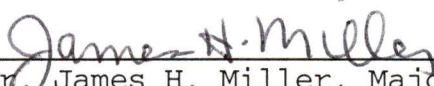
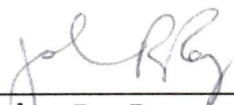


To the Graduate Council:

I am submitting herewith a thesis written by Robert Lewis Baldwin entitled "Lie Detection: An Enhanced Ability in Deaf Individuals?" I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Rehabilitation Counseling.


Dr. James H. Miller, Major Professor

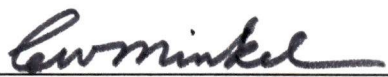
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Ability in Deaf Individuals?

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Robert Lewis Baldwin
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ABSTRACT

The purpose of this study was to ascertain some of the possible effects that communicating visually has on the perception of the behaviors of others. It is feasible that the lack of ability to hear causes compensation in the visual abilities of humans to detect and understand non-verbal behavior. Studies have shown that when people lie there are hints in their non-verbal behavior that suggests that they are not being truthful. Being Deaf could possibly increase the ability of people to more accurately detect lies than hearing individuals. Data were collected on 42 deaf undergraduate psychology students from Gallaudet University. Their ability to detect lies was measured by a deception detection test created by Dr. Paul Ekman from the Human Interaction Laboratory in the Psychiatry Department at the University of California, San Francisco and Dr. Mark Frank from Rutgers University in 1992. All of the subjects were given a questionnaire asking them to rate their ability to detect lies. The results of the deaf subjects were compared against the results of the hearing subjects obtained in a study by Ekman and Frank (in press).

Counter to what was hypothesized, the results showed that on average the hearing subjects were significantly better than the deaf subjects on the deception detection

measure. It was hypothesized that the female deaf subjects would do better than male deaf subjects on the test. There was no significant difference between the two groups. It was also hypothesized that on average the deaf subjects would be more confident about their lie detection skills than the hearing subjects on the three pretest measures and the one posttest measure. The results supported this hypothesis in that deaf subjects, when compared to the hearing subjects, on average were significantly more confident on the two pretest measures that rated their ability to conceal their emotions and to detect lies from others' actions. Between the groups there was no significant difference on either the pretest rating examining their general ability to detect lies or the posttest confidence rating on how well they thought they did. Finally, it was hypothesized that there would be a relationship between the deaf subjects' confidence ratings on their abilities to detect lies on the pretest and posttest measures when compared to their results. There was no significant relationship when the ratings were compared to the results within the group of deaf subjects.

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CHAPTER I

INTRODUCTION

Introduction

Profound congenital deafness precludes the normal acquisition of spoken language. In order for individuals who are deaf to communicate, sight must be used. For many years there has been conflict between two different methods of teaching children who are deaf to use their sight to communicate. One method involves teaching the deaf child to speak and to read lips for communication and learning. The other method uses non-verbal communication, American Sign Language(ASL), as the primary way to communicate with and to teach the child. The purpose of this study was to ascertain some of the possible effects that communicating visually had on the perception of the behaviors of others. It is possible that one of the two methods has a greater effect on this perceptual ability than the other, but for the purpose of this study it was assumed that being Deaf affects the visual ability of the subjects in this study in a general fashion. It is feasible that the lack of ability to hear causes compensation in the visual abilities of humans to detect and understand non-verbal behavior.

Being Deaf could possibly increase the ability of people to more accurately detect lies than hearing individuals. A

study by Sahlman and Koper(1992) was presented at the Annual Meeting of the International Communication Association(Miami, FL, May 21-25, 1992). It was suggested that subjects without vision tended to be more accurate at detecting deceptive communication than sighted subjects. The study suggested that sensory compensation may occur in people without vision. Just as it is possible for individuals without sight to be more perceptive at detecting lies than sighted individuals, based upon a possible increased auditory ability "to make finer distinctions in listening to the human voice" (Sahlman & Koper, 1992, p. 7), it is possible that individuals who are deaf have a similar increased visual ability.

Purpose of the Study

The purpose of the current study was to explore the relationship between deafness and the visual ability to accurately perceive meaning behind the behaviors of others. More specifically, the ability of the Deaf to detect deceptive behavior was investigated.

Statement of the Problem

What is the relationship between being Deaf and the ability to accurately interpret bodily and facial expression in order to detect lies? More specifically, this study attempted to answer the following questions:

1. What is the difference between hearing individuals and deaf individuals on lie detection?
2. What are the differences between male and female deaf

individuals on lie detection?

3. What is the relationship between observers' confidence in their ability to detect lies and their actual ability to do it?

Hypotheses

1. Deaf subjects will be significantly better than hearing subjects in their ability to detect lies on the crime scenario video tape used in a study by Ekman and Frank(in press).
2. Female deaf subjects will be significantly better than male deaf subjects in their ability to detect lies on the lie detection measure.
3. Deaf subjects will be more confident about their lie detection skills than the hearing subjects on three pretest measures and one posttest measure. There will be a significant relationship between confidence in ability and actual ability.

Significance of the Study

It is beneficial to study how deafness affects people. By studying how the lack of hearing affects an individual, conclusions can be drawn about the functions of hearing. For example, before it was discovered that a child could be reached and taught through special education or with the use of ASL, the Deaf were placed into homes for the mentally ill because they were unable to learn socially appropriate behavior. For individuals who can hear, hearing is the most

important connection to others. If a deaf child is not in an environment that allows for visual communication, then the important connection to others, which is a crucial part of learning to be a socially functioning individual, will not occur. Understanding how the Deaf were treated illustrates how devastating the loss of hearing can be. It also is important to study how an individual who is deaf uses other senses to compensate for the lack of hearing. Knowledge gained from such studies help professionals learn how to more effectively teach children who are deaf. For example, research could focus on trying to ascertain if it is more effective to teach deaf children using either a method that utilizes sign language or an oral method.

There are many areas of human interaction in which deception takes place, for example, in the home, school, and work-place(Ekman & O'Sullivan, 1991). Studying lie detection is a logical area in which to discover how and to what extent people can interpret the behaviors of others. If this study finds that deaf subjects are more accurate at detecting deceptive behavior, it will be suggested that other studies should be pursued investigating the benefits of this increased perceptual accuracy. It could be that people who are better able to accurately analyze behavior are more successful in areas such as employment and school. If this is the case, then perhaps visual acuity for behavior should be taught to deaf children to improve their chances of

success. If this study finds that the Deaf are less accurate, then the possible harm caused by such a deficit should be studied. If this reduced perceptual accuracy is problematic, there could be reason to teach visual enhancement techniques.

Procedures

The subjects used in this study met the following criteria:

1. They were Deaf.
2. They were fluent in American Sign Language.
3. They were at least eighteen years of age.

Each subject was asked to view a video tape with ten interviews depicting individuals either lying or telling the truth about taking money in a mock crime scenario. The video tape of the scenarios was created and normed by Dr. Paul Ekman from the Human Interaction Laboratory in the Psychiatry Department at the University of California, San Francisco and Dr. Mark Frank from Rutgers University in 1992 (Ekman & Frank, in press). The subjects in this study were asked to make a decision as to whether each of the ten people on the tape were being truthful. Each subject was given a questionnaire designed to gather personal background information (See Appendix C). The data that was collected was compared against the results of the Ekman and Frank study that showed that observers were, on average, 58% accurate at lie detection (with chance being 50%) (Ekman & Frank, in press).

Assumptions

For the purpose of this study it was assumed that the criteria used to select subjects created a sample group in which the experience of deafness had affected each individual similarly. In other words, it was assumed that being Deaf and using ASL affects the visual receptive abilities of individuals generally the same way. For the purpose of data analysis, it was necessary to assume that the data collected was interval in nature.

Limitations

Due to the fact that this study uses a causal-comparative design, there are some inherent limitations that must be addressed. Since the independent variable is deafness that has already occurred, it was not possible to exert the same type of control that is possible in an experimental study and thus establish causation. It was possible only to state that a relationship exists. In other words, the study sought to determine if there was a relationship between deafness and the ability to detect lies. There was no attempt to assert that being Deaf causes an individual to be better (or worse) at detecting lies. It may be conjectured that there is a cause and effect, but the nature of the study did not allow cause and effect to be explicitly stated. It was also possible that any relationship that was found could be due to another unknown variable.

Definition of Terms

adventitiously deaf- Those people born with normal hearing, who lose it later in life.

congenitally deaf- Individuals who are born deaf.

deaf- This term is used to describe individuals with any degree of hearing loss, but particularly people who cannot understand spoken messages through hearing alone (Goldmann & Mallory, 1992).

Deaf- Deaf with a capital "D" is used to refer to the group of individuals who are profoundly deaf, whose community and culture are based on common experiences, such as growing up in institutions for the deaf, and who use ASL to communicate (Goldmann & Mallory, 1992).

hard-of-hearing- Individuals who have some usable hearing are referred to as hard-of-hearing. They can comprehend speech with or without a hearing aid and generally depend on lip-reading, facial expression, and gestures to supplement what is heard (Goldmann & Mallory, 1992).

prelingual deafness- Individuals having hearing loss severe enough to prevent the use of hearing for speech before the acquisition of language has occurred.

visual receptive ability- An individual's level of ability to discern changes in the visual field. In this study, the phrase refers to an individual's level of ability to accurately perceive the behaviors of others through the use of sight.

Organization of the Study

Chapter I contains the statement of the problem, hypothesis, purpose of the study, significance of the study, procedures, assumptions, limitations, definitions of terms, and organization of the study. Chapter II consists of a review of related literature. The review of the literature contains a section on increased visual abilities, use of facial and body expression in ASL, and lie detection. Chapter III consists of a review of the Ekman and Frank study(in press) upon which this study is based and against which the results were compared. Chapter IV describes the subjects, methods, procedures, instrumentation, and data analysis. Chapter V contains a description of the subjects, the results of the study, and discussion. Chapter VI includes a summary of the study, conclusions, and recommendations for further research.

CHAPTER II

REVIEW OF THE LITERATURE

Increased Visual Acuity in the Deaf

Virginia Swisher (1989) stated, "It seems more than likely that deaf people, for the sake of survival, would need to be more visually alert than those who get auditory information and that they might visually monitor the environment more actively" (p. 101). David Wright (1969) suggested that individuals who are deaf perform at higher levels of visual sensibility. It also has been suggested that, with the Deaf, there is a heightened ability to discriminate between subtle variations of facial expression (Corina, 1989). Another study suggested that individuals who are deaf have an enhanced ability to discriminate faces (Bellugi, et al, 1990). It seems that being Deaf may indeed increase an individuals abilities in many different visual areas.

In order to examine the body of literature that exists, regarding visual abilities of individuals who are deaf, it is important to divide the literature into analyzable sections. Neil Reynolds (1978, 1981, 1987) separates the literature into research that presents evidence to support what he calls the deficiency hypothesis, the compensation hypothesis, and the equivalence hypothesis. The deficiency hypothesis

suggests that all of the sensory systems that humans have are interdependent and that the loss of hearing leads to deficits in the other senses (Reynolds, 1978, 1981, 1987). The compensation hypothesis holds that if one sense is impaired the others make up for that loss (Reynolds, 1978, 1981, 1987). The last hypothesis, the equivalence hypothesis, proposes that individuals with hearing loss show a normal range of abilities when compared to those with normal hearing (Reynolds, 1981).

Up until the past ten years Reynolds (1978, 1981, & 1987) found that the majority of research favored the deficiency hypothesis. He found that the research seemed to show that individuals who are deaf tend to have more visual problems than individuals with normal hearing. Research, starting in the 1950's described certain perceptual deficiencies in deaf subjects. When hearing subjects were compared to deaf subjects there were deficiencies in visual memory for stimuli presented in succession, field independence (perception of figures as different from its environment), figure-matching tasks with a preference for color over form, and shape. He concluded that the lack of evidence supporting the compensatory or equivalence hypotheses could be related to the fact that little research had been done on abilities in which perception might be better.

