternal recognition of these patterns. Illingworth (1955) noted that mothers in four-bedded wards of a maternity hospital reported that they woke when their own infants cried, but slept when other infants on the ward cried.

In a follow-up study inspired by Illingworth's observation, Formby (1967) found that mothers recognized their own baby's cry-signal from about 48 hours after birth. The study found no evidence that maternal age, multiparity, or method of feeding were correlated with this ability.

Valanne et al. (1967) explored whether mothers were able to identify their own newborn's cry-signal during the first week of life. They found that about a third of the mothers they tested were able to identify their own infant's cry-signal from a taped series of nine different infants' hunger cry-signals.

Greenberg et al. (1973) compared 50 mothers "rooming-in" with their infants and 50 mothers in a conventional hospital situation where the infant was placed in a separate nursery. Results of self-assessment ratings showed that there was a significant difference in the two groups. Rooming-in mothers judged themselves to be more confident and competent in the care of their babies. They also felt that they could understand one or more attributes of their baby's cry-signals.

Tulkin and Kagan (1970) in studying maternal behavior responses found that maternal differences were related to various factors. Among these factors were the different conceptions of infancy and different values. Middle-class mothers were found to respond more quickly and more frequently to their infants' frettings, than working-class mothers.

Bernal (1972), in a study involving various influences on mothers' responses to crying during the first 10 days of life, found that mothers of second-borns responded to crying more quickly than mothers of first-born infants. She also found that the time since the last feeding was the most important determinant of the speed and nature of the maternal response. In this study, "only a small group of the mothers in the sample considered the type of cry to be a determinant of their response" (p. 368).

Wolff (1969) found similar results. He concluded that "with some exceptions the mother's personal style (and hence her past experience) are far more important than the form of crying for determining how she will care for her crying baby" (p. 93). Wolff stated that according to his observations, most experienced mothers were guided in their interaction with their crying infant by the events of the preceding three hours.

Infant Cry-Signal Patterns as Meaningful

Along with the research on maternal recognition of infant cry-signals, came separate research on the frequency of and stimulus for infant cry-signal patterns. In research on the frequency of infant crying, Aldrich et al. (1945) found that the more care an infant was given, the less crying behavior the infant exhibited. Their study measured the crying behavior of infants for the first eight days of life.

Aldrich et al. (1949) in a study of 18 babies during the first eight days of life identified five reasons for crying. They were hunger, vomitus, soiled diaper, wet diaper, and unknown reason. The most prevalent reason for crying was hunger, which accounted for 37% of all cry-signals. It was closely followed by unknown reasons, which made up 31.1% of the reasons for crying. Aldrich et al. (1949) in their conclusion on neonatal crying "assumed the cry of the newly born baby as an individualized form of self-expression" (p. 669).

Brazelton (1962) had eighty mothers keep records on their infants for the first twelve weeks of life. The results indicated that on the average an infant cries $2\frac{1}{4}$ hours a day during the first 7 weeks of life. Crying diminishes thereafter. From this study, Brazelton hypothesized that a certain amount of crying is inevitable.

Other researchers looking at the stimulus for infant cry-signal patterns focused their attention on the individualized nature of the infant cry-signal. Karelitz et al. (1964) suggested that infant crying is a possible indicator of intellectual potential, and recommended further research in this area. Karelitz (1962) and Fisichelli (1963) indicated that the crying activity of normal infants can be distinguished from that of infants with brain damage. In follow-up studies of infant cry-signal patterns, Vuorenkoski et al. (1970) and Koivisto et al. (1970), using sound spectrographic

equipment, found that the cry-signal patterns of a group of infants with various diseases deviated from normality in several acoustic characteristics. One characteristic which dominated the abnormal cry-signal patterns was an elevation in the pitch of the cry. Another sign of abnormal cry activity in infants was a low or high number of cry-signals during a certain period of time.

Lind et al. (1967) found that 90 pediatricians, general practitioners, and medical students were very accurate in identifying abnormal cry-signal patterns. These individuals averaged 15.4 correct answers out of 20 for pain cry-signals from infants with Down's syndrome, Kernikterus, hyperbilirubinemia, and Maladie du Cri du Chat.

In 1964 Wasz-Hockert et al. disconfirmed the negative results of Sherman (1927) and found that 80 trained women nurses between 23 and 37 years old could distinguish different types of infant cry-signal patterns. In this experiment Wasz-Hockert et al. (1964a) used recorded vocalizations typical to the situations of birth, pain, hunger, and pleasure. They also gave response categories to all subjects in advance, so that the task was structured in a multiple-choice manner. The tape used in this research consisted of

> 24 selected vocal responses that seemed, by an auditive analysis, to be typical for the four situations: six birth vocalizations (obtained during the first 5 minutes of the life of the child), six pain vocalizations (recorded when vaccinations were administered, from two weeks to eight months of age), six hunger cries (recordings were made about 4 hours after previous mealtime, from babies one week to eight months

of age), and six pleasure cries (obtained after meal from babies 4-8 months old). All material used was obtained from normal children and normal deliveries. (p. 154)

In distinguishing between the four different types of cry-signals, Wasz-Hockert et al. (1964a, 1964b, 1968) found that each cry-signal had distinct characteristics. They also found that it was possible to identify most cry-signals of these four types from spectrograms.

Wasz-Hockert et al. (1964b), in an experiment involving males and females who either had experience or lacked experience in child care, found significant differences between experienced and inexperienced females on recognizing the pain cry-signal, the experienced females being more accurate. Experienced and inexperienced males in child care differed significantly in recognizing the hunger cry-signal. Again, the experienced males were better in this task. The researchers defined the experienced group of females (N=96) as "mothers, children's nurses, pediatricians, and midwives, who had looked after children aged 0-2 for longer than two weeks" (p. 393). The inexperienced group of women (N=61) were childless females, who had not had such experience. The experienced group of males consisted of fathers and male pediatricians (N=81) "who had handled children" (p. 393). The inexperienced group of males (N=42) was composed of "men without children or experience in handling them" (p. 393). Ages for all groups ranged from 17 to 50 years.

No overall significant difference in cry-signal recognition was found between experienced and inexperienced males. However, with the females, the experienced group's overall score was significantly higher than the inexperienced group's. In evaluating the results, Wasz-Hockert et al. (1964b) stated that "training definitely plays a part in identifying the meanings of a child's preverbal cries" (p. 394).

This research group also suggested that in the future experiments of this type include the subject's "background" apart from experience in child care.

Using an observational and experimental approach, Wolff (1969) studied the cry-signal patterns of eighteen infants. Through the analysis of spectrographic records and observations, he distinguished four cry-signal patterns: rhythmical, anger, pain, and frustration. Wolff considered the rhythmical cry-signal, sometimes referred to as the "hunger cry", to be the basic pattern. This cry-signal was described as being "characteristically rhythmical and varies in fundamental frequency from 250 to 450 cycles per second in both sexes" (p. 82). According to his observations, Wolff found that most mothers made an explicit distinction between the rhythmical cry-signal and the angry cry-signal. Wolff also found that when mothers were in an adjoining room and heard a pain cry-signal, they responded more quickly and with more concern than to other cry-signal patterns.

Although Wasz-Hockert et al. (1964a, 1964b, 1968) and Wolff (1969) did not agree precisely on the cry-signal patterns displayed in infancy, it is interesting to note that two of the patterns they identified--rhythmical and pain-- were the same. In evaluating the similarities and differences between the results, it should be noted that Wolff's study was conducted in the homes of the infants after birth. Thus, he did not consider the birth cry-signal pattern. Furthermore, for unknown reasons, Wolff did not discriminate a pleasure cry-signal as did Wasz-Hockert et al.

The other differences between the cry-signal patterns are explained best in terms of collecting and grouping the data. Wasz-Hockert et al. collected their data for up to eight months after birth, as opposed to six months by Wolff. Furthermore, the data from Wasz-Hockert et al. were collected at more specific times (e.g., when vaccinations were administered) as opposed to the collecting of data in the homes for extended periods of time employed by Wolff.

A final difference between the two data samples is in terms of classifying and refining. What Wolff classified as anger and frustration cry-signals, Wasz-Hockert et al. considered to be variations of the rhythmical and pain cry-signals. Thus, the differences between Wolff and Wasz-Hockert et al. may not be as great as they initially appear. In general, it seems that the research by Wasz-Hockert et al. was more comprehensive than that by Wolff. However, Wolff was more interested in studying maternal behavior, while

Wasz-Hockert et al. were more concerned with differentiating between infant cry-signal patterns. For that reason, the latter's classification system of cry-signal patterns was used in this study.

Personality Factors and Experience with Infants

It is interesting to note in the research on infant cry-signal recognition that while experience with infants has been taken into account (Wasz-Hockert et al., 1964a, 1964b, 1968; Wolff, 1969), individual personality factors have not been measured in any objective manner. Yet some personality factors (e.g., empathy) are believed to be directly related to skill in interpersonal communication and understanding. Furthermore, it has been shown that empathy can be increased through experience. For example, Cantrell and Hendrickson (1970) found that empathy, as measured by the Dawe-Jones Picture Test, increased as college students learned about child development. In follow-up on these same women students three to five years later, the researchers discovered that the empathy level of the students was still higher than it was before they enrolled in child development courses. However, the students had not retained the entire empathy increase they had scored at the end of the course.

Other studies associated with empathy, such as the ability to read nonverbal cues (Allport, 1924; Davitz, 1964; Guilford, 1929; Jenness, 1932; Kline & Johannsen, 1935), also found that ability in this area increased with training.

Furthermore, Dimitrovsky (1964) hypothesized that cultural sex-role pressures and experiences have a lot to do with emotional sensitivity. Thus, studying empathy appears to be a useful way of determining how a "background" personality trait affects the ability to recognize infant cry-signal patterns.

Definitions of Empathy

Perhaps the reason empathy has not been widely studied in adult/child interactions is due to the difficulty of defining what empathy is and how it is measured. Empathy has been defined in many ways by those inside and outside the discipline of psychology.

Freud (Strachey, 1957) was one of the first to deal with the subject of empathy. He spoke of it in terms of identification. According to Freud, empathy was an unconscious activity based on instincts. It was subject to decline with maturity. The reason decline took place with maturity, according to Freud, was due to the fact that the individual came to feel less similar to objects and to other people. Thus s/he found identification to be less reliable.

