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**COMMUNICATION APPREHENSION AND EXERCISE ADHERENCE:
AN EXPLORATORY STUDY**

A Thesis

Presented to the

Department of Communication

and the

Faculty of the Graduate College

University of Nebraska

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

University of Nebraska at Omaha

by

Janette Thomas Carr

December 1996

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THESIS ACCEPTANCE

Acceptance for the faculty of the Graduate College,
University of Nebraska, in partial fulfillment of the
requirements for the degree Master of Arts, University of
Nebraska at Omaha.

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ABSTRACT

This thesis explored whether adhering to an exercise program could significantly predict an individual's level of communication apprehension (CA). The project expands the study of CA by analyzing a potentially new treatment option for alleviating this fear of communication. Specifically, it asked if an individual's level of exercise adherence (EA) - as measured by the four components of intensity, frequency, duration, and longevity - could significantly predict an individual's level CA in each of the four contexts - interpersonal conversations, group discussion, meetings and public speaking - and overall. Five research questions were posited (one for each context and trait) and tested utilizing the Personal Report of Communication Apprehension instrument (McCroskey, 1982) and an EA measure. Due to the study's exploratory nature demographics such as age and gender were also examined in supplemental analyses. Results using SPSS-X stepwise multiple regression, Pearson r correlations and Deviations of Linearity indicated partial support that a significant linear relationship exists between three of the EA components and four of the five CA scores, and a significant deviation from linearity relationship exists between one demographic variable and three of the five CA scores. Discussion and interpretation of results as well as recommendations for future research are given.

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J.E.T.C.

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Chapter I

INTRODUCTION

Communication cannot be completely avoided. Communication apprehension (CA) is a condition suffered by individuals who fear communication in any or all of four contexts: interpersonal conversations, group discussion, meetings, and public speaking. It specifically refers to “an individual’s level of fear or anxiety associated with either real or anticipated communication with another person or persons” (McCroskey, 1977, p. 78). Those who experience this fear do try to avoid communication. Many treatment methods to reduce or eliminate this fear have been tried with success. These treatments include, but are not limited to, cognitive restructuring, systematic desensitization (McCroskey, 1970), skills training (Phillips, 1968) visualization (Ayers & Hopf, 1993) or any combination of the preceding (Ayers & Hopf, 1993; Richmond & McCroskey, 1995).

One common characteristic of the above treatment methods is they all have been shown to reduce anxiety. “People with high levels of general anxiety are more likely to be high communication apprehensives, and vice versa” (Richmond & McCroskey, p. 50). Exercise/physical activity has also been shown to reduce anxiety (Otto, 1995; Sachs, 1982; Schwartz & Kaloupek, 1987). However, exercise as a potential treatment method for CA has received limited exploration. Due to the far-reaching impacts CA can have on people’s professional and personal lives, for instance they feel less satisfied in their job or career, interact less with others, have fewer dates and fewer close relationships (Daly & Leth, 1976; Daly & Stafford, 1984; Richmond, 1984), it appears to be imperative to

explore any viable treatment method to eliminate or reduce the negative effects of this condition.

The present research attempts to further study the treatment for CA by isolating its relationship to one particular construct, exercise adherence (EA), which involves four components - intensity, frequency, duration and longevity - that has been shown to positively influence the social, emotional, and cognitive aspects of a person's development by reducing anxiety and the effects of stress (Otto, 1990; Sachs, 1982; Schwartz & Kaloupek, 1987; Sedlock & Duda, 1994).

Two conditions made a study of this relationship appropriate: 1) CA is a widespread problem shown to create personal difficulties - feeling less attractive (Prisbell, 1982), having less social interaction and fewer dates (Richmond & McCroskey, 1995); as well as professional hardships - fewer job interviews, fewer promotions, and less academic success (Richmond & McCroskey, 1995); and 2) Exercise/physical activity has been shown to reduce anxiety and stress (Otto, 1990; Sachs, 1982; Sedlock & Duda, 1994).

Because CA is capable of creating serious personal and professional problems, alleviating CA has been the focus of many studies. Current treatment methods for CA have had success; however, due to the widespread numbers of people suffering with CA and the detrimental effects CA can have on a person's personal and professional life, any viable new treatment possibilities to decrease or eliminate such apprehension should be explored.

Because exercise/physical activity has been shown in numerous studies to reduce anxiety and stress, as well as improve self-confidence, feelings of self-efficacy, control and self-sufficiency (Dishman, 1994; Dzewaltowki, 1994; Otto, 1990; Sachs, 1982; Sedlock & Duda, 1994), participation in exercise/physical activity was deemed to possibly be an effective treatment for alleviating CA. In addition, exercise does not necessitate other people. Everyone can adhere to an exercise program, alone, or if one chooses, with others.