More recent studies, however, have found possible

compensation or equivalence of many spatial and visual imagery abilities in the Deaf. An analysis of the spatial cognitive abilities of deaf signing children exhibited at least equivalence and sometimes compensation of abilities when compared to hearing children on a battery of different tasks/tests (Bellugi, O'Grady, Lillo-Martin, & O'Grady, 1990). In their study deaf subjects were better able to discriminate faces in one analysis and, by age three, they were performing as well as the six year old hearing subjects. On another test the authors found that deaf children from Hong Kong were better able to remember, analyze and decode Chinese script written in the air with a small light than hearing children. Another study showed evidence suggesting that being born deaf may affect the way the brain develops for certain imagery tasks (Emmorey, Kosslyn, & Bellugi, 1993). In this study, deaf subjects, hearing subjects of deaf parents, and hearing subjects were compared on several visual imagery tasks. On image generation and image maintenance tasks there was no evidence to indicate that being born deaf leads to enhancement of ability. On the mental rotation task, on the other hand, the results indicated that being born deaf may lead to increased accuracy in this ability.

Studies involving peripheral vision have produced the most evidence suggesting that there may be a difference in and perhaps a compensation of abilities in individuals who

are deaf. There are many reasons why this difference or compensation may exist. One reason may be linked to the fact that when deaf individuals communicate with each other they tend to focus on the face of the person with whom they are communicating (Sipple, 1978). This means that many of the signs that are read in everyday communication are read with the use of peripheral vision. This everyday use of peripheral vision may lead to increased ability to handle and interpret peripheral stimuli. Virginia Swisher (1990) discovered that deaf subjects were capable of accurately identifying signs presented peripherally. Parasnis and Smar (1985) found that deaf subjects with a foveal stimulus were better able to redirect their attention to peripheral stimuli than hearing subjects on the same task. A study by Neville and Lawson (1987) showed that deaf subjects were better able to detect motion faster and more accurately in peripheral vision than hearing subjects. Studies examining the difference in brain function between hearing and deaf subjects have contributed evidence that could explain how and why deaf subjects are better at using their peripheral vision on certain tasks.

It is possible that being born without the sense of hearing may cause the brain to develop differently than it would with it. A study by Neville, Schmidt, and Kutas (1983) showed that the visual-evoked potentials recorded from deaf subjects were significantly larger than those of hearing

subjects in both the visual and auditory cortical regions of the brain. A study by Neville (1988) found evidence that the neural systems in deaf subjects, that attend to attention and detection of motion in peripheral vision, are different from those of hearing subjects. These two studies suggest that deaf individuals may be reallocating auditory areas of the brain to be used with the visual sensory system. Not only does the brain develop differently, it may also work differently. Other studies have found differences between hearing and deaf subjects in brain hemisphere specialization when performing certain tasks.

The different functions of the brain have classically been divided between those that are language related in the left hemisphere (LH) and those that are not related to language in the right (RH) (Sacks, 1990). Stimuli that have classically been thought of as belonging to the processes of the right side of the brain sometimes are processed in the left side of the brain in deaf subjects. A study by David Corina (1989) suggests that facial expressions are processed differently between hearing and deaf subjects. He found that hearing subjects processed facial stimuli faster and more accurately when presented to the left visual field (LVF) which suggests that the right side of the brain is better suited for this task. In deaf subjects, Corina found that when linguistically significant facial expressions were presented before non-linguistically significant facial

expressions, the asymmetry seen in the hearing subjects was not present. This suggests that the presence or absence of facial expressions used in American Sign Language (ASL) influences which side of the brain will be used in face recognition tasks. In a peripheral motion perception study by Neville and Lawson (1987) deaf subjects displayed greater event-related brain potentials for right visual field (RVF) stimuli, which suggests left hemisphere processing, while the hearing subjects showed larger amplitudes for LVF/RH stimuli. The authors concluded that the relationship between language and motion in individuals who were deaf caused the deaf subjects to process the motion information in the left and more linguistic side of the brain. Reynolds (1993) found that stimuli presented in the periphery with no foveal stimulus created a LVF/RH advantage in deaf subjects and a RVF/LH advantage in hearing subjects. When a foveal stimulus was present with the peripheral stimulus, the visual field advantage switched in both groups of subjects. Reynolds suggested that the peripheral stimuli presented without the foveal stimulus demonstrated the preferred side of the brain for processing the type of information presented. When there was a foveal stimulus present the preferred side of the brain was busy processing that information and therefore processed the peripheral information in the opposite side of the brain. The research suggests that there is a difference in the side of the brain that is used to process certain information in

deaf and hearing subjects. The evidence implies that deaf subjects may use the left side of the brain to process movement and facial information that is perceived as linguistically significant.

Individuals who are deaf use facial expression, body language, and relevant linguistic movement of the hands, head and body in communication with ASL. The literature discussed above suggests that auditory deprivation from birth and the consequent use of ASL as a first language lead to differences in the way things are perceived visually. There is evidence that on some tasks deaf subjects display a deficit when compared to hearing subjects. There may also be superior abilities for processing visual stimuli that are related or similar to what is present in ASL such as motion in peripheral vision and recognition of facial expressions. The research provides evidence that there are equivalent abilities, but that these abilities may be processed differently or in different parts of the brain. It is obvious that individuals who are deaf analyze visual information differently and sometimes more efficiently when the information is language related than individuals who are hearing.

Use of Facial and Body Expression in ASL by the Deaf

Charlotte Baker-Shenk states that "American Sign Language (ASL) is a visual-gestural language, a language expressed with movements of the body and received with the

eyes. The primary context in which it is used is face-to-face interaction, where at least the top half of the bodies of the interactants is generally visible" (Baker-Shenk, 1983, p. 39). Sign language interaction involves the use of the hands, arms, body, head, and face to communicate the same things that are communicated through manipulation of air and the vocal cords in hearing individuals. Body language and facial expression are comparable to voice intonation in spoken languages (Reilly, McIntire, & Bellugi, 1990). The face can display affective information as well. Reilly, McIntire, and Seago (1992) found that when subjects viewed signers that were and were not wearing a mask they did better on questions concerning affect when the signers were not wearing a mask. Baker and Padden (1978) discussed how facial movements could mark negatives, interrogatives, and relative clauses. The conclusion was also made that facial expressions are morphemic in nature and are similar to such English prefixes as "-un" in "uneasy" (Baker-Shenk, 1983). Non-manual behaviors have also been cited as helping signs by acting as adverbs or adjectives and serve as grammatical markers (Baker-Shenk, 1985). It becomes even more obvious that non-manual behaviors are a significant part of ASL, when the effects of incorrectly incorporating them into ASL are studied.

When non-manual markers are left out or are not incorporated properly into ASL, much of what is trying to be

conveyed may be lost or distorted. It has been discovered that many deaf students have difficulty seeing the difference between a question and a statement with hearing teachers. Baker-Shenk (1985) describes the difference between how hearing and deaf people communicate. She describes how hearing listeners may not look at the speaker at all times. On the other hand, deaf speakers often will not start signing if the receiver or receivers are not looking them in the face. This is evidence that visual cues such as facial expressions may be more important in signed languages than in spoken ones. Further, evidence that non-manual markers are important in ASL comes from examining how the eyebrows are used during communication. The use of the eyebrows is an important part of asking questions in ASL. As seen in Figure 2-1, the eye-brows are raised in the yes-no question and lowered in the wh-question. Often times, hearing teachers of deaf students do not use the correct non-manual markers and this confuses the students (Baker-Shenk, 1985; Kluin & Kluin, 1983). Now that sufficient evidence has been presented on the importance of non-manual behaviors in ASL, it is important to examine the research that has analyzed how non-manual behaviors are used. Examples of how they are used can be seen in research on their use in the formation of clauses, adverbs, and questions.

Non-manual behaviors are often used to mark the beginning or end of a clause. Baker and Padden (1978) found



Wh question
 Yes-no question
 Figure 2.1 Use of Eyebrows in ASL
 Source: Baker-Shenk, C. (1985). Using your face to communicate.
 Perspectives for Teachers of the Hearing Impaired, 3(3), 19-21.

that in the use of conditional clauses there were at least four different non-manual markers present such as eye blinks, brow raise, and head nodding. Liddell (1986) found that out of all of the different kinds of non-manual behaviors present in the conditional clause the raise of the eyebrow was present in each one observed. Baker and Padden (1978) examined video tapes of subjects signing different sentences. They found that when blinking was used to group signs they were usually at grammatical junctures, such as at the end of a clause.

Example 1 (a) ME WORK O-T O-T (blink) FINISH ME MONEY ME
"If I'd work overtime a lot, I'd really get a lot of money"
(Baker & Padden, 1978, p. 42).

(b) ME WORK O-T O-T FINISH (blink) ME MONEY ME
"If I had worked overtime a lot, I'd have a lot of money now"
(Baker & Padden, 1978, p. 42). Using the speaker's blink to group the signs into clauses changed the meaning of the sentence. A deaf bilingual observed the video tape and agreed that the grouping by when the subjects blinked and the subsequent change in meaning matched what she perceived the sentences to mean (Baker & Padden(1978).

It has also been reported that non-manual signs can be used as adverbs.

Example 2 (a) BOY LETTER WRITE
"The boy is writing/wrote a letter" (Reilly, McIntire, & Bellugi, 1990, p. 371).

(b) BOY LETTER mm WRITE

The non-manual marker "mm" (mouth closed, bottom lip protruding) means "with ease, regularity, or pleasure" and changes the meaning to: "The boy writes a letter regularly or easily" (Reilly, McIntire, & Bellugi, 1990, p. 371).

(c) BOY LETTER th WRITE

The non-manual marker "th" (tongue thrust out of mouth) means "carelessly or without paying attention" and changes the meaning to: "The boy is writing/wrote a letter carelessly" (Reilly, McIntire, & Bellugi, 1990, p. 371).

This example is one of many ways that non-manual markers can be used as adverbs in ASL.

Baker-Shenk (1983) performed an in depth analysis of the non-manual markers used in the formation of three different kinds of questions. She found that native deaf signers used different facial expressions for each one. In asking yes-no questions their eyebrows and eyelids are raised and their heads are tilted forward and downward (See Figure 2-1 above). For wh- questions, their eyebrows are lowered and drawn together (see Figure 2-1 above). As seen in Figure 2-2, during the signing of a rhetorical question, their heads are tilted back and to one side with their eyebrows raised (but not their upper eyelids). In order to properly ask a question in ASL the non-manual markers must be present.

From this review, it is apparent that non-manual (and



Rhetorical question

Figure 2.2 Non-manual markers is ASL

Source: Baker-Shenk, C. (1985). Using your face to communicate. *Perspectives for Teachers of the Hearing Impaired*, 3(3), 19-21.

obviously non-verbal) signs such as facial expressions are an integral part of the grammatical structure of sign language. Individuals who are deaf view the non-manual markers as more than just grammatical structures. In a study on simultaneous communication (using voice while signing) deaf individuals were asked what they felt was important to include in the signing aspect of this way to communicate (Newel, Stinson, Castle, Mallery-Ruganis, & Holcomb, 1990). One participant stated, "It [facial expression and body language] is what deaf culture is. It's what makes it [signing] an attraction to deaf culture and the people in deaf culture" (Newell, et al, 1990, pg 399). Another participant stated, "So with the deaf person, it's the body language and the facial expression and you get more of a feeling...if communicators are not really using a lot of facial expression or body language, you lose a lot of the tone of the communication" (Newell, et al, 1990, pg 400). Statements such as these speak for themselves. Facial expressions and body language are an essential part of signed communication and are used in everyday communication among the Deaf.