> without any special reflection we attribute to everyone else our own constitution and therefore our consciousness as well...this identification is a sine qua non of our understanding. This inference (or this identification) was formerly extended by the ego to other human beings, to animals, plants, inanimate objects and to the world at large, and proved serviceable so long as their similarity to the individual ego was overwhelmingly great; but it became more untrustworthy in proportion as the differences between the ego and these "others" widened. (p. 169)

Freud's explanation of the development of empathy is one that linked understanding with the feeling of similarity.

Sullivan (Blitsten, 1953) also viewed empathy as most intense in the infant stage of development. He agreed that empathy tended to decline with growth. For Sullivan empathy referred to "the peculiar emotional linkage that subtends the relationship of the infant with other significant people" (p. 79).

Another early definition of empathy was given by Downey (1929). Downey defined empathy in terms of projection.

> Through subtle imitation we assume an alien personality, we become aware of how it feels to behave thus and so, then we read back into the other person our consciousness of what his pattern of behavior feels like. (p. 177)

Mead (1934) described empathy as the ability to "take the role of the other" (p. 142). Mead saw empathy as related strongly to social intelligence. It was Mead's belief that if one practiced role-taking, one's social sensitivity would be increased, and self-concept and self-control would be enhanced.

Murphy (1947) described empathy as "experiencing within oneself what actually belongs to other perceived persons or objects" (p. 496). Wedek (1947) referred to empathy as the "ability to judge correctly the feelings, moods, and inclinations of others" (p. 133).

In a comprehensive and philosophical manner, Buber (1948) stated:

> Empathy means, if anything, to glide with one's own
> feeling into the dynamic structure of an object, a
> pillar, or a crystal or the branch of a tree, or
> even of an animal or a man, and as it were to trace
> it from within, understanding the formation and
> motoriality of the object with the perceptions of
> one's own muscles; it means to "transpose" one-
> self over there and in there. (p. 97)

Although not limited specifically to human interper-

sonal relationships, Buber's definition represents as

thorough a definition of empathy as has been given.

However, other definitions of empathy have been more

specific. Jones (1954) gave an operational definition of

adult empathy for young children. It characterized the

empathic individual as one who

> will respond to a child's expression of needs by
> quickly recognizing and accepting the child's feel-
> ings in the situation. He will take appropriate
> action to meet the child's needs, show warmth and
> sympathy toward the child, and will see the
> child's reaction in terms of causes. (p. 683)

In counseling, empathy has been defined in many of the

same terms used in other definitions. One of the best defi-

nitions in this field has been given by Truax and Carkhuff

(1967). Their concept of accurate empathy is that which

occurs when "both the therapist's sensitivity to current feel-

ings and his verbal facility to communicate this understanding

in a language attuned to the client's current feelings" (p. 46).

Although counseling definitions usually involve the use of

words, language is not considered necessarily a part of

empathy.

Hogan (1969) has summed up the meaning of empathy on all

levels. According to Hogan,

the consensus of dictionaries is that empathy means
the intellectual or imaginative apprehension of
another's condition or state of mind without
actually experiencing that person's feelings.
Although this definition implies a task, it says
nothing about accuracy of performance. (p. 308)

Devising a technique for measuring how accurately empathy

is experienced has been yet another problem of conducting

research in this area.

The Measurement of Empathy

In dealing with the problem of measurement, various

empathy scales have been devised. Most of these scales

have been developed to measure therapist empathy in a coun-

seling session. However, two early instruments developed

to measure empathy, those by Kerr (1947) and Jones (1954),

were not concerned with therapist empathy per se.

Kerr's Empathy Test has been the object of numerous

reliability and validity studies. Performance on the test

was found to be related to functioning in industry, sales,

and clinical practice. The Dawe-Jones test of adult empathy

for young children was an adaptation of the children's forms

of the Rosenzweig Picture-Frustration Study. This instru-

ment was developed at the University of Wisconsin. The test

was mainly projective. The subject was asked to imagine

what s/he would say in response to a child after seeing a

picture of a line drawing that showed a child and an adult

talking to each other with the child's words already given.

Numerous other instruments all rather diverse have been developed over the years to try to measure empathy. According to Kurtz and Grummon (1972) there are at least four general approaches under which the measurement of empathy, specifically therapist empathy, can be classified. These approaches are: (1) situational, (2) predictive, (3) tape-judged ratings, and (4) perceived empathy.

The situational approach to measuring empathy has been one that has employed a standardized test situation in order to elicit responses. Measured in this manner, empathy has been judged to be a trait with those scoring highest on the situational test considered to be capable of greatest empathy. The Affective Sensitivity Scale (Kagan et al., 1967) is a representative test of this approach. On the Affective Sensitivity Scale, the test taker, after viewing a videotape segment of an actual interview, is told to choose a statement that best describes the last feeling expressed by a client. Although this test does not measure empathy per se, it does measure the ability to perceive and identify affective states in others, abilities considered important components of empathy.

The predictive approach to measuring empathy has focused on the predictive ability of the therapist to sense how his client will respond to a series of self-descriptive items. In this approach either a standardized instrument, like the Interpersonal Checklist (La Forge & Suczik, 1955), or a

tailor-made instrument is utilized. The therapist checks the items s/he believes the client has previously checked as being self-descriptive. "The percentage of correctly predicted responses provides the index of the therapist's predicted empathic ability" for a particular client (Kurtz & Grummon, 1972, p. 108).

In the judged tape ratings, independent judges rate the level of therapist empathy actually present in an interview. The Carkhuff Empathic Understanding in Interpersonal Process Scale (1969) has been a prime example of this method. Carkhuff's scale employs a 5-point rating system. In level 1, the therapist's responses either distract from the expressions of the client or do not attend to what is being said. In level 3, the therapist's responses are seen as being inter-changeable with the client's words. In essence, the thera-pist is seen as expressing the same affect and meaning of the client. In level 5, the therapist is judged to be responding in such a way that his/her words add significantly to the feelings and meanings of the client. In this way the therapist expresses thoughts or feelings that the client has been unable to express. Carkhuff's model of judging and training empathy in individuals has been especially popular in counseling programs.

A final classification of empathy, according to Kurtz and Grummon (1972) has been perceived empathy. This classi-fication has used such instruments as the Barrett-Lennard

Relationship Inventory (1962). This inventory measures the client's perception of the therapist's empathy. It is filled out by the client at specified times during therapy interviews. Since the instrument does not allow for a neutral position, the client either agrees or disagrees with the scale's 16 statements. Using a perceived empathy instrument at various times has allowed for a comparison of perception over time.

In 1969, Hogan

> developed an empirically keyed empathy scale by comparing the responses of 57 men with high ratings and 57 with low ratings for empathy across the combined-item pool of the California Psychological Inventory (CPI)...and the Minnesota Multiphasic Personality Inventory (MMPI). (Grief & Hogan, 1973, p. 280)

Hogan's instrument was based on the ratings used to define the construct empathy. Martin and Tomey (1973) describe Hogan's view of the empathic individual as one who is socially perceptive of a wide range of social cues, who has an awareness of his impressions on others, who is adept at social facilitation techniques, and who is insightful into his own and others' behavior and motivation.

Hogan's scale differs from previous empathy instruments in that: (1) the scale is not projective and (2) the scale is based mainly on items found in other standardized personality tests, such as the CPI and MMPI. It is Hogan's contention that his scale measures "trait empathy" as opposed to "state empathy". Hogan has cautioned that scores on an empathy scale do not predict such things as counseling

ability. At the same time, Hogan has pointed out that it is unrealistic to isolate empathy as such, since it is related to a number of different factors.

Empathy and Sex Differences

One factor that empathy has been associated with is sex differences. As early as 1935, Koffka proposed that women were superior to men in empathic judgment. Although Koffka did not test his hypothesis, others did. Halpern (1949) and Wolf and Murray (1937) found that the accuracy of empathic judgments appeared to be related to the similarity between the person making a rating and the person about whom the rating was being offered. Allport (1937) stated that in regard to understanding personality, males understood the personality of males better than they did females. A similar relationship was stated to hold true for females.

Olesker and Balter (1972), using the Affective Sensitivity Scale, found that males and females did not differ significantly with regard to empathic ability in judging the feelings of clients during videotaped counseling sessions. However, in support of Allport (1937) they found

> significant differences...between same-sex groups, supporting the hypothesis that individuals will show more empathy when judging people of the same sex than when judging people of the opposite sex. (p. 559)

In testing out the assumption that sex differences are related to the development of sensitivity, Dimitrovsky (1964) studied 224 children selected from a normal school population.

He found that between the ages of five and twelve, there is
a "gradual and steady progressive increase in the ability to
identify the emotional meaning of vocal expressions" (p. 81).
He also found that girls were more accurate in their judgment
of vocal expressions of feelings than were boys. The only
group Dimitrovsky found where boys scored higher than girls
was in the five-year-old group. In speculating on this find-
ing, Dimitrovsky hypothesized that with age there is greater
cultural expectations on boys and girls to conform to the
norm that a girl is "sensitive and intuitive" and a boy is
"active and objective". These cultural expectations play an
increasing role in development according to Dimitrovsky and
"one would expect greater differences in the degree to which
boys and girls attend to emotional stimuli and thus acquire
skill in discriminating emotional expressions" (p. 84).

The differences between the sexes in acquiring sensitiv-
ity is apparently a measurable trait in adulthood. Hogan
(1969) noted that on his empathy scale "females score one to
two points higher than males on the average; that is, women
seem to be slightly (but not significantly) more empathic
than men..." (p. 313). This finding according to Hogan is
in line with conventional wisdom on this topic.

The Present Study

Although past research projects in the separate fields
of infant cry-signal pattern recognition and empathy have
been conducted in many areas, some research questions have

not been explored. For instance, past studies have failed to explore the relationship between empathy and the recognition of infant cry-signal patterns. Part of the reason for this lack of research has been due to the absence of an accurate instrument with which to measure empathy. However, the Hogan Empathy Scale is a measure that has resolved this problem. The present study made use of the Hogan scale as well as the cry-signal patterns of infants defined and recorded by Wasz-Hockert et al. (1964a). Specifically the relationship between high and low empathy and infant cry-signal recognition ability was explored.

In addition, this study sought to answer another question not examined in the past. Specifically, the question was whether males and females equally low in child-care experience score similarly in infant cry-signal pattern recognition.

The question of training adults to recognize infant cry-signal patterns was another area where research had not been conducted in a systematic way. It too was explored.

Thus, the present study examined questions left unanswered by past studies--especially those questions concerned with the relationship between empathy, gender, and training in the recognition of infant cry-signal patterns.