Lie Detection

"If his lips are silent, he chatters with his fingertips; betrayal oozes out of him at every pore" (Freud, 1959, p. 94). The idea that when people lie there is the possibility that their behavior will show it is not a new concept. In this section, research that explores the non-

verbal correlates of deception is addressed. First the social aspects of deception are discussed. A list is given of some of the different verbal and non-verbal correlates that may be present during deception. An explanation is provided of the differences between the verbal and non-verbal aspects of lying. A model by Zuckerman and Driver (1985) is presented, describing four factors that may affect non-verbal behaviors. Next, follows the explanation of several studies examining non-verbal behaviors present when some one lies such as, changes in facial expression, body movement, smiles, and eye gaze. Last of all, the research that has been done on the abilities of people as lie detectors and the effects of training on this ability is explored.

It has been theorized that lying is a natural everyday occurrence in the course of human interaction. There are varying degrees of dishonesty. It has been proposed that people will distort the truth whenever possible by hedging, evading, exaggerating, or telling only part of what is considered true (DePaulo, Stone, & Lassiter, 1985). In addition to all of these distortions there is the ambiguous nature of attitudes, feelings, and beliefs. Not only are lies common, they are common in all realms of life. They occur in the home, school, work-place, and in legal situations such as in courtroom testimony (Ekman & O'Sullivan, 1991). Even though deception seems to invade every corner of human existence, it is an important goal to

appear truthful and credible in social interaction (Fidler, 1989). In fact, honesty is perceived as one of the most important impressions that people want to convey in their interpersonal interactions above even kindness and intelligence (DePaulo, Stone, Lassiter, 1985). With the social importance of being perceived as honest, and the counter intuitive persistence of deception, it is no wonder that so much research has been done in this area.

Many research projects have been done on the different verbal and nonverbal correlates that exist when someone is lying. There is evidence that suggests that there are verbal and non-verbal behaviors that are often times present during deception. These behaviors may exist, but they may not be what is stereotypically thought of as how liars act (DePaulo, Stone, & Lassiter, 1985). Table 2-1 was derived from a review article by Zuckerman & Driver (1985), a study by deTurck & Miller (1985), and a study by Fidler (1989). It lists the different verbal and non-verbal correlates that may be present during deception. The different correlates presented have been identified as either being possibly present when some one is lying or possibly present and different from someone that is not lying (e.g., both deceptive and truthful people blink, but a deceptive person may blink more than a truthful person). With so many different verbal and non-verbal correlates how does one

Table 2-1: Verbal and Non-verbal Correlates of Deception

Verbal Correlates	Non-verbal Correlates
Decrease in Illustrators	Adaptors(scratching, rubbing, etc.)
Irrelevant Information	Blinking
Leveling(overgeneralized statements, e.g., all, none, etc.)	Eye Gazing
Message Duration	Foot and Leg Movements
Negative Statements	Head Movements
Response Latency	More Postural Shifts
Self References	Pupil Dilation
Speech Errors	Shoulder and Hand Shrugs
Speech Hesitation	Smiling
Speech Rate	
Voice Pitch	
Content Related Verbal Correlates	
Desirability	
Embellishment	
Infrequency	
Intimacy	
Suspiciousness	
Verifiability	

research what actually occurs during deception? Research tends to examine only one aspect of lie detection at a time.

One way to examine the different behaviors that may be present during deception is by looking at verbal versus non-verbal behaviors. It is a long standing belief that there is a big difference between what is said and what is expressed non-verbally. It is widely felt that the non-verbal display

is often times a more reliable source of the truth than words are (Zuckerman & Driver, 1985). This difference may be due to a factor of control. There appears to be a hierarchy around which channels of expression are more controllable. Zuckerman and Driver (1985) describe the face and voice as being more controllable than the body and tone of voice. It may be easier to control verbal over non-verbal information because there is often an emphasis on what is said in our society and therefore people are more consciously aware of verbal behavior (DePaulo, Stone, & Lassiter, 1985).

The difference between verbal and non-verbal behavior can also be seen in a study examining what is called the motivational impairment affect (DePaulo, Kirkendol, Tang, & O'Brian, 1988). The authors describe this effect as occurring when a person tries to control all of the different verbal and non-verbal channels. They predicted that a person that is trying to control both verbal and non-verbal correlates will be able to successfully control their verbal but not their non-verbal channels. The results showed that the lies in the study were more distinguishable to observers that had access to the non-verbal cues than those that did not.

Zuckerman and Driver (1985) proposed a model that describes four different factors that influence verbal and non-verbal behaviors. After analyzing 45 different studies on different parts of deception they found that the following

factors that were linked with lie telling: control, arousal, negative affects, and cognitive complexity. They argued that any expression present during deception could be linked to one or more of the four factors.

The factor of control deals with the fact that people who are lying are trying to control how they are acting and what they are saying in order to convince others that they are telling the truth. The action of trying to control has a two fold effect. First, the person may appear to be too contrived. Second, not all aspects of behavior are able to be monitored and controlled at the same time. Some behaviors are more controllable than others. As a result, there are discrepancies between behaviors that have been successfully controlled and those that have not.

The factor of arousal discusses the physical stimulation that occurs as a result of lying. Evidence suggests that when people are lying they are more aroused than when they are not lying. This arousal causes many behavioral as well as physical reactions. A good example of research on this type of arousal is evidenced in a study by deTurck and Miller (1985). They examined the different sympathetic activation responses that occur during deception, such as those used in polygraph tests (e.g., heart rate, blood pressure, skin conductance, etc.). They were interested in examining if arousal in a truthful situation produces the same verbal and non-verbal behaviors seen in situations involving lies.

The affective factor involves the emotions and feelings that are often felt during a lie. It is not socially acceptable to lie and therefore when people do lie they often feel guilty about it. As a result of these negative feelings and emotions, facial expressions as well as verbal content may be more negative in appearance than if that person was actually telling the truth.

The last factor discussed by Zuckerman and Driver (1985) discusses how difficult of a task it is to lie. Based upon their review of the literature, they suggest that it is more cognitively taxing to lie than it is to tell the truth. This cognitively complex task causes such reactions as increased pupil dilation, more frequent hesitations, longer latencies, and fewer illustrators. A meta-analysis of the different studies that were examined in their review support their four factor model of deception. All of the studies discussed in this section also appear to be linked to this model by at least one of the four factors. What follows is a review of several studies looking at changes that may take place in individual non-verbal behaviors while someone is lying.

There is evidence that suggests that facial expressions may change during deception. The expression of emotion is often times not controllable and the result is discrepancy between the expressed true feelings and the expressed contrived ones. Ekman (1985) proposes that there are many outward signs that appear on the face, in the voice, and in

the body language of individuals who are lying. He describes this appearance of deception clues as leakage. Deception is two sided by nature, it consists of the deceiver trying to convey a false message (while keeping the truth from the perceiver) and at the same time trying to sway the perceiver into believing that he or she is being genuine (Zuckerman, DePaulo, & Rosenthal, 1981). According to this definition, it is important to hide any emotions that may be linked to the truth. By Ekman's (1985) definition, leakage occurs when a person has failed to hide his or her true feelings thus providing a link to the truth through the face, body, voice, or the context of what is said.

One of the reasons that Ekman gives on why it is hard to conceal emotions is that people have no control over when an emotion will be felt. The expression of emotion is both involuntary and voluntary. Emotions are displayed primarily on the face. The face is directly linked to the part of the brain that can voluntarily express any given emotion. People often attempt to hide the truth through the voluntary expression of a contrived emotion or facial expression different from the truth. The face is also linked to the area of the brain that is involved in the involuntary expression of emotion. Since emotions are not controllable, when they are felt the involuntary aspect of emotional expression will cause leakage of the truth on the face of the deceiver (Ekman, 1985).

In a study on body movement and voice pitch in situations involving deception, leakage occurred in hand movement and voice (Ekman, Friesen, & Scherer, 1976). These authors found that subjects hand movements and voice pitch changed significantly from honest to deceptive scenarios. Another study found that different kinds of smiles could significantly determine the difference between truthful and deceptive behavior (Ekman, Friesen, & O'Sullivan, 1988). By using the Facial Action Coding System (Ekman & Friesen, 1976, 1978) the authors were able to measure the subtle differences between smiles used during deception and those used in other scenarios. They found that "felt happy smiles" decreased and "masking smiles" increased when honest interviews were compared to dishonest interviews. The length of time that a person gazes into the eyes of the perceiver was found to increase when lying to the opposite sex (Burns & Kintz, 1976). Fidler (1989) found evidence that contradicts the popular belief that non-verbals are the most reliable and widely used method of deception detection. In his study, he found that when compared to content related material, the contribution of non-verbal correlates was negligible and was no different from chance. It is obvious from the majority of the studies discussed that there is a component of deception that is detectable on the face and in behavior. Do some people use non-verbal behavior more effectively than others in deception detection? If not, can people be trained to do

so? The study by Fidler (1989) suggests that people do not use non-verbal behavior in lie detection as much as one would think they should. There have been numerous studies that have attempted to identify individuals who are exceptionally good at detecting lies.

A study by Ekman and O'Sullivan (1991) examined the lie detection abilities of different occupational groups. The groups examined are typically thought of as requiring good abilities to detect deceit. They cite that usually people are only marginally better than chance at detecting lies. They found that in general there was no relationship between subjects' confidence in their ability to detect lies and how they did after the lie detection test and their actual ability. Ekman and O'Sullivan examined the abilities of individuals in the U.S. Secret Service, California Police Department, federal polygraphers (from the Central Intelligence Agency, Federal Bureau of Investigation, National Security Agency, and Drug Enforcement Agency), judges, psychiatrists, college students and working adults. Out of all of these groups only subjects from the Secret Service did better than chance on the deception detection tasks. They also found that there was a significant correlation between being able to recognize emotional facial expressions and accurately identifying liars. There was no significant correlation between accuracy when compared to gender.

In the current study it was hypothesized that deaf subjects would rate their deception detection abilities higher, on pretests and a posttest than would hearing subjects. It was also predicted that deaf subjects would do better at deception than hearing subjects. It is possible that the Deaf think that they should be and are better at visual tasks than individuals who are hearing. Counter to what was found in the study by Ekman and O'Sullivan (1991), it was hypothesized that there would be a significant relationship between deaf subjects confidence ratings and their ability on the deception detection measure. On the other hand, the current study attempted to replicate the results from their study that shows no relationship between accuracy and gender.

Subjects who are trained how to detect deception through the use of non-verbal cues were significantly better at deception detection than untrained social perceivers (deTurck, Harszlake, Bodhorn, & Texter, 1990). Fiedler and Walka (1993) proposed that there are two processes available for people to use in lie detection. The first involves decoding non-verbal information and using it to detect deception. The other uses heuristic knowledge based on personal experiences. They conclude that people have the ability to detect the non-verbal correlates of deception, but do not know how to accurately decode it. They found that through feedback and instruction on non-verbal cues,

performance was better than those who did not receive feedback or instruction. They also found that subjects who received feedback and cue instruction reported using heuristics less than those who did not receive any feedback or instruction.

Summary

Individuals who are good at reading facial expressions or who are trained to use facial expression typically outperform those who do not on lie detection tasks. Individuals who are deaf use facial expressions and non-verbal behavior to communicate in everyday conversation. It has also been demonstrated that individuals who are deaf may be more efficient at analyzing visual information than hearing people. In all of the studies examined, hearing people generally do a little better than chance without any training in nonverbal cue detection and identification. It seems to be a reasonable and logical conclusion that individuals who are deaf may be better at lie detection than individuals who are hearing.

CHAPTER III

REVIEW OF THE EKMAN AND FRANK STUDY

Introduction

The study by Ekman and Frank (in press) suggests that accurate high stake lie detection is based upon the ability to read the leakage of non-verbal behaviors caused by strong emotions. It also suggests that this ability is generalizable across different scenarios. The second part of their study examined whether or not there was a correlation between being able to detect facial expressions and ability to detect lies in two scenarios. Their study showed that there was a positive correlation between subject's ability to detect lies in one high stake lie scenario about a crime and in another deception scenario about an opinion. Further, there was a positive correlation between subject's lie detection ability and their ability to read facial expressions. Only the results relevant to the current study will be reported. If individuals who are deaf are better than individuals who are hearing at reading non-verbal behaviors, such as facial expressions, then they may be better at lie detection than individuals who are hearing.