CHAPTER III

METHOD

Previous research on infant cry-signals has been pre-dominantly descriptive. The present study, however, was both descriptive and inferential.

Design

This research incorporated a 2 x 2 x 2 experimental design. Factor one was empathy. Factor two was gender. Factor three was training. The dependent variable was infant cry-signal recognition, which was made up of four distinct patterns (birth, hunger, pain, and pleasure) as well as an overall cry-signal score. Homogeneity of groups was gained by accepting only those participants who had little experience with the care of infants.

The overall paradigm for the design was as follows:

	Group A_1 (No Training)		Group A_2 (Training)	
B_1 High Empathy	C1 Females (N=10)	C2 Males (N=10)	C_1 Females (N=10)	C2 Males (N=10)
	INFANT CRY-SIGNAL RECOGNITION SCORES			
B_2 Low Empathy	(N=10)	(N=10)	(N=10)	(N=10)

"A" Factor is Group

"B" Factor is Empathy

"C" Factor is Gender

Hypotheses

The following hypotheses were proposed:

Hypothesis I. There will be no significant difference in mean scores on the Infant Cry-Signal Recognition Checklist between subjects who score high and those who score low in trait empathy.

Hypothesis II. There will be no significant difference in the mean scores on the Infant Cry-Signal Recognition Checklist between adult males and adult females.

Hypothesis III. There will be a significant difference in the mean scores on the Infant Cry-Signal Recognition Checklist between those subjects who have been trained and those who have not.

Hypothesis IV. There will be no significant interaction effect.

Control of Variables and Variance

In this research there was a maximizing of the experimental variance (i.e., the variance of the dependent variable influenced by the independent variables) through controlling the variables of experience, gender, and empathy in the sampling procedure. The sample of participants was selected through the administration of a biographical questionnaire and an empathy scale. Experience was controlled through the elimination of those subjects who had had the equivalent of two weeks or more as the primary caregiver of an infant from

0-2 years of age within the past five years. The variable
of gender was controlled by randomly assigning an equal
number of males and females to the experimental and control
groups.

The variable of empathy was controlled by observing
the frequency of distribution for the empathy scores.
Based upon the distribution of scores, high and low cutoff
points were determined for both experimental and control
groups. This had the effect of maximizing the variance by
establishing groups with empathy scores at the extremes of
the curve. It also maximized the difference noted by expos-
ing the experimental group to training.

For the present study, scores were based on a community
college population of 340. The mean score and standard devi-
ation on this test for males was 35.52 and 5.46 respectively.
For females, the mean score was 34.82 and the standard
deviation was 4.11. High scores were 40.98 and above for
males and 38.93 and above for females. Low scores were 30.06
and below for males and 30.71 and below for females.

Control of extraneous variance was established by using
only adults who had a similarly low experience background
with infants 0-2 years of age. Further control was gained
through keeping the groups as homogeneous as possible using
age (18-30) and environment (mainly rural and small town).
In addition, in order to insure homogeneity, the subjects

were all community college students in social science

classes.

Subjects

The adults from whom the subjects were chosen were 340

students enrolled in social science classes at Rockingham

Community College in Wentworth, North Carolina. These stu-

dents were all enrolled during the Winter Quarter of 1976-1977.

The age range of the group was from 18 to 56. Subjects were

from Rockingham County and surrounding communities, including

Guilford, Alamance, and Caswell counties in North Carolina

and Pittsylvania and Henry counties in Virginia.

The subjects were students ages 18 to 30 ($N=89$) selec-

ted from the subject pool. They were similar in having had

no previous experience in caring for infants from 0-2 years

of age. Half of the participants scored high on the Hogan

Empathy Scale and half scored low. They were almost equally

divided according to gender (47 females, 42 males). Half

were given training in identifying infant cry-signal pat-

terns before they were asked to identify twenty-four such

patterns. The other half of the group was not given any

training, but was asked to respond to the task of identifying

twenty-four infant cry-signals.

The assignment of participants to groups was done in

such a way that each participant had an equal chance of

being assigned to either the control or experimental group.

In this case, participants were divided according to gender and the name of each participant was written on a slip of paper and drawn from a hat.

The experimental group was similar to the control group except they were given an audio-taped training session on how to recognize infant cry-signals prior to being asked to identify the twenty-four signals.

Instruments

The three instruments used in this study were the Hogan Empathy Scale (Hogan, 1969, Appendix A), the Biographical Questionnaire (Appendix B), and the Wasz-Hockert et al. (1964a) audio tapes; the checklist for recording responses to the tapes is shown in Appendix C.

The Hogan Empathy Scale is a 64-item self-report measure of empathy. It was published by Hogan in 1969. The author compared the responses of groups with high- and low-rated empathy, using a combined item pool from the Minnesota Multiphasic Personality Inventory (MMPI) and the California Psychological Inventory (CPI). Thirty-one items on the test were from the CPI and 25 items were from the MMPI. The remaining eight items came from various experimental testing forms used in studies at the University of California's Institute of Personality Assessment and Research (IPAR) in Berkeley.

The validity and reliability of Hogan's scale have been extensively analyzed. Validity correlations between the scale

and Q-sort-derived empathy ratings have ranged from .62 on the sample used to develop the scale (N=211) to .39 on an independent sample of medical school applicants (N=70).

> In the original sample, the scale correlated .58 with rated social acuity; in an independent sample of medical school applicants, this value was .42. The scale also effectively discriminated between junior high school students with high and low teachers' ratings for social acuity. (Grief & Hogan, 1973, pp. 280-281)

Hogan (1969) also reported validity correlations of .61 and .58 between the scale and overall skill at playing charades. Finally, in a test-retest reliability check with a sample of 50 college undergraduates after a 2-month interval, Hogan (1969) obtained a reliability coefficient of .84. Normative data for the empathy scale have been derived from various population samples.

The Biographical Questionnaire was a 17-question instrument, devised by the present researcher, that provided general background information on the subject (e.g., age, sex, birth position in family), as well as specific information about the subject's experience as a primary caregiver to an infant 0-2 years of age. The information obtained from this questionnaire was used to determine which subjects were within the age range (18-30) of the study and had very little experience as an infant caregiver.

The Wasz-Hockert et al. (1964a) checklist was a multiple-choice checklist containing four categories of cry-signals--birth, pain, pleasure, and hunger. Subjects were asked in

advance to place every vocalization from the Wasz-Hockert
et al. (1964a) tape of 24 vocalizations into one of the four
categories. Each correct answer counted 1 and each wrong one
counted 0. The sum of the correct answers was the subject's
total score. Scores on each of the four cry-signals were
also tabulated separately. "The splithalf reliability coef-
ficient corrected for the total scores was estimated to be
0.85" (Wasz-Hockert et al., 1964b, p. 394).

Procedures

All students in social science classes (N=340) were
administered the Hogan Empathy Scale (Appendix A) and the
Biographical Questionnaire (Appendix B) during a regular
class period. Students were then assigned to groups by
gender and level of empathy score (high or low). Within
each category (males high in empathy; males low in empathy;
females high in empathy; females low in empathy), random
selection was made until at least ten participants were
assigned to each of the four categories. Half of the par-
ticipants in each category were randomly assigned to either
the control group or the experimental group.

The experimental group listened to the training tape.
This tape was developed by using definitions that Wasz-
Hockert et al. (1968) used in describing each of the four
infant cries, along with recording cry-signal patterns from
a tape Wasz-Hockert et al. (1968) made of these cry-signal

patterns. The training tape was tested out on the clinical staff of the Rockingham County Mental Health Center in Wentworth, North Carolina, who made suggestions regarding instructions to be given to the experimental group (Appendix D) and the control group (Appendix E).

Both the trained and the untrained group filled in the infant cry-signal recognition checklist.

Analysis of Data

The data were analyzed by means of a three-way analysis of variance on each of the dependent factors (birth cry-signal, pleasure cry-signal, hunger cry-signal, pain cry-signal, and overall cry-signal score). Specifically the three way ANOVA was gender x empathy x training. Alpha was set at the .05 level. A multivariate analysis of variance was also conducted.

CHAPTER IV

RESULTS

This chapter reports the findings from the various areas of the study, including the selection of subjects and the testing of the four hypotheses of this research. These findings are presented in terms of the mean scores and standard deviations of the five dependent measures (i.e., birth, hunger, pain, pleasure, and overall cry-signal scores) according to the separate and interaction effects of the three independent measures of empathy, gender, and training. This chapter also presents the analysis of variance (ANOVA) data for each of these variables. In addition, the multivariate analysis of variance (MANOVA) is given for all variables.

In obtaining these results the Statistical Analysis System (Barr et al., 1976) was used to analyse the data.

Selection of Subjects

There were 340 students in the subject pool from which the subjects for this study were selected. This group of students represented 96 percent of the 355 students enrolled in social science courses at Rockingham Community College in Wentworth, North Carolina, during the Winter Quarter of 1976-1977. The 15 students enrolled in social science

classes who did not participate as a part of the subject pool were excluded either at their request or because of their inability to participate (e.g., prolonged illness).

Of the 340 students in the subject pool, all were administered the Hogan Empathy Scale and the Biographical Questionnaire at the beginning of a regular class period. In evaluating the Biographical Questionnaire, it was found that 78 subjects were either too old (above the age of 30), or too experienced (having been a primary caregiver for an infant 0-2 years of age for more than two weeks during the past five years) to be included as subjects in the study. However, scores of all 340 students were used to compute the means and standard deviations on the Hogan Empathy Scale for male and female subjects.

The 150 male students had a mean score on the 64-item Hogan Empathy Scale of 35.62 $\pm$ 5.79. The 190 female students had a mean score of 34.54 $\pm$ 5.02. In comparing these scores to those collected by Hogan (1969), it can be seen that the mean scores for both males and females in this study were below the means for Hogan's college students (Table 1). However, Hogan's sample was from four-year colleges. When the community college students are viewed in light of this fact, the mean score outcome is what might be expected. The community college students scored between Hogan's college students (all levels) and junior high school students.

Table 1

Mean Scores on Hogan Empathy Scale

(1969 Hogan Study and Present Study)

Group	N	M	SD
Males			
*1. Psychology majors	24	44.7	5.2
*2. Education abroad students	18	43.2	4.8
*3. Medical students	70	42.4	5.3
*4. Research scientists	45	40.3	5.4
*5. College students (all levels)	90	39.1	4.7
*6. Honor students in engineering	66	38.0	6.4
*7. Military officers	100	37.7	7.1
*8. Architects	124	36.8	5.3
*9. Junior high school students (Grades 7 and 8)	51	31.0	5.0
*10. Prison inmates	92	30.4	–
*11. Young delinquents	100	29.1	–
**12. Community college students	150	35.62	5.79
Females			
*1. College seniors	143	41.5	5.1
*2. College students (all levels)	93	40.7	5.9
*3. Junior high school students (Grades 7 and 8)	70	33.7	5.2
**4. Community college students	190	34.54	5.02

*Hogan study

**Present study

It should be noted that the 16 male subjects who were either too old or experienced for this study had a mean score of 34.68 on the Hogan Empathy Scale. This score was slightly below the mean score of 35.62 for all 150 male students. The 62 female subjects who were either too old or experienced had a mean score on the Hogan Scale of 35.40. This score was slightly above the mean score of 34.54 for all 190 female students. Thus, the inclusion of these subjects into the overall subject pool had little effect on the mean scores for either the male or female subjects.

Of the 134 males who were neither too old nor too experienced for this study, 42 had scores on the Hogan Empathy Scale that were rated as high or low in empathy. A score was rated high if it was one standard deviation or more above the mean. A score was rated low if it was one standard deviation or more below the mean. Of the 42 males who were selected from the subject pool to be subjects, 21 were rated high in empathy and 21 were rated low in empathy.

Of the 128 females who were neither too old nor too experienced for this study, 47 had scores on the Hogan Empathy Scale that were rated as high or low in empathy. There were 26 females who were rated high in empathy and 21 who were rated low. The criteria for rating the females was the same as that used to rate the males, except that the mean scores and standard deviations were based on female norms.

Thus the final sample numbered 89 (42 males, 47 females). Of that total, 78 (87.6%) were between 18 and 24 years, while 11 (12.4%) were between 25 and 30 years of age. Broken down into programs offered at the community college, 6 (6.7%) were enrolled in the vocational program, while 12 (13.5%) were enrolled in the technical program, and 64 (71.9%) were enrolled in the college parallel program. The remaining 7 (7.9%) were enrolled in the nursing program.

According to employment measures, 84 (94.4%) of the subjects were full-time students, while 5 (5.6%) were part-time students. The marital status of the subject population was as follows: 75 (84.3%) were single, 3 (3.4%) were divorced, 9 (10.1%) were married, and 2 (2.3%) were separated.

In examining the ordinal position of the 89 subjects it was found that 37 (41.6%) were first born, 30 (33.7%) were second born, 14 (15.7%) were third born, 7 (7.9%) were fourth born, and 1 (1.1%) was fifth born. In terms of ever living in the same household with an infant 0-2 years of age, 50 of the subjects (56.2%) had had such an experience, while 39 (43.8%) had not had this experience. On a final factor, familiarity with the behavior of an infant 0-2 years of age, 46 (53.9%) of the subjects reported they were familiar, while 41 (46.1%) of the subjects did not consider themselves familiar. These data are summarized in Table 2.

Subjects were assigned to either the experimental or the control group by first dividing them according to gender

Table 2

Description of Subject Sample
from Biographical Data (N=89)

	Classification	N	%
Gender			
1.	Males	42	47.2
2.	Females	47	52.8
Age			
1.	Between 18-24	78	87.6
2.	Between 25-30	11	12.4
Program at community college			
1.	Vocational	6	6.7
2.	Technical	12	13.5
3.	College parallel	64	71.9
4.	Nursing	7	7.9
Employment			
1.	Full time student	84	94.4
2.	Part time student	5	5.6
Marital status			
1.	Single	75	84.3
2.	Divorced	3	3.8
3.	Married	9	10.1
4.	Separated	2	2.3
Ordinal position in family			
1.	First born	37	41.6
2.	Second born	30	33.7
3.	Third born	14	15.7
4.	Fourth born	7	7.9
5.	Fifth born	1	1.1
Lived in the same household with an infant			
1.	Yes	50	56.2
2.	No	39	43.8
Familiar with the behavior of infants			
1.	Yes	46	53.9
2.	No	41	46.1

(male, female) and empathy level (high, low). In this way four groups (high empathy males, low empathy males, high empathy females, low empathy females) were created. After the four groups had been established, subjects were given numbers. These numbers were written down and drawn out of a hat until an equal number of subjects in each of the groups had been assigned to either the control or experimental group.

Mean Scores on the Five Dependent Variables

The mean scores on the five dependent variables were computed separately for each variable. On each of the first four dependent variables (birth cry-signal, hunger cry-signal, pain cry-signal, and pleasure cry-signal), the maximum score that could be made was 6 and the minimum score was 0. These scores were derived by tabulating 1 point for each correct answer the subject gave and 0 for each incorrect answer. There were 6 vocalizations of each cry-signal. The fifth dependent variable (the overall cry-signal) was the combined score of the four cry-signals. The maximum score that could be made on this variable was 24 and the minimum was 0. These data are shown in Table 3.

Each of the dependent variable mean scores was examined in terms of the three independent variables of empathy, gender, and training. Interaction effects of the variables was also examined.

Table 3

Mean Scores on Infant Cry-Signal Recognition by Empathy, Gender and Training

	N	Birth	S.D.	Hunger	S.D.	Pain	S.D.	Pleasure	S.D.	Overall	S.D.
Empathy											
1. High	47	2.36	1.07	4.19	1.48	3.60	1.14	5.53	0.65	15.77	2.66
2. Low	42	2.93**	1.02	4.07	1.24	3.48	1.02	5.48	0.80	15.95	2.70
Gender											
1. Females	47	2.77	1.05	4.26	1.22	3.72	0.95	5.40	0.83	16.09	2.61
2. Males	42	2.48	1.11	4.00	1.51	3.33	1.18	5.62	0.58	15.60	2.72
Training											
1. Training	46	2.93**	0.90	4.74***	0.98	3.80*	1.05	5.63	0.53	17.11***	1.88
2. No Training	43	2.30	1.17	3.49	1.44	3.26	1.05	5.37	0.87	14.51	2.74

* $p < .05$
** $p < .01$
*** $p < .001$

Empathy

The mean scores on each of the five dependent measures differed according to empathy. Low empathy subjects scored higher on the overall cry-signal recognition and on the birth cry-signal. High empathy subjects scored slightly higher in recognizing the hunger, pain, and pleasure cry signals. These results are summarized in Table 3.

Gender

The mean scores on each of the five dependent measures differed slightly according to gender. Females scored slightly higher than males on all of the cry-signals, except the pleasure cry-signal. These data are summarized in Table 3.

Training

The mean scores on the factor of training were uniformly higher on each of the dependent variables. The greatest differences between scores for the trained and untrained were noted on the overall and the hunger cry-signals. These data are summarized in Table 3.

Interaction Effects

The mean scores for the interaction effects of empathy x gender are reported in Table 4. It is notable that none of the cry-signal scores differed very much between the groups.

The mean scores for the interaction effects of gender x training are reported in Table 5. The most noticeable difference between scores in this table is that both males

Table 4

Mean Scores on Infant Cry-Signal Recognition:

Empathy x Gender

	N	Birth	S.D.	Hunger	S.D.	Pain	S.D.	Pleasure	S.D.	Overall	S.D.
High Empathy/Females	26	2.42	0.90	4.50	1.17	3.69	1.01	5.50	0.65	16.00	2.42
Low Empathy/Females	21	3.19	1.08	3.95	1.24	3.76	0.89	5.29	1.01	16.19	2.89
High Empathy/Males	21	2.29	1.27	3.81	1.75	3.48	1.29	5.57	0.68	15.48	2.96
Low Empathy/Males	21	2.67	0.91	4.19	1.25	3.19	1.08	5.67	0.48	15.71	2.53

Table 5

Mean Scores on Infant Cry-Signal Recognition:

Gender x Training

	N	Birth	S.D.	Hunger	S.D.	Pain	S.D.	Pleasure	S.D.	Overall	S.D.
Training/Females	25	3.00	0.91	4.68	0.99	4.12	0.73	5.64	0.57	17.32	1.73
No Training/Females	22	2.50	1.14	3.77	1.30	3.27	0.98	5.14	0.99	14.68	2.77
Training/Males	21	2.86	0.91	4.81	0.98	3.43	1.25	5.62	0.50	16.86	2.06
No Training/Males	21	2.10	1.18	3.19	1.54	3.24	1.14	5.62	0.67	14.33	2.76

and females with training scored considerably higher than untrained males and females. The one exception to this finding was on males' recognition of the pleasure cry-signal where the score for the trained and untrained showed no difference.

The mean scores for the interaction effect of empathy x training are reported in Table 6. In examining these data, it can be seen that subjects with training consistently scored higher on cry-signal recognition, regardless of their empathy rating.

The mean scores for the three-way interaction effect of empathy x gender x training are reported in Table 7. It is noteworthy that subjects with training had generally higher scores on the cry-signals than subjects without training. It was found from examining these data that empathy and gender play a minimum role in effecting cry-signal recognition. The large difference in the mean score for the hunger cry-signal between High Empathy/Males/Training (5.10) and Low Empathy/Males/No Training (2.64) is especially interesting (Table 7).

Analysis of Variance

Overall Cry-Signal Recognition

The factor of training was the only factor that made a significant difference ($p < .001$) in the overall cry-signal score. Subjects with training scored higher on the overall cry-signal recognition (17.11) than did subjects without training (14.51) (Table 3).