Creation of the Crime Scenario Video Tape

The crime scenario video tape that was used in the current study was created and normed by Ekman and Frank in

1992. The subjects used to create the scenario were 20 males from the San Francisco area who answered an ad for a study called "Communication Skills Experiment" in which they would be paid ten dollars an hour for their participation. All of the subjects used were between the ages of 18 and 28. They were told that there would be a possibility to earn more money depending upon their performance.

Each subject was told that he and a confederate would have a chance to take fifty dollars from a briefcase. Each subject was told that he and the confederate would each enter the room one at a time and then each would be interrogated. This way, as in real life, the interrogation would occur after the crime and each subject would know that the crime was committed (i.e., if the subject entered the room and the money was gone, he would have to convince the investigator that he was indeed innocent and if the money was in the room and the subject took it, he would have to lie). In real life deception detection situations, anxiety is created by the fear of being punished (i.e. caught lying or wrongly accused). Having the subject know that the interrogator would know that the money was stolen helped to produce anxiety. Out of fear of being punished, anxiety would arise from being put in the position of having to convince the interrogator that he did not take the money whether he did or not. It was important for Ekman and Frank to create this anxiety so that the video tapes would accurately depict

people lying and not lying as they might appear in real life deception situations.

In order to create a situation such as the one described, each subject was told that if they were judged to be lying (whether they were or not) they would be punished by not receiving their 10 dollar an hour subject fee as well as the 50 dollars if they indeed took it. Further, half of the subjects were told that, if they were judged to be lying, they would be made to go into a small dark room, sit in a cold metal chair for an hour, and listen to 10 to 40 randomly sequenced, 110 decibel blasts of noise. Each subject was given a demonstration of the punishment to assure them that they would not want to receive it. The incentive to steal the money was created by telling the subjects that if they convinced the investigator that they did not take the money when they in fact did they could keep it. A ten dollar reward was offered to all those subjects that did not take the money and were judged as being truthful. The situation created is similar to real situations in which lying has a greater gain in the short run than telling the truth. In reality, all subjects received the ten dollar an hour subject fee, those judged to be lying were told that they would not receive a bonus and would not be punished, and those deemed truthful received the bonus.

All of the subjects were video taped via a hidden camera while they were being interrogated. As described earlier,

individuals who were in high stake situations that require either a deceitful or truthful defense may elicit strong emotions detectable in non-verbal behaviors that make it possible to tell if that individual is lying or not. In order to help ensure that the crime situation elicited the desired strong emotions, the Facial Action Coding System (FACS; Ekman and Friesen, 1976, 1978) was used to analyze the visible facial muscle movements of the subjects. It was apparent that the situation was such that it did elicit the desired negative emotion in those that lied.

Description of the Study Part One

The subjects used were 49 undergraduate observers (32 female and 17 male) obtained from the San Francisco State University. All of the subjects received class credit for participating in the study. Each of the 49 subjects was asked to observe the two deception video tapes (crime scenario and opinion scenario). The tapes were showed to the subjects in groups of 7 to 11 in a counterbalanced order in a classroom setting. They were told that they would see 10 men who were being interrogated about a crime involving the theft of some money and 10 different men being interrogated about their opinion on a social topic. All of the subjects were asked to make a decision as to whether they felt each of the interviewees were being honest by circling the word truthful or deceitful by circling the word lying. They were told that one forth to three fourths of the interviewees were lying in

order to prevent the subjects from thinking that the study was a trick and believe that all of the interviewees were being truthful. All of the subjects were asked to answer questions about who they were (e.g., gender, age, etc.). They were also asked to rate how well they thought that they would do, before the test, and how well they thought they did, after the test. Ekman and Frank predicted that there would be a positive correlation between one's deception detection ability on one video when compared to the ability on the other video. It was also predicted that there would be no relationship between observer confidence and accuracy.

Description of the Study Part Two

The subjects used were 30 undergraduate observers (17 female and 13 male) obtained from San Francisco State University. All of the subjects received class credit for participating in the study. The methods used in this study were the same as those used in study one except for one addition. In this study, after the observers finished watching the two videos and answering the relevant questions, they were given a microexpression test based upon a test used in a study by Ekman and O'Sullivan (1991). The test involved showing subjects flashes of pictures depicting facial expressions of emotion. In the Ekman & O'Sullivan study, subjects who were more accurate at identifying the facial expressions were also more accurate at detecting deceit. Ekman and Frank predicted that this study would have the same

results at the previous one, but would also show a positive correlation between performance on the microexpressions test and deception detection.

Results of the Study Part One

One subject was dropped for not following directions. There were no main or interaction effects for gender of observer on accuracy (all F 's(1,42)<0.96, n.s.). Accuracy of observers' performance on the Crime video was ($M=58\%$; $F(1,42)<1$). Crime video accuracy ($t(47)=3.78$, $p<.01$) was greater than chance (50%). The scores ranged from 80% to 10% in a normal distribution for the video. There was no relationship between the observer's pretest confidence in ability to detect lies and actual accuracy at detecting lies for the video (pretest, $r=+.10$, $p=n.s.$; posttest, $r=+.13$, $p=n.s.$). There was a significant correlation between pretest confidence and posttest confidence in that those who were confident prior to the crime video tended to be more confident after the video, and those who were less confident before the video remained less confident afterwards ($r=+.53$, $p<.001$). Twenty-seven subjects were high scorers (60% or above) and 21 were low scorers (50% or below).

Results of the Study Part Two

There were no main or interaction effects for gender of observer on accuracy (all F 's(1,28)<1, n.s.). Accuracy of observers' performance on the crime video was ($M=61\%$; $F(1, 28)=1.38$, n.s.). Crime video accuracy ($t(29)=4.04$, $p<.01$)

was greater than chance (50%). There was no relationship between the observer's pretest confidence in their ability to detect lies and their actual accuracy at detecting lies for the video (pretest, $r=+.20$, $p=n.s.$; posttest, $r=+.05$, $p=n.s.$). There was a significant correlation between pretest confidence and posttest confidence such that those who were confident prior to the crime video tended to be more confident after the video, and those less confident before the video remained less confident afterwards ($r=+.41$, $p<.01$). Nineteen subjects were high scorers (60% or above) and 11 were low scorers (50% or below). The crime accuracy correlated significantly with the microexpression test ($r=+.34$, $p<.04$ one tailed).

Conclusion

Ekman and Frank(in press) concluded that an individual's ability to detect lies is generalizable across different situations involving deceit. They also concluded that being able to accurately identify facial expressions of emotion was related to ability to detect lies. The ability of their subjects to detect lies was a little better than chance and this is similar to other findings. In the current study it was hypothesized that deaf subjects would do better than hearing subjects on the crime scenario video tape. Further it was hypothesized that there would be no gender differences as was found in their study as well as in others (Ekman & O'Sullivan, 1991). In contradiction to the Ekman and Frank

study and the Ekman & O'Sullivan (1991) study, it was predicted that there would be a significant relationship between deaf subjects' confidence in their ability and their accuracy. It was believed that the deaf subjects would both rate themselves higher on their abilities than did the hearing subjects, and also out perform the hearing subjects on the crime scenario video.

CHAPTER IV

METHODOLOGY

Subjects

The results of the current study were compared against the results from the study by Ekman & Frank (in press). It was imperative that the subjects from the current study and the Ekman and Frank study be as much alike as possible. Subjects were selected from undergraduate psychology students (as was done in the Ekman and Frank study) at Gallaudet University in Washington DC. Professors in the department of psychology, with undergraduate students, notified their students that they would have an opportunity to receive course credit for participation in a research study (in the study by Ekman and Frank the subjects also received academic credit). The principal investigator described the study to the students and asked those interested in participating in the study to volunteer by signing the sign-up sheet posted in the psychology department. A handout describing the study and what would be expected of the subjects was distributed to everyone in each class (See Appendix A). It was made clear that participation would be voluntary. The sign-up sheet had predetermined session times scheduled between March 24, 1997 and April 1, 1997. It was possible for a maximum of five students to sign up for each session.

Methods and Procedures

Upon arrival to the session, the principal investigator distributed a statement of understanding to each subject (Appendix B). After it was made clear that participation was voluntary and that individual results would be kept confidential (names were not used in the sessions or with the data), the directions, answer sheet, and dialogue script was passed out (see Appendix C & D). The instructions were explained to the students, and all questions were answered before viewing the video tape. At the end of the session, after all of the questions had been answered, the video watched, and a determination made about which individuals on the tape were lying, the students were told how to obtain the results of the study if interested.

All information gathered in the course of the study was and will be handled in a confidential manner. All of the answer sheets will be kept in a locked room in Claxton Addition at the University of Tennessee in Knoxville for three years at which time they will be destroyed. Other than the risks existing in the handling of confidential information, this study contains no other risk to the subjects above and beyond those present in everyday life. The fact that the sign-up sheet was destroyed and that no names were used in conjunction with the data further ensures that the subjects who participated were not at risk, and will not be, from participating in this study.

Instrumentation

The ability of deaf subjects to detect deception will be compared against the results of the hearing subjects in the study by Ekman and Frank (in press). The authors looked at how generalizable the ability to detect lies was in two different scenarios, but only the results involved in determining the ability of the hearing subjects to detect the lies on the crime scenario video tape will be used in the present study. Through correspondence with Dr. Ekman and Dr. Frank, permission was obtained to use the video tape of the crime scenario from their study for the purpose of assessing the lie detection abilities of individuals who are deaf. Since the subjects in the current study are Deaf, the video tape was captioned, and a print out of the dialogue that is on the video was given to each subject to be read before viewing each interview (see Appendix D). The subjects did not have to rely solely on the captioning to understand the dialogue, due to having read the script before viewing, and therefore were able pay close attention to the non-verbal behavior on the video. Each subject answered personal data questions and recorded a judgement of whether each of the ten individuals on the video was lying on a modified version (see Appendix C) of the form used in the study by Ekman and Frank. The form was modified to be acceptable for use with deaf subjects.

Data Analysis

The computer center at the University of Tennessee in Knoxville had the necessary equipment for data analysis. The statistical program JMP was used to compute the analysis. A one-way ANOVA was used to ascertain if the mean results of the deaf subjects was significantly different from the mean results of the hearing subjects from the study by Ekman and Frank (in press). One-way ANOVAs were used to determine the relationship between the demographic information of the subjects (i.e., age, gender, amount of hearing loss, etc.) and the results. In order to determine if there was a relationship between the pretest and posttest ratings on confidence, and the results, an ANOVA test was used. Chi Squares were used to determine if the results of the deaf subjects on each of the ten interviews were different from the results of the hearing subjects. A confidence level of .05 was used to compute statistical significance between the groups.

CHAPTER V

RESULTS

Description of the Subjects

There was a total of 42 subjects used in the study. Their ages ranged from 18 to 49 with an average of 25. The level of hearing loss for the subjects ranged from moderate to profound. Twenty-eight of the subjects stated that they had profound hearing loss, six stated they had severe, five stated that they had moderate-severe, and three stated that they had moderate hearing. Twenty-six subjects stated that their hearing loss was from birth, nine stated that they lost their hearing between birth and age two, six stated that they lost their hearing after age two, and one incorrectly answered this question. There were no significant relationships between the demographic information discussed above when compared to accuracy on the lie detection test. In the rest of the calculations, the data was analyzed without regard for level of hearing loss, onset, age, or gender.

Results of the Study

It was hypothesized that the deaf subjects would be significantly better than hearing subjects in their ability to detect lies on the crime scenario video tape used in a study by Ekman and Frank (in press). A one-way ANOVA showed

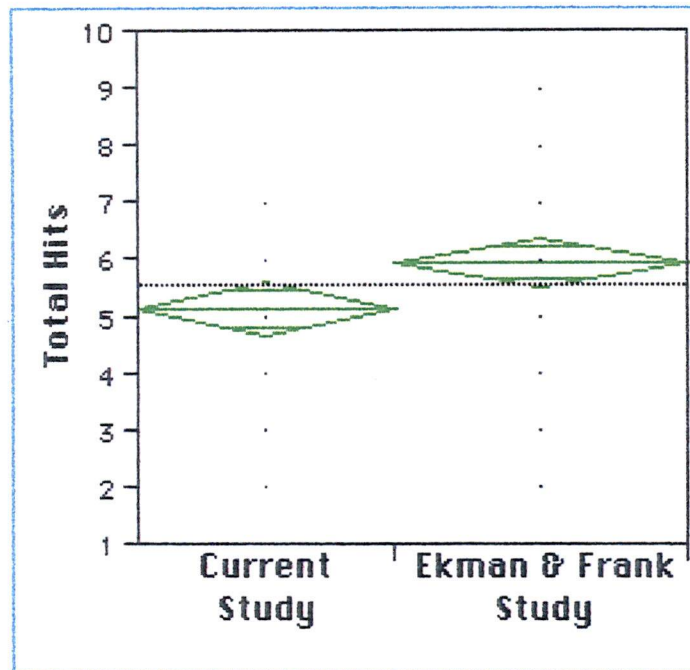


Figure 5-1 Results of the Deception Measure

that the score of the hearing subjects on the lie detection measure was significantly better than the average score of the deaf subjects ($p < 0.05$) (see figure 5-1 above). See Appendix E for further information on the one-way ANOVA performed on the results of the current study compared to the results of the Ekman and Frank study.

Chi Square computations were used to determine whether there was any difference on the results between the deaf and hearing subjects on each of the ten interviews. The results show that the hearing subjects were significantly better at detecting who was lying on interview number six ($p < 0.0001$) and interview number nine ($p < 0.05$). For a break down on the cross tabulations on each of the Chi Square tests performed see Appendix E.

It was hypothesized that female deaf subjects would be better than male deaf subjects in their ability to detect lies on the lie detection measure. A one-way ANOVAs showed that within the subjects of the current study there was no relationship between the average results and gender ($p=0.2850$).

It was hypothesized that deaf subjects would be more confident about their lie detection skills than the hearing subjects on three pretest measures and one posttest measure. When pretest confidence ratings of the deaf subjects were compared against the pretest confidence ratings of the hearing subjects, the deaf subject's ratings on their abilities were on average higher than the ratings of the hearing subjects on their ability to conceal their emotions ($p<0.0001$) and on their ability to detect lies from others actions ($p=0.0042$). There were no significant differences on both of the ratings for their ability to detect lies in general ($p=0.5827$) and their posttest rating on how well they thought they did on the test ($p=0.6202$).

It was further hypothesized that there would be a relationship between confidence in ability and actual ability. There was no relationship between any of the pretest confidence ratings and results on how well subjects felt they could conceal their emotions ($p=0.2641$), detect lies in general ($p=0.7147$), or detect lies from others actions ($p=0.4250$). On the posttest measure of how well

subjects thought they did on the study, there was also no relationship with the results ($p=0.2061$).

In order to check for experimenter effect, an ANOVA was used. For the first 27 subjects obtained, the principal investigator (PI) was visible to the subjects while they watched the video tape and for the rest of the subjects, the PI was not. There was no relationship between location of the PI and the results ($p=0.8413$).

Discussion

The purpose of this study was to ascertain what abilities individuals who are deaf have in the area of lie detection when compared to individuals who are hearing. More specifically, the following questions were looked at:

1. What is the difference between hearing individuals and deaf individuals on lie detection?
2. What are the differences between male and female deaf individuals on lie detection?
3. What is the relationship between observers' confidence in their ability to detect lies and their actual ability to do it?

It was hypothesized that the Deaf would be better at detecting lies than the Hearing. The results show that the opposite was true in the current study. Counter to what was hypothesized, on average, the hearing subjects were significantly better than the deaf subjects. It was hypothesized that the female deaf subjects would do better

than male deaf subjects on the lie detection measure. There was no significant difference between the two groups. Finally, it was hypothesized that the ratings of the deaf subjects would be higher than the ratings of the hearing subjects and that there would be a relationship between subject confidence ratings on their abilities on pretest and posttest measures when compared to actual performance. The results supported this hypothesis in that deaf subjects on average were more confident in their abilities to conceal their emotions and better able to detect lies by observing the actions of an individual. There was no relationship between the ratings on the general ability to detect lies and posttest confidence ratings between the two groups. Further, there was no relationship between the pretest and posttest ratings when compared to the results.

CHAPTER VI

DISCUSSION

Summary

The purpose of the study was to explore relationships between deafness and visual ability to accurately perceive meaning behind behaviors of others. More specifically, the ability of the Deaf to detect deceptive behavior was investigated. Subjects were volunteers from undergraduate psychology students at Gallaudet University in Washington DC. The performance of deaf subjects on the deception detection test used in the Ekman and Frank (in press) study, was compared with the performance of hearing subjects on the same test used in the Ekman and Frank study (in press). Subjects from both groups answered questions about their perceived deception detection abilities before they actually took the test. The test involved watching a video tape of ten individuals in an interview situation. One-half of the individuals was lying about whether they stole fifty dollars or not. The subjects were required to make a determination as to which individuals were lying or being honest. When the subjects completed the test, they answered a question on how well they thought they performed. Each subject was thanked and told how they could obtain the results of the study.

Generally, the hearing subjects were significantly

better at lie detection on the crime scenario video tape than the deaf subjects. The deaf subjects on average rated their abilities on deception detection significantly higher than the hearing subjects on two of three pretest measures. The results showed, however, that the hearing subjects performed significantly better on two of the ten deception detection items on the crime scenario video tape than the deaf subjects did. There were no other relevant significant differences found within or between groups.

Conclusion

Although the results did not support the anticipated outcome, there are two factors that may have impacted the results. First, the fact that individuals who are deaf use facial expressions differently from individuals who are hearing may have been a factor. In chapter II, two articles were discussed that described how deaf students often times have trouble understanding questions asked by hearing teachers (Baker-Shenk, 1985; Kluin & Kluin, 1983). It is possible, since the individuals shown on the video tape were all hearing, that the deaf subjects may have interpreted the non-verbal behaviors incorrectly. Several subjects stated, after the test was over, that the test would have been better if the people on the video tape had been Deaf because hearing people do not evince enough facial expressions when they speak. Second, even though the subjects were given a script to read before viewing the video tape, it may have been

difficult to concentrate on the facial expressions of the people on the video tape while reading the captions. The only conclusion that can be made is that students from Gallaudet may find it difficult to detect deception when observing individuals who are hearing.

Further Research

There are a two studies that could be conducted to further examine the abilities of individuals who are deaf to accurately perceive facial expressions in conjunction with deception detection. First, it would be interesting to ascertain how deaf subjects would perform on a deception detection test that included only deaf people as the stimulus on a video tape when compared with the performance of hearing children of deaf parents. In a study of this nature, hearing subjects and deaf subjects could be given the same stimulus without any modifications (e.g., captions or script). Second, the results of the current study showed a decreased ability in deaf subjects on a lie detection measure when compared with hearing subjects. It would be interesting to ascertain if the possible deficit evidenced, negatively affects the lives of deaf individuals. One way to study the affects would be to examine if there is a correlation between how well deaf subjects perform on a deception detection test and some measure of success. For example, it may be that "more successful" deaf individuals are better at lie detection than other "less successful" deaf individuals.

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APPENDICES

**APPENDIX A
INFORMATION SHEET**

General Information About the Study

The purpose of this study is to ascertain some of the possible effects that communicating visually has on the perception of the behaviors of others. It is feasible that the lack of the ability to hear causes compensation in the visual abilities of humans to detect and understand non-verbal behavior. Studies have shown that when people lie there are hints in their non-verbal behavior that suggests that they are not being truthful. Being Deaf could possibly increase the ability of people to more accurately detect lies than hearing individuals. Between 40-50 undergraduate psychology students from Gallaudet University will be needed for the study. All subjects that participate in the study will receive course credit. In order to be eligible, students must be:

1. Deaf
2. Fluent in American Sign Language
3. Eighteen Years or Older

Each subject will be asked to view a video tape with ten interviews depicting individuals either lying or telling the truth about taking money in a mock crime scenario. The video tape of the scenarios was created and normed by Dr. Paul Ekman from the Human Interaction Laboratory in the Psychiatry Department at the University of California, San Francisco and Dr. Mark Frank from Rutgers University in 1992. The subjects will be asked to make a decision as to whether or not each of the ten people on the tape is being truthful or not. Each subject will be given a questionnaire designed to gather personal background information. The amount of time spent receiving instructions, viewing the video tape, and answering the questionnaire should take no more than thirty minutes. If you are interested, please sign-up at room 310 in Hall Memorial Building.

If you have any questions or if you need to change/cancel the time that you signed up for please do not hesitate to call me. While I am in the Washington DC area, I will be staying at a couple of different places.

From March 24th through March 28th
(301)-942-0515(V or TTY)

From March 28th through March 29th
(201)-669-9587(V or TTY)

If you are interested in receiving the results of this project send me an E-mail message requesting a write-up of the study. All requests must be made before the end of April.

Robert Baldwin,
Principal Investigator
baldwin9@utkux.utcc.utk.edu
(423)-546-4541(V or TTY)

Also, Dr. Williams will be given the results as well.

APPENDIX B
STATEMENT OF UNDERSTANDING

Statement of Understanding

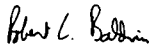
It is understood that this research project is being conducted by Robert Baldwin for the purpose of completing his master's thesis. Participation in this study will involve viewing a video tape of individuals in an interview scenario and deciding if the individuals are either lying or telling the truth. Participation will take approximately thirty minutes.

All information and results gathered will be handled in a confidential manner and will only be used for the purpose of this research project.

The sign-up sheet will only be used to determine how many people will be present at each thirty minute session. The sign-up sheet will be destroyed on or before April 2, 1997 and the names of volunteers will not be used at any other time.

Participation in this study is voluntary and at any point during this study you may withdraw from it with no penalty.

Thank you for your participation!



Robert L. Baldwin

APPENDIX C
INSTRUCTION AND ANSWER SHEET

X173

Instructions-Crime.

You will watch a videotape which shows 10 different men as they are each questioned by an interrogator. The tape is captioned so that you will be able to follow what is happening in the interview. You will be given a script of the dialogue that takes place in each of the 10 interviews on the video. Before each of the 10 interviews the tape will be paused in order for you to read the dialogue that will take place. This way you can concentrate more on the individual's facial expressions than on the captions. You will see each of these men, one at a time, as the interrogator asks each one if he took \$50 dollars from a briefcase. Every one of these men will say that he did **NOT** take the money.

Some of these men who say that they did not take the money are lying to the interrogator because they actually took the money.

Some of these men who say that they did not take the money are telling the truth to the interrogator because they did NOT take the money.

You are to judge which men are lying, and which men are telling the truth.

First, let us tell you exactly what happened to each and every man:

Before he was questioned by the interrogator each man had gone into Room 104, where he saw a briefcase. He had been told to look inside the briefcase. Sometimes the envelope in the briefcase had \$50; and sometimes there was no money in the envelope because a man named Stan, who works in the interrogator's laboratory, had already taken the money.

If the envelope had the \$50, the man could:

-leave it there and tell the interrogator the truth when he says he didn't take it.

-or, he could take the money and lie to the interrogator, claiming he did not take it.

And, of course, if there was no money in the envelope, the man would not have the chance to take it.

All the interrogator knew before he questioned each man was that the money was not in the briefcase. He did not know whether the man he was questioning had taken it or whether it had been taken by Stan.

You will watch each man as he is questioned by the interrogator. Some of the men are lying, and some are telling the truth. Your job is to judge whether each man is lying or telling the truth.

NOW PLEASE TURN THE PAGE.

NOW WE WOULD LIKE YOU TO ANSWER SOME QUESTIONS BEFORE WE START.