Table 6

Mean Scores on Infant Cry-Signal Recognition:

Empathy x Training

	N	Birth	S.D.	Hunger	S.D.	Pain	S.D.	Pleasure	S.D.	Overall	S.D.
High Empathy/Training	24	2.63	0.82	4.88	1.03	3.88	1.12	5.71	0.46	17.08	1.95
High Empathy/No Training	23	2.09	1.24	3.48	1.56	3.30	1.10	5.35	0.78	14.39	2.62
Low Empathy/Training	22	3.27	0.88	4.59	0.91	3.73	0.98	5.55	0.60	17.14	1.83
Low Empathy/No Training	20	2.55	1.05	3.50	1.32	3.20	1.01	5.40	0.99	14.65	2.92

Table 7

Mean Scores on Infant Cry-Signal Recognition:

Empathy x Gender x Training

	N	Birth	S.D.	Hunger	S.D.	Pain	S.D.	Pleasure	S.D.	Overall	S.D.
High Empathy/Females/ Training	14	2.71	0.61	4.71	1.07	4.14	0.86	5.79	0.43	17.14	1.51
High Empathy/Females/ No Training	12	2.08	1.08	4.25	1.29	3.17	0.94	5.17	0.72	14.67	2.64
Low Empathy/Females/ Training	11	3.36	1.12	4.64	0.92	4.09	0.54	5.45	0.69	17.55	2.02
Low Empathy/Females/ No Training	10	3.00	1.05	3.20	1.14	3.40	1.07	5.10	1.29	14.70	3.06
High Empathy/Males/ Training	10	2.50	1.08	5.10	0.99	3.50	1.35	5.60	0.52	17.00	2.54
High Empathy/Males/ No Training	11	2.09	1.45	2.64	1.43	3.45	1.29	5.55	0.82	14.09	2.70
Low Empathy/Males/ Training	11	3.18	0.60	4.55	0.93	3.36	1.21	5.64	0.50	16.73	1.62
Low Empathy/Males/ No Training	10	2.10	0.88	3.80	1.48	3.00	0.94	5.70	0.48	14.60	2.95

The data for the factor of training in relation to the overall cry-signal recognition scores are summarized in Table 8.

Birth Cry-Signal Recognition

In correctly identifying the birth cry-signal, the two independent factors of empathy and training were found to be significant ($p < .01$) (Table 9). Subjects who scored low in empathy were significantly better at identifying the birth cry-signal ($\overline{X}=2.93$) than were subjects high in empathy ($\overline{X}=2.36$) (Table 3). The factor of training was associated not only with higher recognition scores for the birth cry-signal, but also for the other cry-signals (Table 3). There were no interaction effects among variables in regard to the birth cry-signal (Table 9).

Hunger Cry-Signal Recognition

The most notable result of the ANOVA on hunger cry-signal recognition scores was the significant difference ($p < .001$) between subjects with training and subjects with no training. Subjects with training scored significantly higher ($\overline{X}=4.74$) than subjects without training ($\overline{X}=3.49$) (Table 3).

The interaction factor of empathy x gender x training was significant ($p < .01$). Data on hunger cry-signal recognition scores are summarized in Table 10 (see means Table 7).

Table 8

ANOVA for Overall Infant Cry-Signal Recognition Scores

Source	df	SS	MS	F
(A) Empathy	1	1.00	1.00	0.17
(B) Gender	1	5.32	5.32	0.92
(C) Training	1	147.93	147.93	25.67***
A x B	1	0.07	0.07	0.01
A x C	1	0.17	0.17	0.03
B x C	1	0.08	0.08	0.01
A x B x C	1	1.82	1.82	0.32
Error	81	466.70	5.76	
Total	88	623.10		

***$p < .001$

Table 9

ANOVA for Birth Cry-Signal Recognition Scores

Source	df	SS	MS	F
(A) Empathy	1	7.54	7.54	7.43**
(B) Gender	1	1.86	1.86	1.83
(C) Training	1	8.40	8.40	8.28**
A x B	1	1.00	1.00	0.48
A x C	1	0.18	0.18	0.68
B x C	1	0.30	0.30	0.59
A x B x C	1	1.21	1.21	0.28
Error	81	82.26	1.02	
Total	88	102.76		

**$p < .01$

Table 10

ANOVA for Hunger Cry-Signal Recognition Scores

Source	df	SS	MS	F
(A) Empathy	1	0.25	0.25	0.18
(B) Gender	1	1.45	1.45	1.06
(C) Training	1	34.45	34.45	25.13***
A x B	1	4.00	4.00	2.92
A x C	1	0.52	0.52	0.38
B x C	1	2.75	2.75	2.00
A x B x C	1	9.95	9.95	7.26**
Error	81	111.03	1.37	
Total	88	164.38		

**$p < .01$

***$p < .001$

Pain Cry-Signal Recognition

The data on the pain cry-signal indicate that training was the only factor that made a significant difference ($p < .05$) in the recognition of this cry-signal (Table 11). Again, those who received training had a significantly higher mean score (3.80) than those who did not receive training (3.26) (Table 3).

Pleasure Cry-Signal Recognition

None of the three factors of empathy, gender, or training made a significant difference in the ability of subjects to recognize the pleasure cry-signal. Subjects who had training, high empathy, and were male scored slightly but not significantly higher than their counterparts (Table 3). All of the scores for the various factors had an average of above 5.0 out of a possible score of 6.0. Data from this analysis are reported in Table 12. Subjects consistently scored higher on recognition of pleasure cry-signal than on any of the other cry-signal scores.

Multivariate Analysis of Variance

A multivariate analysis of variance (MANOVA) was performed to determine overall significance for the five dependent variables. The results are shown in Table 13. It can be seen from this table that only the training effect was significant ($p < .05$). This finding is in line with the results derived from the analysis of variance data.

Table 11

ANOVA for Pain Cry-Signal Recognition Scores

Source	df	SS	MS	F
(A) Empathy	1	0.22	0.22	0.20
(B) Gender	1	3.37	3.37	3.09
(C) Training	1	6.43	6.43	5.89*
A x B	1	0.83	0.83	0.76
A x C	1	0.00	0.00	0.00
B x C	1	2.29	2.29	2.10
A x B x C	1	0.50	0.50	0.46
Error	81	88.46	1.09	
Total	88	102.11		

*$p < .05$

Table 12

ANOVA for Pleasure Cry-Signal Recognition Scores

Source	df	SS	MS	F
(A) Empathy	1	0.10	0.10	0.20
(B) Gender	1	1.02	1.02	2.00
(C) Training	1	1.58	1.58	3.08
A x B	1	0.47	0.47	0.93
A x C	1	0.21	0.21	0.41
B x C	1	1.41	1.41	2.76
A x B x C	1	0.03	0.03	0.06
Error	81	41.42	0.51	
Total	88	46.25		

Table 13

MANOVA for Five Dependent Variables

(Birth, Hunger, Pain, Pleasure and Overall Cry-Signals)

Source	Wilks' Lambda
(A) Empathy	.90
(B) Gender	.90
(C) Training	.71*
A x B	.88
A x C	.98
B x C	.89
A x B x C	.88

*$p < .05$

CHAPTER V

DISCUSSION

The general purpose of the present investigation was to
determine the effects of empathy, gender, and training on the
ability to recognize infant cry-signals. The discussion of
this purpose is considered under two headings. First, the
results of the ANOVA and MANOVA are discussed. Secondly, a
comparison of other research with this study is examined.

ANOVA and MANOVA Results

The results of the ANOVA and MANOVA are discussed in
relation to the hypotheses proposed.

Empathy

Hypothesis I was stated as follows:

There will be no significant difference in scores on
the Infant Cry-Signal Recognition Checklist between subjects
who score high and those who score low in trait empathy.

The results of this study confirmed this hypothesis for
the overall cry-signal score and for each of the individual
cry-signal scores with the exception of the birth cry-signal.
Subjects whose scores placed them in the low empathy group
scored highest in the recognition of the birth cry-signal.
This unexpected finding is difficult to explain at first
glance. However, in examining the mean scores in Table 3

for high and low empathy subjects, a trend that helps explain this finding is apparent. The fact that low empathy subjects scored significantly higher on the birth cry-signal than high empathy subjects may be due to their lower response rate on the other cry-signals. It is interesting to observe that high empathy subjects scored slightly higher than low empathy subjects on the other three comparable cry-signals. This trend may mean that high empathy subjects were more atuned to all of the cry-signals, while low empathy subjects were more "specialist", at least on the birth cry-signal. In explaining this data it should also be kept in mind that the birth cry-signal was the first box on the Infant Cry-Signal Recognition Checklist. If low empathy subjects did have a harder time distinguishing all of the cry-signals, they may have tended to check the first box on the checklist more than the high empathy subjects.

Another explanation is that the birth cry-signal is the most "primitive" and objective of the cry-signals. Low empathy subjects may have scored higher on this cry-signal because it required less interpretation, whereas high empathy subjects may have had a tendency to "read" more into the signal than was there. Whatever the case, it is apparent that the birth cry-signal was the most difficult of the cry-signals to recognize. Its mean score for all subjects was 2.63, compared to 4.13 for the hunger cry-signal, 3.54 for the pain cry-signal, and 5.51 for the pleasure cry-signal.

In examining the nonsignificant effect of high empathy in this study, it should be kept in mind that the high scores for males and females in this study were considerably below the scores Hogan (1969) reported on college males and females on all levels (Table 1). The fact that the subjects in this study did not score as high in empathy as subjects in Hogan's study (1969) may be an indication that these individuals were less mature developmentally and perhaps less sensitive to the environmental cues around them.

Gender

Hypothesis II was stated as follows:

There will be no significant difference in the mean scores on the Infant Cry-Signal Recognition Checklist between adult males and adult females.

This hypothesis was confirmed. There was no significant difference between males and females on overall cry-signal recognition scores nor on any of the individual cry-signals. It is interesting to note that males scored slightly higher than females on identification of the pleasure cry-signal, while females scored slightly higher than males on recognition of the other three cry-signals (Table 3). In observing the fact that gender made no significant difference in cry-signal recognition, it is also interesting to note that males had a slightly higher mean score (35.62) than females (34.54) on the Hogan Empathy Scale (Table 1). This finding indicates

the current difficulty of ascribing traditional sex type behavior or feelings on subjects from either gender. The present study seems to indicate that young males and females, who are inexperienced as caregivers for infants, are very near equal in measurable abilities and characteristics in terms of cry-signal recognition and trait empathy. Could the lack of gender differences be accounted for by androgynous qualities in human beings? Many individuals now display traits and behaviors formerly ascribed to one sex or the other (e.g., sensitivity, objectiveness).

Training

Hypothesis III was stated as follows:

There will be a significant difference in the mean scores on the Infant Cry-Signal Recognition Checklist between those subjects who have been trained and those who have not.

This hypothesis was supported. On the overall cry-signal, the difference between subjects who received training and those who did not was significant at the .001 level of confidence (Table 8). Subjects who received training had an overall mean score of 17.11 compared to an overall mean score of 14.51 for subjects with no training (Table 3). From this finding, it appears that training is the most important of the three independent variables examined in this study in recognizing infant cry-signals.

On the individual cry-signal scores significant differences between subjects with training and no training were:

birth cry-signal ($p < .01$), hunger cry-signal ($p < .001$), and pain cry-signal ($p < .05$). In all cases, subjects with training scored higher. There was no significant difference between trained and not trained subjects in recognition scores for the pleasure cry-signal (Table 12).