1. Age_____ 2. Gender_____ Today's Date_____
3. What is your year in school?_____
4. How is your hearing classified? (check one)
☐ Mild ☐ Moderate ☐ Moderately Severe ☐ Severe ☐ Profound
5. When did you become deaf?_____
6. How do you rate your ability to conceal your emotions? (check one)
☐ VERY POOR ☐ POOR ☐ AVERAGE ☐ GOOD ☐ VERY GOOD
7. In general, how good do you think you are in detecting when someone is telling a lie? (check one)
☐ VERY POOR ☐ POOR ☐ AVERAGE ☐ GOOD ☐ VERY GOOD
8. How do you rate your ability to detect other's lies from their actions? (check one)
☐ VERY POOR ☐ POOR ☐ AVERAGE ☐ GOOD ☐ VERY GOOD

Now the test will begin. Please DO NOT make any unnecessary movements while the videotape is playing because you may disturb others and/or unduly affect their judgements. You will see each person for 1 minute. You will not be able to see the interrogator. After you see each man, CIRCLE whether you think that man was LYING or TRUTHFUL. Please read the dialogue for Item 1 now.

Item 1:	LYING	TRUTHFUL
Item 2:	LYING	TRUTHFUL
Item 3:	LYING	TRUTHFUL
Item 4:	LYING	TRUTHFUL
Item 5:	LYING	TRUTHFUL
Item 6:	LYING	TRUTHFUL
Item 7:	LYING	TRUTHFUL
Item 8:	LYING	TRUTHFUL
Item 9:	LYING	TRUTHFUL
Item 10:	LYING	TRUTHFUL

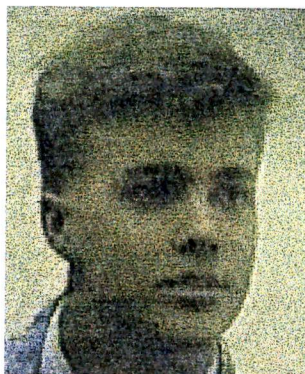
ANSWER THIS QUESTION AFTER THE VIDEOTAPE IS OVER.

9. How well do you think you did in telling who was lying in this video? (check one)
☐ VERY POOR ☐ POOR ☐ AVERAGE ☐ GOOD ☐ VERY GOOD

APPENDIX D
SCRIPT

Crime Scenario Script

Item 1



Interrogator: Can you describe exactly what happened, what you saw and did, when you were in that room?

Subject: I went in the room. I opened up the brief case. I-I found that, uh, like the other guy had taken the money. And, uh, and then I guess, waited for the beep, and then I came back out.

Interrogator: Now describe for me what your thoughts were, that is, what was going through your mind as you stood in that room and looked into the envelope.

Subject: I like, "this other guy's already got the money, and uh, he has a chance for the bonus." So I, uh, was just like, "O.K., here I am, I'll-I'll just wait and uh..."

Interrogator: Now, do you know how much money, was or, was supposed to be in the envelope?

Subject: There was supposed to be fifty dollars.

Interrogator: Did you take that money from the envelope?

Subject: No.

Interrogator: Did you bring the money with you into this room?

Subject: No.

Interrogator: Are you lying to me right now?

Subject: No.

Item 2



Interrogator: Describe exactly what happened, what you saw and did, when you were in that room.

Subject: Uh, I walked into room 104, and I opened the briefcase, and I noticed a white envelope inside, and I noticed there, uh, was some money missing or there was nothing in the envelope.

Interrogator: Tell me what your thoughts were, that is, what was going through your mind when you stood in that room and looked into the envelope.

Subject: Uh, that somebody took the money, uh, before me, uh, I wasn't the one who took the money.

Interrogator: Do you know how much money was supposed to be in the envelope?

Subject: Uh, fifty dollars.

Interrogator: Did you take that money from the envelope?

Subject: No, I did not.

Interrogator: Did you bring that money with you into this room?

Subject: Uh, no, I did not.

Interrogator: Are you lying to me now?

Subject: No, I am not.

Item 3



Interrogator: ...exactly what happened, what you saw and did, when you were in that room.

Subject: Well, I walked in and one of the first things I saw was the brief case on the table, and saw that it was unlatched already. And, I remember noticing that its, uh, the front of the building, so I naturally looked outside. I opened it up, and, um, opened up the envelope, it's empty already... so you can't take any money that's not there. So, sat back down; put it back down, and waited for the buzz to go back into the room.

Interrogator: Now, what were your thoughts, that is, what went through your mind when you looked into the briefcase?

Subject: Well, my thoughts were just, uh, there's a simple decision to be made, and you know, it made it even simpler for me. Because I mean that, its either or, and, um, you don't have much of a choice.

Interrogator: Do you know how much money was supposed to be in the envelope?

Subject: Yeah, fifty dollars.

Interrogator: Did you take that money from the envelope?

Subject: No, I did not.

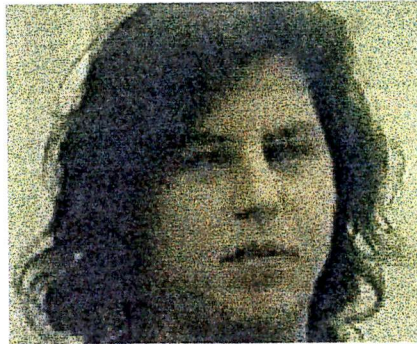
Interrogator: Did you bring that money with you into this room?

Subject: No, I did not.

Interrogator: Are you lying to me now?

Subject: No, I am not.

Item 4



Interrogator: ...exactly what you saw and did when you went into that room.

Subject: When I entered the room, I saw the window shades were pulled down. I noticed there was a black, as I was facing a brief case, there was a black cloth behind it covering something up, and there was another black cloth to my left. Um, I proceeded to, I wasn't sure if the briefcase was locked or unlocked, so I turned the key and locked it. So then, I unlocked it, picked it up, and I opened it up, and I saw that there was money in there. Took the money out, looked at it, played with it, made some noise with it, put it back in, closed the briefcase back down, and exited the room. Came back in here to the intercom.

Interrogator: Tell me what your thoughts were when you had that money in your hands.

Subject: When I had the money in my hands, I was thinking, "should I take the money or shouldn't I take the money?" And, I decided not to take the money, because I figured it would be easier to tell the truth than to lie, for me at least.

Interrogator: And how much money was it?

Subject: Fifty dollars, two twenties and a ten.

Interrogator: Did you take that money from the envelope?

Subject: I took it out, but I did not put it into my pocket. I replaced it back into the envelope.

Interrogator: Did you bring that money with you into this room?

Subject: Um, no, I didn't.

Interrogator: Are you lying to me now?

Subject: No, I'm not.

Item 5



Interrogator: Describe exactly what happened, what you saw and did, when you were in that room.

Subject: Um, I saw a silver briefcase with, um, UC Medical Center on it. Um, the clasps were undone. I opened it, and inside there was an empty envelope.

Interrogator: Can you tell me what thoughts, ahh, what was going through you mind when you stood in that room and looked into that empty, empty envelope?

Subject: ... Um, ...

Interrogator: Did you have any particular thoughts?

Subject: No, nothing that really stands out.

Interrogator: Do you know how much money was supposed to be in the envelope?

Subject: Fifty dollars.

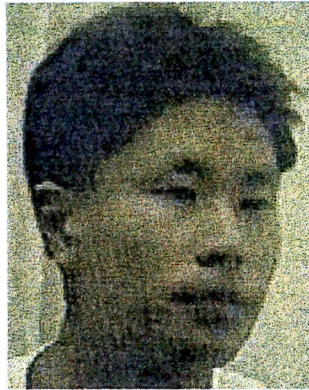
Interrogator: And, did you take that money from the envelope?

Subject: No, I didn't.

Interrogator: And, are you lying to me now about what your are saying?

Subject: No, I'm not.

Item 6



Interrogator: Can you describe exactly what happened, what you saw and did, when you were in that room?

Subject: O.K., I went into the room, and I saw the briefcase. I opened it up. I made sure that fifty dollars was in the envelope, and there was two twenties and a ten. So, I left it in there, and I left the room.

Interrogator: What were you thoughts, that is, what went through your mind as you looked into the envelope.

Subject: Well, I thought, "Should I take the money or not, um, I don't really need the money." So, I just left it in there.

Interrogator: And how much money was in the envelope?

Subject: Fifty dollars.

Interrogator: And, you did not take it?

Subject: No.

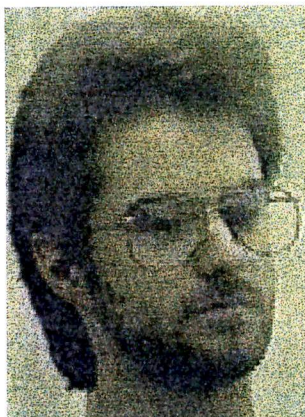
Interrogator: You did not bring that money into this room?

Subject: No.

Interrogator: Are you lying to me now?

Subject: No.

Item 7



Interrogator: ...exactly what happened, what you saw and did, when you were in that room.

Subject: Uh, I entered the room, opened the briefcase, looked in the briefcase, saw the money, put the... didn't take the money out, uh, counted it though, took the envelope, put it back on the foam of the briefcase, closed the briefcase, uh, opened the door slightly, because I thought I might not hear the buzzer, and waited for the buzzer to go off.

Interrogator: What were your thoughts as, what went through you mind when you looked in the envelope.

Subject: Uh, my first thought was just to see if the money was in there. Um, after that not much, I had already made a decision.

Interrogator: When did you make the decision?

Subject: When I was sitting out here before going in.

Interrogator: How much money was in the envelope?

Subject: I believe it was fifty dollars.

Interrogator: Did you take that money from the envelope?

Subject: No, I didn't.

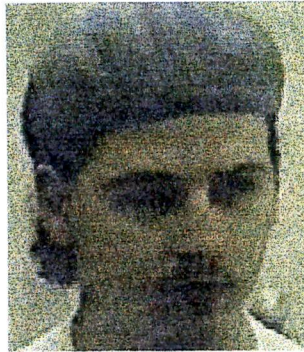
Interrogator: And, did you bring that money with you into this room?

Subject: No, I didn't.

Interrogator: Are you lying to me now?

Subject: No, I'm not.

Item 8



Interrogator: Tell exactly what happened, what you saw and did, when you were in that room.

Subject: Uh, I went in there and there was, uh, a steel briefcase on, uh, the table. And, I opened it up, and there was a white envelope there. And, I, uh, looked inside the envelope, and there was no money there. So I, uh, waited for the buzzer, and came back in here.

Interrogator: What were your thoughts, what went through your mind when you looked in the envelope?

Subject: Uh, I was kind of disappointed, because I wanted to get the money, and hopefully keep the fifty dollars.

Interrogator: So, you, how did you know that it was fifty dollars that was supposed to be in there?

Subject: Because, they told us in the instructions.

Interrogator: And, did you take that money from the envelope?

Subject: No, I didn't.

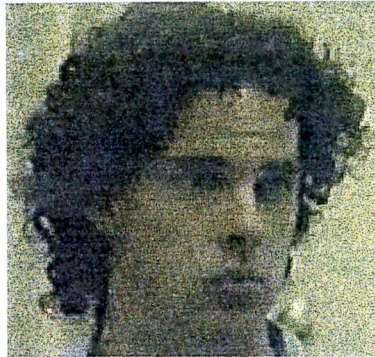
Interrogator: Did you bring that money into this room.

Subject: Nope.

Interrogator: Are you lying to me now?

Subject: Nope.

Item 9



Interrogator: ...exactly what happened, what you saw and did, when you were in that room.

Subject: I walked in the room, closed the door, put the instructions down on the table, and stood there for two minutes, and waited for the buzzer to sound. And, after the buzzer sounded I came back in here and sat down.

Interrogator: Tell me what your thoughts were, I mean, what went through your mind when you looked into the envelope?

Subject: I saw the money, and I just closed the case, and that was it.

Interrogator: How much money was in the envelope?

Subject: Fifty dollars.

Interrogator: Did you take that money from the envelope?

Subject: No.

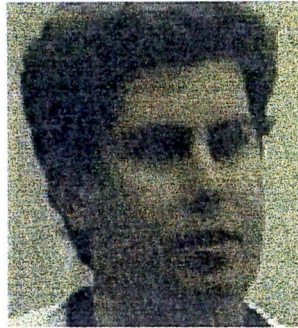
Interrogator: Did you bring that money with you into this room?

Subject: No.

Interrogator: Are you lying to me now?

Subject: No.

Item 10



Interrogator: Describe exactly what happened, what you saw and did, when you were in that room.

Subject: Mmhem, I was the second person to go in. I went in, the briefcase was closed, I opened it, the envelope was lying flat, um, on its, on its back with the flap open, and it was empty.

Interrogator: What were your thoughts, that is, what went through your mind when you stood in that room and looked at the envelope.

Subject: I was kind of relieved, um, because there was no money in it, and I am not a very good liar. So, I didn't have to lie about it.

Interrogator: Do you know how much money was supposed to be in the envelope?

Subject: Fifty dollars.

Interrogator: Did you take that money from the envelope?

Subject: No.

Interrogator: And, did you bring that money into this room?

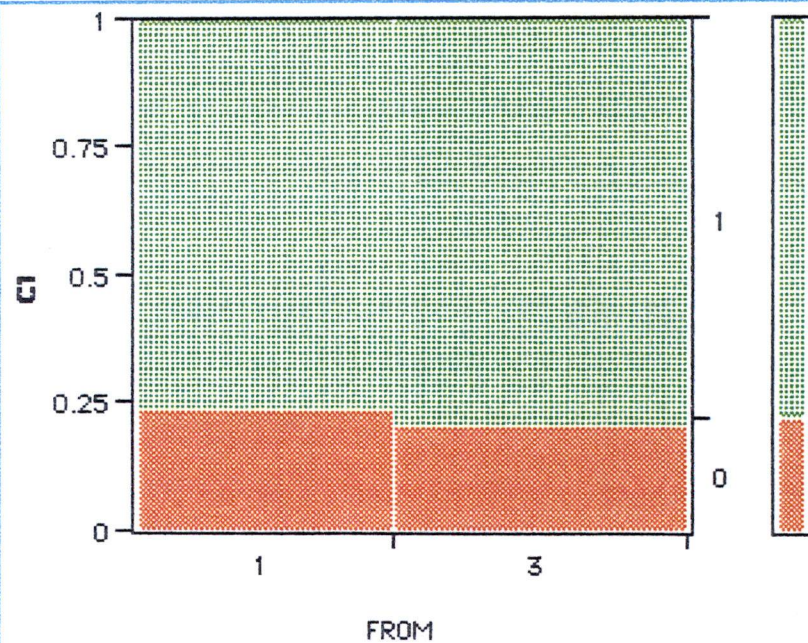
Subject: No.

Interrogator: Are you lying to me now?

Subject: No.

APPENDIX E
RESULTS

C1 By FROM



Crosstabs

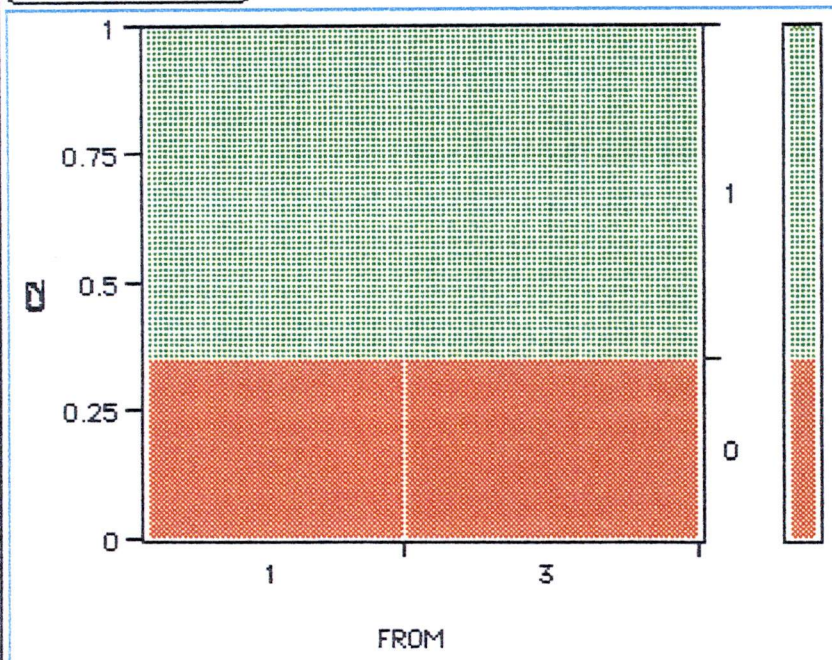
Count	FROM		
	1	3	
0	10	10	20
1	32	38	70
	42	48	90

ChiSquare=0.7349

1=Current Study

3=Ekman & Frank Study

C2 By FROM



Crosstabs

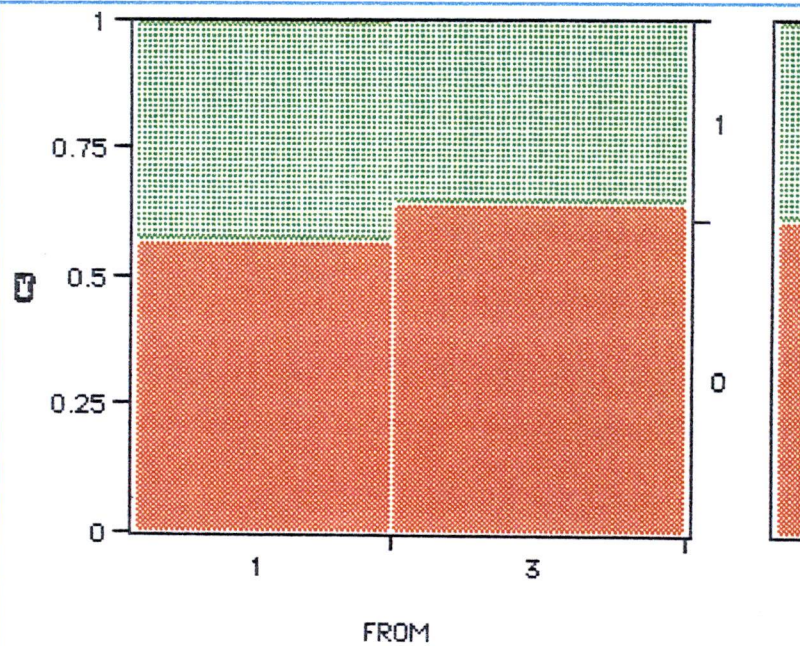
Count	FROM		
	1	3	
0	15	17	32
1	27	31	58
	42	48	90

ChiSquare=0.9765

1=Current Study

3=Ekman & Frank Study

C3 By FROM

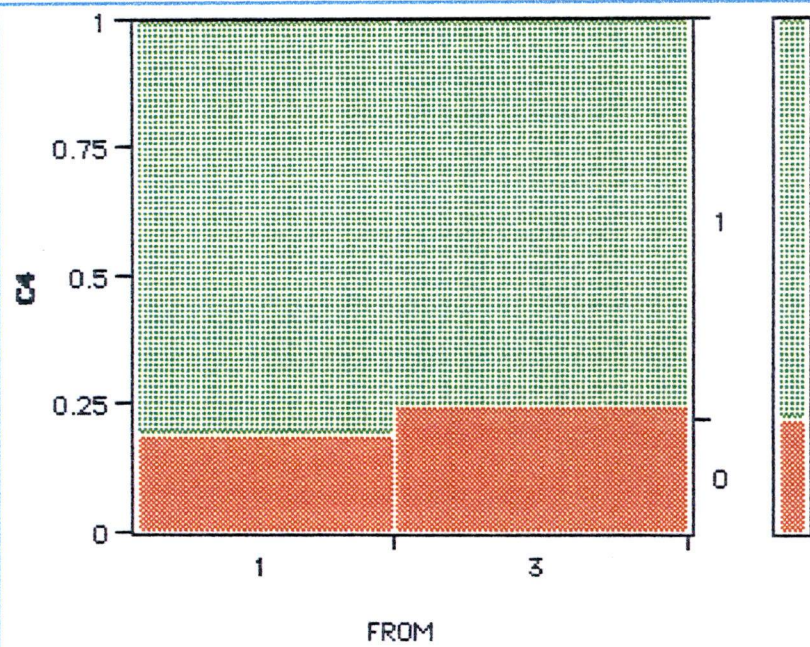


Crosstabs

Count	FROM		
	1	3	
0	24	31	55
1	18	17	35
	42	48	90

ChiSquare=0.4702
 1=Current Study
 3=Ekman & Frank Study

C4 By FROM



Crosstabs

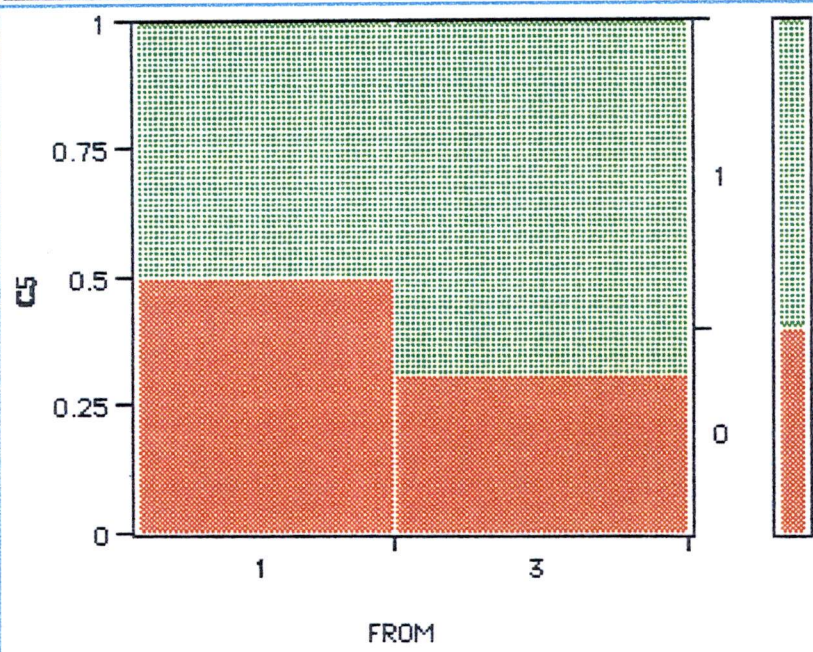
		FROM		
Count		1	3	
C4	0	8	12	20
	1	34	36	70
		42	48	90

ChiSquare=0.4966

1=Current Study

3=Ekman & Frank Study

C5 By FROM



Crosstabs

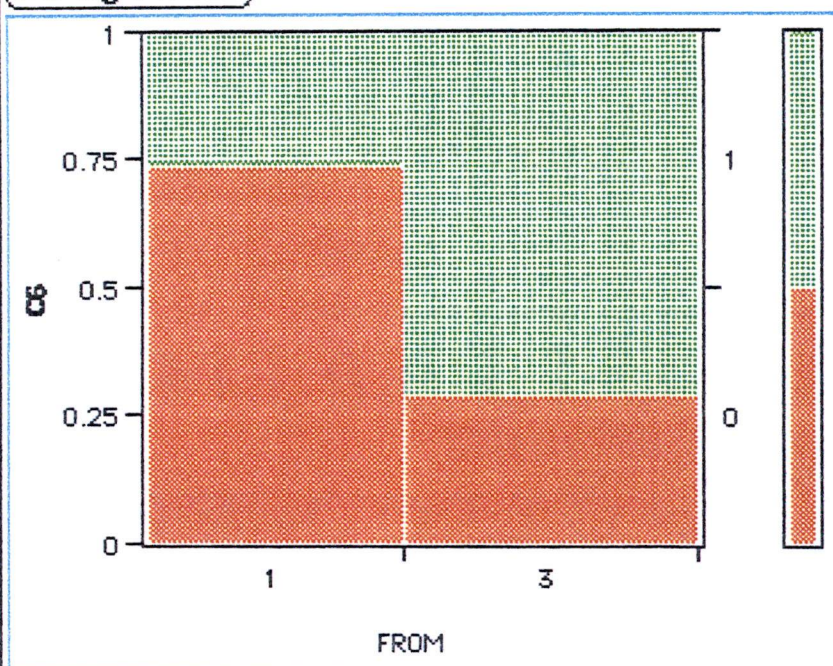
C5	FROM		
	1	3	
0	21	15	36
1	21	33	54
	42	48	90