Training appears to have been most significant in helping subjects identify the hunger cry-signal. Subjects who received training had an average hunger cry-signal recognition score of 4.74. Subjects without training had an average score of 3.49. Since the difference between these two scores is highly significant ($p < .001$), it would appear that the hunger cry-signal is the cry-signal most influenced by training. Thus, training may be a vital factor in sensitizing adults as to when to respond with a feeding response to an infant's cry-signal.

From the analysis of data on the birth and pain cry-signals it appears that training is also an important factor in the correct identification of these cry-signals, although less so than on the hunger cry-signal.

The reason why there was not a significant difference between trained and untrained subjects on the pleasure cry-signal is probably due to the fact that the pleasure cry-signal is the most readily identifiable of all the cry-signals. Subjects even without training had an average score of 5.37, while subjects with training had mean scores of 5.63. Since the maximum possible score on any of the individual cry-signals was 6.0, and since both of these scores

are considerably higher than any of the other cry-signal scores (Table 3), it is reasonable to assume that training did not make much difference in the case of this relatively easy discrimination task.

In examining the results of training on the ability to recognize infant cry-signals, the limitations of the training tape should be kept in mind. Although Wasz-Hockert et al. (1964a) have reported good reliability and validity with their tape, Wasz-Hockert in a recent communication to this researcher (1977) indicated that it was the feeling of his research group "that some of the signals are much too short to give a real expression of what it is all about." Since their research group is in the process of preparing a new tape, later findings in relation to the effect of training on infant cry-signal recognition scores may be altered.

Judging the results of the present research it appears that when backgrounds as a primary caregiver are low, training provides the learning edge that makes it possible to recognize cry-signals more accurately.

Interaction Effects

Hypothesis IV was stated as follows:

There will be no significant interaction effect.

This hypothesis was supported for the overall cry-signal recognition scores and for all of the individual cry-signals except the hunger cry-signal. There was a significant ($p < .01$)

interaction effect between empathy, gender, and training on the hunger cry-signal. This significant finding appears to have been caused by the strength of the significance of training for this cry-signal. When taken alone, neither gender nor empathy was significant. However, training was significant at the .001 level of confidence. This strong relationship between training and hunger cry-signal recognition had a carryover influence on the interaction score. When it is noted that there are no other significant interaction effects in this study, then the explanation of why this one factor is significant is more parsimonious.

Comparison with Other Studies

Studies that the present research can be compared with are the two studies conducted by Wasz-Hockert et al. (1964a, 1964b). The 1964a study reported the cry-signal recognition scores of "80 trained nurses, aged 23-37 years. No one had children of her own, and some had been working with children after having completed their training" (p. 154). The average nurse in this sample made 15.9 right choices out of 24. The 47 female subjects in the present study, all initially untrained in caring for infants, had a comparable score of 16.1. In examining the females in the present study who received training with those who did not, it can be seen that their scores differed significantly. The average score of the trained females was 17.3 as compared to the average score of 14.7 for the untrained females. The similarity in

scores between the Scandinavian females and the American females would suggest a high reliability in the infant cry-signal recognition tapes.

In the second study reported by Wasz-Hockert et al. (1964b), both experienced and inexperienced males and females were compared in their performance on identifying the 24 infant cry-signals. The experienced females scored significantly higher than the inexperienced females overall and were significantly better in identifying the pain cry-signal. In males the overall cry-signal recognition difference was not significant, although experienced males were significantly better at correctly identifying the hunger cry-signal. When these results are compared to the present study, several interesting similarities and differences can be noted (Table 14).

One of the similarities is that in both studies female subjects with experience/training were better at identifying the overall cry-signal than were their inexperienced/untrained counterparts. A second similarity is that experienced/trained females in both studies were significantly more successful than inexperienced/untrained females in identifying the pain cry-signal. A final similarity between the studies is that experienced/trained males were better at correctly identifying the hunger cry-signal than were their inexperienced/ untrained counterparts.

Table 14

Mean Scores on Cry-Signal Recognition between the

Wasz-Hockert et al. (1964b) Study and the Present Study

	N	Birth	Hunger	Pain	Pleasure	Overall
* Females/Experienced	96	2.1	4.1	4.8	5.8	16.8
* Females/Inexperienced	61	1.8	3.8	4.3	5.8	15.7
* Males/Experienced	81	1.5	3.3	3.1	5.7	13.6
* Males/Inexperienced	42	1.5	2.7	3.2	5.5	12.9
** Females/Training	25	3.0	4.7	4.1	5.6	17.3
** Females/No Training	22	2.5	3.8	3.3	5.1	14.7
** Males/Training	21	2.9	4.8	3.4	5.6	16.9
** Males/No Training	21	2.1	3.2	3.2	5.6	14.3

 * Wasz-Hockert et al. (1964b) Study

** Present Study

Dissimilarities between the second Wasz-Hockert et al. (1964b) study and the present one are also noteworthy. One of the most noticeable differences is that the overall cry-signal scores for both trained and untrained males in the present study were considerably higher than for experienced and inexperienced males in the Wasz-Hockert et al. (1964b) study. The average overall score for males with training in the present study was 16.9, compared to an average score of 13.6 for experienced males in the Wasz-Hockert et al. (1964b) study. Similarly, the average overall score for males with no training in the present study was 14.3, compared to an average score of 12.9 for inexperienced males in the Wasz-Hockert et al. (1964b) study.

One reason for the differences between the two groups may be in the definitional concepts about training and exper-ience. For Wasz-Hockert et al. (1964b) inexperienced males were males "without children or experience in handling them," while experienced males were "fathers and male pediatricians who had handled children" (p. 394). For the present study, trained and untrained males were distinguished by specific experience in listening to and discriminating infant cry-signals. This more precise definition may be one reason the trained group of males in the present study is considerably higher ($\overline{X}=16.9$) than the experienced males ($\overline{X}=13.6$) in the Wasz-Hockert et al. (1964b) study. Simply being a father or handling children does not automatically make one sensitive

to the nonverbal communication of infants. Learning through discriminating listening appears to be an essential variable.

Another difference between the two studies is that in the present study trained males were considerably better than untrained males at distinguishing not only the hunger cry-signal, but the birth cry-signal as well. Trained females were better than their counterparts in distinguishing not only the pain cry-signal, but the birth and hunger cry-signals. Specific training in recognizing these cry-signals probably made the difference in the correctness of response.

One interesting difference between the two studies is that cry-signal recognition scores were generally higher in the present study than in the Wasz-Hockert et al. (1964b) study. A clearcut explanation cannot be given for this fact, although consideration may be given to the fact that all of the subjects in the present study were within a community college environment, while the Wasz-Hockert et al. (1964b) subjects were mainly hospital personnel and parents.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this research was threefold. It was to
test the relationship of empathy, gender, and training to
the ability of adult males and females to recognize four
infant cry-signals (birth, hunger, pain, and pleasure).
An overall recognition score for infant cry-signals (the total
score of the above four cry-signals) was also considered.

Empathy was tested by using the Hogan Empathy Scale, an
instrument developed by Hogan in 1969 to measure trait empathy.
Infant cry-signal recognition was measured by using a check-
list method and audio tape devised by Wasz-Hockert et al.
(1964a).

The subject pool for this study comprised 340 students
who were enrolled in social science courses at Rockingham
Community College during the Winter Quarter of 1976-1977.
All subjects in the subject pool were administered the Hogan
Empathy Scale and a Biographical Questionnaire, the latter
assessing their previous experience as a primary caregiver
for infants 0-2 years of age. From the subject pool, 89 sub-
jects (47 females and 42 males) were selected. All were
judged low in previous infant/caregiver experience (less
than two weeks as a primary caregiver for an infant 0-2 years

of age during the past five years). The subjects were 18 to 30 years of age. Half were judged high in empathy (one standard deviation above the subject pool mean on the Hogan scale) and half were judged low in empathy (one standard deviation below the subject pool mean).

Half of the low empathy subjects were randomly assigned to a training group where they listened to a 15-minute training tape on how to recognize four infant cry-signals as defined by Wasz-Hockert et al. (1964a). After this training and at the same session, these subjects were asked to identify 24 infant cry-signals from a tape prepared by Wasz-Hockert et al. (1964a). The other half of the low empathy subjects were randomly assigned to a group where they were simply asked to listen to 24 taped infant cry-signals and to try to identify them. Both groups were divided approximately equally as to males and females. The same procedure was followed with the high empathy subjects.

The data were analyzed using the Statistical Analysis System (Barr et al., 1976). An ANOVA and MANOVA were performed to assess the variables. It was found that on the birth cry-signal low empathy subjects scored significantly higher ($p < .01$) than high empathy subjects. This result was attributed to the fact that low empathy subjects tended to specialize on the birth cry-signal, while high empathy subjects appeared to be more attuned to all of the cry-signals. It was also noted that since the birth cry-signal

is the most "primitive" and objective of the cry-signals,
low empathy subjects may identify it more correctly than
high empathy subjects because they may "read" less into it.
As predicted empathy level did not make a significant dif-
ference in the ability to recognize the other three infant
cry-signals. It was noted that the birth cry-signal was
the most difficult of the cry-signals to identify. The fact
that high empathy subjects in this study did not score as
high as college students in Hogan's (1969) study was also
discussed.

It was found that, as predicted, gender did not signif-
icantly affect the ability to recognize infant cry-signals.

Training, as predicted, was a significant factor in the
correct identification of the cry-signals. Subjects of both
genders and levels of empathy were significantly aided by
training and scored significantly higher than subjects with-
out training. The one exception to this effect was found
for the pleasure cry-signal. On this cry-signal, training
did not appear to affect recognition scores. It was specu-
lated that the reason training did not make a difference in
recognizing this cry-signal was due to the fact that the
pleasure cry-signal was easily identified. Training was
most significant in helping subjects to recognize the hunger
cry-signal and achieve high overall cry-signal recognition
scores. On these aspects subjects with training scored higher
and were significantly different from those who received no

training (.001 level of confidence). It was speculated that the hunger cry-signal is more influenced by the training factor than any of the other cry-signals.

There was one significant interaction effect between empathy, gender, and training on the hunger cry-signal. This effect was significant at the .01 level of confidence. It was speculated that the effect was a carryover of the strong effect of training ($p < .001$) in recognizing the hunger cry-signal, because neither empathy nor gender approached significance on the hunger cry-signal. No other interaction effects were noted.

When the 47 female subjects in the present study were compared to the 80 trained female nurses in the Wasz-Hockert et al. (1964a) study highly similar overall infant cry-signal recognition scores (16.1 and 15.9) were found. When the present study was compared to the Wasz-Hockert et al. (1964b) study, a number of other similarities and differences were noted. In both studies subjects who had training or experience were best at identifying infant cry-signals. Trained or experienced females were found in both studies to be better at identifying the pain cry-signal. A similar relationship was found between males in identifying the hunger cry-signal. Differences between the present study and the Wasz-Hockert et al. (1964b) study were in the overall higher cry-signal scores for trained and untrained men in the present study. This difference was attributed largely to definitional

concepts related to training. Other differences between the two studies were noted for trained males in the present study who were better able to distinguish the birth cry-signal than untrained males. Experienced and inexperienced males in the Wasz-Hockert et al. (1964b) study showed no such differences. Trained females in the present study were better than their counterparts in distinguishing the birth and hunger cry-signals. In the Wasz-Hockert et al. (1964b) study no such differences between experienced and inexperienced females was noted.

Conclusions

From analyzing the results of the present research the following conclusions can be drawn.

1. Brief training of fifteen minutes can significantly increase scores based on the ability of young adults (ages 18 to 30) to recognize infant cry-signals. This conclusion is justified in noting that in four of the five dependent measures (birth, hunger, pain, and overall cry-signal scores) training made a significant difference in the ability of subjects to recognize the cry-signal. In the one case where training did not significantly affect scores, the cry-signal (pleasure) was considered easy to identify.

2. When the subject's background of experience as a primary caregiver for infants is limited, there is no significant difference between adult males and adult females in

the ability to recognize infant cry-signals. Support for this conclusion is found in noting that adult males and adult females in this study, all of whom were low in care-giving experience with infants, did not differ in their ability to correctly identify infant cry-signals.

3. Trait empathy, as measured by the Hogan Empathy Scale, has no significant effect on the ability of young adult males and females to recognize infant cry-signals, except for the birth cry-signal. This conclusion is based on the fact that on the birth cry-signal, low empathy subjects scored significantly ($p < .01$) higher than high empathy subjects in recognizing the birth cry-signal. However, on the other three individual cry-signals, subjects with high empathy had slightly, but not significantly, higher infant cry-signal recognition scores.

4. From this study it is concluded that the easiest cry-signal for adult males and adult females to recognize is the pleasure cry-signal and the most difficult for them to recognize is the birth cry-signal. These conclusions are based on the data that show the highest identification scores were made on the pleasure cry-signal (average score of 5.51) and on the data that show the lowest identification scores were made on the birth cry-signals (average score of 2.63).

5. A final conclusion is that training is most impor-tant to subjects in recognizing the hunger cry-signal. This

conclusion is based on the fact that for both males and females there was a wider discrepancy in scores between trained and untrained subjects (1.62 for males and .91 for females), than for any other cry-signal.

Recommendations

Based upon the procedures, findings, and conclusions of this study, the following recommendations for future research are suggested.

1. It is recommended that a study similar to the one conducted here be carried out with individuals who score higher than did the present subjects in trait empathy. Although there was a wide difference between subjects in the present study who were classified as high and low in empathy, subjects who were classified as high did not have scores as high on the average as Hogan's (1969) sample of college students. By using subjects with higher empathy scores the impact of this variable could be better assessed.

2. It is recommended that the long term effects of training subjects to identify cry-signals be explored. A longitudinal study of cry-signal recognition ability could be very informative and valuable in giving us insight into the benefits of such training. Specifically, measuring how long the training is maintained in subjects (e.g., a year) could give us an indication of the need for specific courses in this area, especially for potential parents.

3. It is recommended that future research be conducted with parent populations. As Bromwich (1977) reminds us, caregivers must become sensitive to the infant's cues if attachment is to be formed. One of the strongest cues an infant gives is the cry-signal. Research is needed in order to evaluate whether new parents differ from other groups in their learning strategies and ability to recognize infant cry-signals. Research is also needed to inform us whether new parents, especially mothers in the lying-in period following childbirth, can benefit significantly from being trained to recognize a specific cry-signal, like the hunger cry-signal. If such training can be conducted successfully there may be a more appropriate response by the caregiver to the infant's cry-signal, and problem areas related to such behavior as overfeeding through a failure to identify the cry-signal properly may be prevented.

4. It is recommended that future research in infant cry-signal recognition be conducted with those who have been involved in child abuse. Since it was found in the present study that a certain level of trait empathy and gender do not relate significantly to the recognition of infant cry-signals in young adults, the effects of training on known child abusers need to be studied. Specifically it needs to be known if training can help the child abuser in the ability to deal with crying behavior in the infant and if so will understanding be translated into appropriate behavior.

5. It is recommended that (as Wasz-Hockert (1977) has suggested in a personal communication to this researcher) the tapes of infant cry-signals be revised. Such tapes should include additional cry-signals that have not been officially defined, such as "frustration", "fretting", and "anger". By identifying and including additional cry-signals, know-ledge may be increased about infants, and about how adults react to infant cry-signals.

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APPENDIX A

Hogan Empathy Scale

T F 1. A person needs to "show off" a little now and then.

T F 2. I like <u>Alice in Wonderland</u> by Lewis Carroll.

T F 3. Clever sarcastic people make me feel very uncomfortable.

T F 4. I usually take an active part in the entertainment at parties.

T F 5. I feel sure that there is only one true religion.

T F 6. I am afraid of deep water.

T F 7. I must admit I often try to get my own way regardless of what others may want.

T F 8. I have at one time or another in my life tried my hand at writing poetry.

T F 9. Most of the arguments or quarrels I get into are over matters of principle.

T F 10. I would like the job of a foreign correspondent for a newspaper.

T F 11. People today have forgotten how to feel properly ashamed of themselves.

T F 12. I prefer a shower to a bathtub.

T F 13. I always try to consider the other fellow's feelings before I do something.

T F 14. I usually don't like to talk much unless I am with people I know very well.

T F 15. I can remember "playing sick" to get out of something.

T F 16. I like to keep people guessing what I'm going to do next.

T F 17. Before I do something I try to consider how my friends will react to it.

T F 18. I like to talk before groups of people.

T F 19. When a man is with a woman he is usually thinking about things related to her sex.

T F 20. Only a fool would try to change our American way of life.

T F 21. My parents were always very strict and stern with me.

T F 22. Sometimes I rather enjoy going against the rules and doing things I'm not supposed to.

T F 23. I think I would like to belong to a singing club.

T F 24. I think I am usually a leader in my group.

T F 25. I like to have a place for everything and everything in its place.

T F 26. I don't like to work on a problem unless there is the possibility of coming out with a clear-cut and unambiguous answer.

T F 27. It bothers me when something unexpected interrupts my daily routine.

T F 28. I have a natural talent for influencing people.

T F 29. I don't really care whether people like me or dislike me.

T F 30. The trouble with many people is that they don't take things seriously enough.

T F 31. It is hard for me just to sit still and relax.

T F 32. Once in a while I think of things too bad to talk about.

T F 33. I feel that it is certainly best to keep my mouth shut when I'm in trouble.

T F 34. I am a good mixer.

T F 35. I am an important person.

T F 36. I like poetry.

T F 37. My feelings are not easily hurt.

T F 38. I have met problems so full of possibliities that I have been unable to make up my mind about them.

T F 39. Often I can't understand why I have been so cross and grouchy.

T F 40. What others think of me does not bother me.

T F 41. I would like to be a journalist.

T F 42. I like to talk about sex.

T F 43. My way of doing things is apt to be misunderstood by others.

T F 44. Sometimes without any reason or even when things are going wrong I feel excitedly happy, "on top of the world".

T F 45. I like to be with a crowd who play jokes on one another.

T F 46. My mother or father often made me obey even when I thought that it was unreasonable.

T F 47. I easily become impatient with people.

T F 48. Sometimes I enjoy hurting persons I love.

T F 49. I have sometimes felt that difficulties were piling up so high that I could not overcome them.

T F 50. I am apt to pass up something I want to do when others feel that it isn't worth doing.

T F 51. People have often misunderstood my intentions when I was trying to put them right and be helpful.

T F 52. I am usually calm and not easily upset.

T F 53. I would certainly enjoy beating a crook at his own game.

T F 54. I am often so annoyed when someone tries to get ahead of me in a line of people that I speak to him about it.

T F 55. I used to like hopscotch.

T F 56. I have never been made especially nervous over trouble that any members of my family have gotten into.

T F 57. I frequently undertake more than I can accomplish.

T F 58. I enjoy the company of strong-willed people.

T F 59. Disobedience to the government is never justified.

T F 60. It is the duty of a citizen to support his country, right or wrong.

T F 61. I have seen some things so sad that I almost felt like crying.

T F 62. I have a pretty clear idea of what I would try to impart to my students if I were a teacher.

T F 63. As a rule I have little difficulty in "putting myself into other people's shoes."

T F 64. I am usually rather short-tempered with people who come around and bother me with foolish questions.

This notice appears at the request of the Psychological Corporation:

"Since there is evidence to indicate that item responses obtained to selected items isolated from the context of a personality inventory may not be comparable to those obtained within the context, the results of this research should not be considered applicable to the standardized complete form of the inventory."

APPENDIX B

Biographical Questionnaire

1. Name_____

2. Address_____

3. Phone _____ 4. Sex M F (Circle one)

5. Age _____

6. Occupation (ex: student, welder, nurse, homemaker, business)

   _____

7. What program are you enrolled in presently?

   ____Vocational

   ____Technical

   ____College Parallel

   ____Nursing

   ____Other, please list (ex: unclassified student)

   _____

8. Mother's age at your birth: ____years old

9. Father's age at your birth: ____years old

10. Birth Position in Family (Circle one) 1 2 3 4 5 6 7 8

11. List all the children and their year of birth in the household in which you grew up. (ex: John, 1950)

   _____   _____   _____

   _____   _____   _____

   _____   _____   _____

12. Your present marital status (Circle one)   single   divorced

    widowed   separated   married

13. Do you have any children? ____yes ____no

14. Have you ever acted as the primary caregiver (e.g., day time and night time) of a baby 0-2 years of age:

_____yes   _____no

If yes, how often did you provide this service?