ChiSquare=0.0696

1=Current Study

3=Ekman & Frank Study

C6 By FROM



Crosstabs

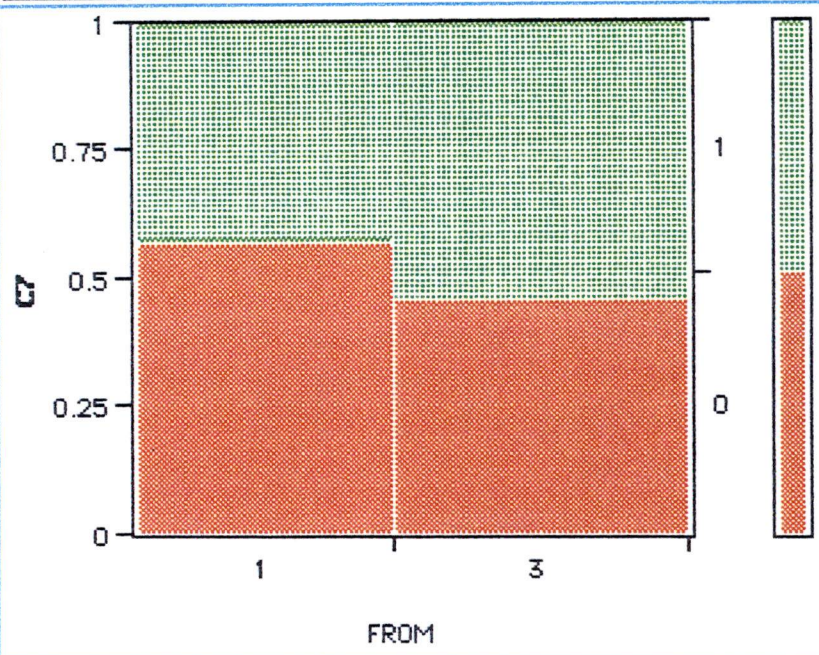
C6	FROM		Count
	1	3	
0	31	14	45
1	11	34	45
	42	48	90

ChiSquare<0.0001

1=Current Study

3=Ekman & Frank Study

C7 By FROM



Crosstabs

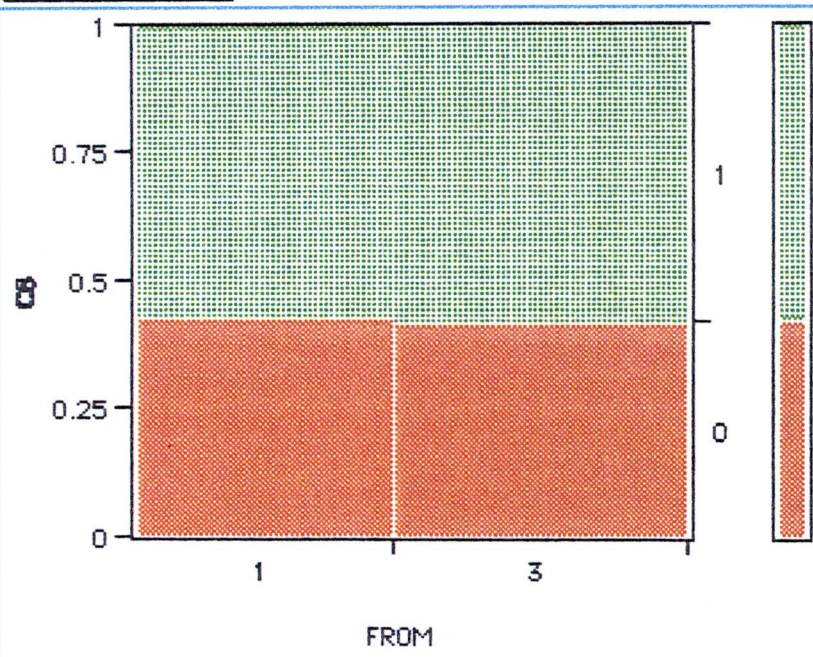
C	FROM		
	1	3	
0	24	22	46
1	18	26	44
	42	48	90

ChiSquare=0.2837

1=Current Study

3=Ekman & Frank Study

C8 By FROM

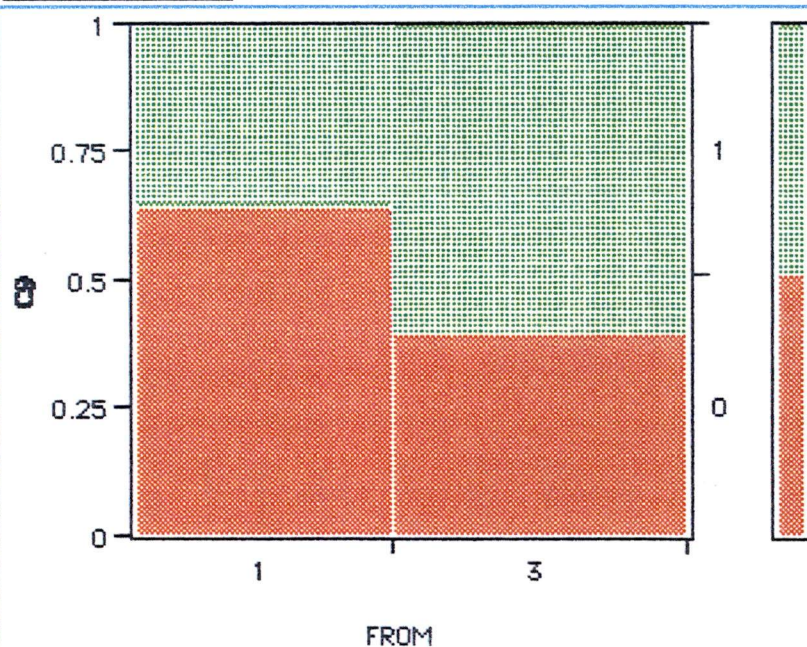


Crosstabs

Count	FROM		
	1	3	
0	18	20	38
1	24	28	52
	42	48	90

ChiSquare=0.9092
 1=Current Study
 3=Ekman & Frank Study

C9 By FROM



Crosstabs

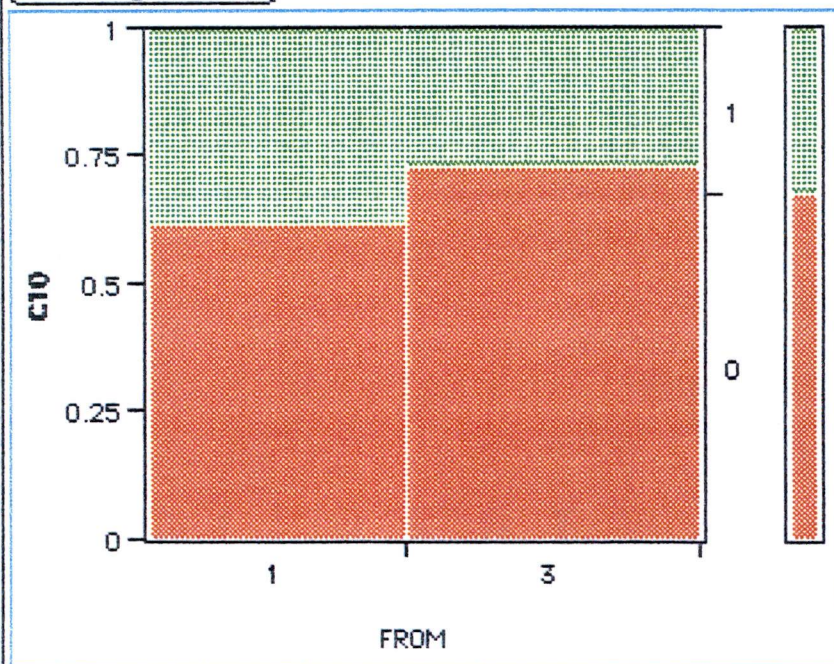
Count	FROM		
	1	3	
0	27	19	46
1	15	29	44
	42	48	90

ChiSquare=0.0187

1=Current Study

3=Ekman & Frank Study

C10 By FROM



Crosstabs

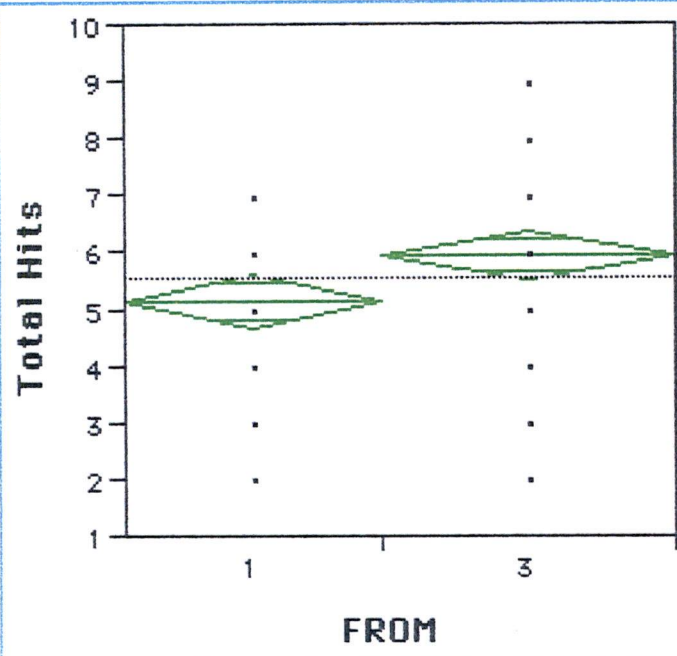
C10	FROM		Count
	1	3	
0	26	35	61
1	16	13	29
	42	48	90

ChiSquare=0.2648

1=Current Study

3=Ekman & Frank Study

Total Hits By FROM



Oneway Anova

t-Test

	Difference	t-Test	DF	Prob> t
Estimate	-0.79464	-2.412	88	0.0179
Std Error	0.32946			
Lower 95%	-1.44937			
Upper 95%	-0.13992			
Assuming equal variances				

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob>F
Model	1	14.14464	14.1446	5.8177	
Error	88	213.95536	2.4313		
C Total	89	228.10000	2.5629		0.0179

Means for Oneway Anova

Level	Number	Mean	Std Error
1	42	5.14286	0.24060
3	48	5.93750	0.22506

Std Error uses a pooled estimate of error variance

1=Current Study

3=Ekman & Frank Study

VITA

Robert Baldwin was born in Manchester, Tennessee on June 14, 1970. In May of 1989 he graduated from Central High School in Memphis, Tennessee. In August of 1989 he entered Rhodes College in Memphis, Tennessee. One and a half years after graduating from Rhodes College, in May of 1993 with a Bachelor of Arts in Psychology, he entered the Master of Science program at the University of Memphis. In January of 1996 he transferred to the University of Tennessee in Knoxville and in May of 1997 completed his Master of Science degree with a major in Rehabilitation Counseling and a concentration in working with individuals who are deaf or hard-of-hearing.

Currently, he plans to move to Washington DC in the summer of 1997 with his wife Katherine Baldwin in order to enter the Clinical Psychology Doctoral program at Gallaudet University.

He is son of Robert Richard and Mary Allie Baldwin, brother of Amy Baldwin Crockett and Allie Baldwin Scott, and husband of Katherine McCaa Baldwin.