_____one day   _____2 or 3 days

_____a week   _____two weeks or more

15. How recent was the experience described above?

_____within the last year, _____within the last 5 years, _____longer than 5 years ago

16. Have you ever lived in a household where an infant 0-2 years of age also lived?

_____yes   _____no

17. Do you consider yourself familiar with the behaviors and development of infants 0-2 years of age?

_____yes   _____no

APPENDIX C

Infant Cry-Signal Recognition Checklist

	Birth	Hunger	Pain	Pleasure
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
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22				
23				
24				

APPENDIX D

Experimental Group Tape Manuscript

Communication is very important to every one of us. By
the time we become adults we have learned that we can relate
to others in a variety of ways. We communicate through
verbal language and also through non-verbal language. By
non-verbal communication we mean gestures, postures, smiles,
frowns, and other body movements. This is what some call
"body language".

Did you ever stop and think about how you came to under-
stand different ways of communicating? For most of us this
process was learned very early in our lives. For instance,
we learned to speak from hearing our parents and others talk
to us. By the end of grade one, most of us had learned to
read from books. In our earliest years we were also learning
to distinguish between voice tones, frowns, and body move-
ments. Soon we were able to tell what kind of a mood a per-
son was in by the person's tone of voice. Again, we learned
to communicate by being around others and noticing how they
behaved and responded.

But what about babies? Did you ever stop and think
how babies communicate? Although they respond to a caregiv-
er's body language and even display body language of their
own, babies cannot speak. Thus one of their main ways of
communicating with us is through their cry-signals. Not

all baby cries mean the same thing. For example, the baby that is hungry and wants its bottle will cry differently from the baby who is in pain because it just received a protective innoculation with a needle.

The purpose of this tape is to introduce you to four cry-signals that babies use in order to communicate with us. The cries you will hear were collected by persons studying infants' communication. These cries have a universal quality about them and are typical of the kinds of cries of infants all over the world. Listen carefully, for at the completion of this tape you will be asked to try to identify a series of infant cry-signals.

The first cry-signal we will listen to is the first cry that a baby gives--the birth cry! This cry is obtained within the first five minutes after the child has been delivered. The typical birth cry has a length of about one second and its melody form is flat or falling. It is usually voiceless and always tense. Here is a good example of the birth cry:

<div align="center">
birth cry-signal #19
(Wasz-Hockert et al., 1968)
</div>

Remember, this cry is relatively short in length (about one second) and its melody is usually flat or falling. Note also that the cry is almost always voiceless and is tense.

Here is another example, perhaps a bit harder to recognize than the first birth cry you heard:

birth cry-signal #20
(Wasz-Hockert et al., 1968)

A second cry-signal that we can identify is the pain

cry. The typical pain cry is rather extended in length.

The length of the pain cry varies according to the age of the

child. The average length of the pain cry is between two and

four seconds. The melody form of this cry is usually fall-

ing. The pitch of the pain cry tends to be high and is

usually tense. Here is a very good example of the pain cry:

pain cry-signal #21
(Wasz-Hockert et al., 1968)

Did you notice how the pain cry differed from the birth

cry? As we have stated this cry is rather long. It has a

high pitch and its melody form is usually falling. The sig-

nal, which is usually tense, has been recorded when the

baby was having a vaccination or after pinching the skin

over the infant's biceps.

Here is the pain cry again. This example of the pain

cry may be somewhat harder to recognize than the first

example:

pain cry-signal #22
(Wasz-Hockert et al., 1968)

The third cry-signal we will identify and listen to is

the typical hunger cry. The melody form of the hunger cry is

very characteristic. Most of the hunger signals have a

rising-falling melody form. The pitch of the hunger cry is

not very characteristic, although the maximum pitch of the

hunger cry is lower than the pain cry. The typical hunger cry is about the same length as that of the birth cry—about one to two seconds. Here is a clear example of the hunger cry:

<div style="text-align: center">

hunger cry-signal #23
(Wasz-Hockert et al., 1968)

</div>

In reviewing the hunger cry, it is important to keep in mind that the melody of this cry is very characteristic, having a rising-falling form. The pitch of the hunger cry, while not characteristic, is lower than that of the pain cry. Like the birth cry, the hunger cry is relatively short. It usually lasts from one to two seconds. It is interesting to note that the hunger cry-signals were recorded about four hours after the baby's previous meal when the infant was crying steadily and all other motives for discontent had been excluded as far as possible.

Here is another example of the hunger cry. It is of a somewhat poorer quality, according to the people who collected these cries:

<div style="text-align: center">

hunger cry-signal #24
(Wasz-Hockert et al., 1968)

</div>

The fourth and final cry-signal we will examine is the typical pleasure cry. The pleasure cry-signal is often flat in form. Usually it has a nasal quality. The melody form is typically rising and falling, somewhat like the hunger cry. The pleasure cry is never tense and never voiceless. It is short in length like the hunger and birth cry. It usually

lasts one to two seconds. The pitch of this signal is much more varied than that of the other cries we have listened to. Here is a typical pleasure cry:

<div align="center">
pleasure cry-signal #25
(Wasz-Hockert et al., 1968)
</div>

It is interesting to note that the pleasure cry does not develop until the baby is about three months of age. The sound is associated with specific pleasure situations, such as the baby looking at an adult who may be stimulating the child with gentle movements or making soft noises. Again, the way we identify the pleasure cry is through its usual flat form and nasal quality, and its rising and falling melody form. This cry is never tense or voiceless and although it has a varied pitch, it is short in length like the hunger and birth cries.

Here is another example of the pleasure cry, perhaps a little harder to recognize than the first example:

<div align="center">
pleasure cry-signal #26
(Wasz-Hockert et al., 1968)
</div>

Thus we have heard four different cry-signals of infants—(1) the birth cry, (2) the pain cry, (3) the hunger cry, and (4) the pleasure cry. Each of these cry-signals has distinctive features.

Briefly as a review we remember that the birth cry is characterized by a short duration (about one or two seconds) and its melody is usually flat or falling. The birth cry is usually voiceless and tense.

The pain cry, the second cry-signal we examined, is the longest in length of the four cries. It typically lasts two to four seconds. It has a high pitch and its melody is usually falling. This cry, like the birth cry, is usually tense.

The third cry-signal--the hunger cry--is somewhat short in length (from one to two seconds) and is characterized by a rising-falling melody form. The pitch of the cry is lower than the pain cry, although it is hard to characterize the pitch as being at a certain level.

The final cry-signal--the pleasure cry--is often flat in form and of a nasal quality. It is short in length (from one to two seconds) like two of the other cries. In reviewing this cry it should be remembered that the melody of the form is usually rising and falling and that the pleasure cry is never tense and voiceless.

After this short lesson do you think you can identify these four cry-signals? I am going to play certain cries and give you an opportunity to test your skill. Here is the first:

<div style="text-align:center">

pain cry-signal #12
(Wasz-Hockert et al., 1968)

</div>

Now was that cry-signal the birth cry, the pain cry, the hunger cry, or the pleasure cry? If you said the cry was the pain cry you are correct. The pain cry, we remember, lasts from two to four seconds and it has a high pitch and its melody is usually falling. This cry, as you heard, is usually tense.

Now let us listen to another cry-signal:

<center>hunger cry-signal #11
(Wasz-Hockert et al., 1968)</center>

What cry do you think that was? Was it the birth cry, the pain cry, the hunger cry, or the pleasure cry? If you said that the cry was the hunger cry, then you were correct. Remember that the hunger cry is somewhat short in duration (from one to two seconds) and it is characterized by a rising-falling melody. The pitch of this cry as we noticed is lower than that of the pain cry, although we cannot characterize the pitch as being at a certain level.

Let us listen now to another cry-signal. See if you can identify this cry pattern:

<center>birth cry-signal #9
(Wasz-Hockert et al., 1968)</center>

In identifying this cry did you say it was the birth cry, the hunger cry, the pain cry, or the pleasure cry? If you said it was the birth cry, you were correct. Remember the birth cry is characterized by a short length (about one or at the most two seconds). Its melody, like the one we just heard, is usually flat or falling. The birth cry again is usually voiceless and is tense.

Now let us listen to a fourth cry-signal and see if we can identify what it is:

<center>pleasure cry-signal #13
(Wasz-Hockert et al., 1968)</center>

In identifying this cry the choices are the same as before. Again, you can choose between the birth cry, the

pain cry, the hunger cry, and the pleasure cry. If you chose
the pleasure cry you were correct. The pleasure cry is often
flat in form and has a typical nasal quality about it. It
is short, like the one we just heard. It usually lasts from
one to two seconds. In reviewing this cry we remember that
the melody of the form is usually rising and falling, and
that the pleasure cry is never voiceless.

Let us listen to the next cry-signal, and see if we can
identify it:

<div align="center">

hunger cry-signal #17
(Wasz-Hockert et al., 1968)

</div>

The choices in identification are still the same. Was
this cry the birth cry, the pain cry, the hunger cry, or the
pleasure cry? If you thought it was the hunger cry you were
correct. We remember the hunger cry is short in duration
(about one to two seconds). It is characterized by a rising-
falling melody. Although we cannot characterize the pitch
of the hunger cry as being at a certain level, we can say that
the pitch of this cry is lower than that of the pain cry.

Now let us listen to one last cry-signal. See if you
can correctly identify this cry pattern:

<div align="center">

pain cry-signal #16
(Wasz-Hockert et al., 1968)

</div>

In identifying this cry you can choose between the
birth cry, the pain cry, the pleasure cry, and the hunger cry.
If you stated that this was the pain cry you were correct.
Remember that the pain cry is fairly long in length (from two

to four seconds). It has a high pitch and this cry is characterized by a falling melody. The pain cry, like the birth cry, is usually tense.

Now we come to the point where you can test your skill in labeling infant cry-signals. On the checklist that you have before you, please check the cry-signal that you think is being played. Twenty-four cries will be played on this tape. You will have ten seconds in between each cry to identify it by checking one of the four categories on your checklist. Be sure to check a response for every cry-signal that is played. If you are unsure of an answer, guess. Let's begin.

APPENDIX E

Control Group Tape Manuscript

On this tape you will hear 24 infant cry-signals.
These signals are divided up according to four categories.
These four categories are (1) the birth cry-signal, (2) the
hunger cry-signal, (3) the pain cry-signal, and (4) the
pleasure cry-signal. On the checklist before you please
check the cry-signal that you think is being played. You
will have ten seconds in between each cry to identify it by
checking one of the categories on your checklist. Be sure
to check a response for every cry-signal that is played.
If you are unsure of an answer, guess.

Let's begin.