Therefore, it seemed plausible that the study on the effects of adherence to an exercise program on CA could make a significant contribution to the treatment and reduction of CA. This thesis measured the CA and EA levels of students enrolled in introductory health, physical education, English, mass communication and public speaking courses. Those enrolled in a public speaking course were queried in the first week of the semester to prevent skills training from confounding the results. The study set out to determine if an individual's level of exercise can significantly predict the level of CA for an overall (trait) CA score and for each of the four CA context subscores: interpersonal conversations, group discussion, meetings and public speaking. To assist in examining the purpose of this thesis, chapter 2 reviews the literature on CA and EA.

Chapter II

REVIEW OF LITERATURE

Communication Apprehension

Communication apprehension (CA) has been among the most studied constructs in the communication literature for the past two decades (Biggers & Masterson, 1984). Payne and Richmond (1984) compiled a bibliography citing nearly 1000 articles, books, and papers directly related to CA. The commonly accepted definition was written by James McCroskey in 1977. Specifically, it refers to “an individual’s level of fear or anxiety associated with either real or anticipated communication with another person or persons” (McCroskey, 1977, p. 78). This fear/anxiety is an aversion condition that sufferers wish to avoid, thus CA is also referred to as CAA (communication apprehension and avoidance).

Numerous CA researchers have discovered that this fear of communication is a serious practical problem for 20 percent of the population (Hackman & Barthel-Hackman, 1983; McCroskey, 1977; Richmond & McCroskey, 1995). In actuality, most people suffer from some degree of CA at some time, such as in a first job interview (McCroskey, 1984). In fact, a national survey conducted by R. H. Bruskin & Associates (1973) revealed that 41 percent of the 2,543 adult respondents reported speaking before a group as one of their biggest fears.

In addition to CA, the reactions displayed by those with communication difficulties have been researched under three different constructs: reticence, shyness and willingness

to communicate (McCroskey, 1977). They differ from CA in that reticence, shyness and willingness to communicate are based in attitudes or behavior, whereas CA is based on a persons' feelings and emotions, with the foundation being fear (Booth-Butterfield & Booth-Butterfield, 1992). According to Phillips (1968), who first defined reticence, reticence involves attitude and behavior. The reticent person sees more gain from not talking than from talking. Reticents are therefore defined as those that avoid communication because they believe that they will lose more by talking than by remaining silent (Phillips, 1968). People with high trait CA (CAs) are not necessarily reticent. However, CA often leads to reticence because the fear experienced with CA results in avoiding communication. (Booth-Butterfield and Booth-Butterfield, 1992). Rather than an affective construct, like CA, reticence is viewed "from a strict behavioral perspective" (McCroskey, 1982, p. 140).

"Shyness is considered to be the tendency to avoid communication and talk less" (Richmond & McCroskey, 1995, p. 37). It is a "discomfort, inhibition and awkwardness in social settings" (Buss, 1984, p. 39). The person doesn't know what to say. Colby, Hopf & Ayres (1993) state that CA is "one manifestation of the broader construct of shyness and concerns cognitive, affective, and/or behavioral disruption associated with fear of social interaction" (p. 221).

Willingness to communicate (WTC) is an individual desire for talk - it is an attitude rather than strictly a behavior (Richmond & McCroskey, 1995). Some people want to talk more than others: in classes, on the phone, at the store, etc. Others find talk less worthwhile or less rewarding. "The concept of willingness to communicate suggests a

motivational perspective in which the individuals make a conscious decision about their interaction” (Booth-Butterfield & Booth-Butterfield, 1992, p. 29). There are several predictors to identifying a low WTC: low self-esteem, alienation and CA. People with high self-esteem feel they have something to say worth hearing. Alienation applies to those people who feel they don’t belong and are therefore less willing to communicate. A person with CA will also exhibit less WTC. They feel it’s “easier and more personally profitable to simply not communicate” (Booth-Butterfield & Booth-Butterfield, 1992, p. 31).

To facilitate distinction between the constructs, the following examples are given: reticence is an attitude that leads to a behavior; it says “I have more to lose by talking, than not talking, so I choose not to talk.” Shyness is a behavior that says “I’m uncomfortable about talking, so I don’t talk.” WTC is an attitude that says “I like or don’t like to talk.” CA has an emotional foundation - fear; it says “I’m afraid to talk, so I try to avoid it even though I sometimes have to talk.”

Recent conceptualization of CA draws a distinction between four types of CA on a continuum: trait CA, audience-based CA, situational CA and context-based CA (Richmond & McCroskey, 1995). Trait CA is highly resistant to change and only changes with long-term effort. It refers to an overall personality orientation *that crosses a large range of situations*, from talking one-on-one to giving a speech before a large audience (Richmond & McCroskey, 1995). Audience-based CA is related to anxiety experienced with a particular person or group. McCroskey defines it as “a relatively *enduring* orientation toward communication with a given person or group of people” (McCroskey,

1995, p. 46). It is also a “trait-like” response because it is consistent across time with particular audiences, such as communicating with an employer (Booth-Butterfield & Booth-Butterfield, 1992). Situational CA “is viewed as a *transitory* orientation toward communicating with a given person or group of people” *at a specific time* (Richmond & McCroskey, 1995, p. 48). It is an emotional response to communicating with another person or persons. It is usually short-lived; when the situation is over, so is the anxiety, such as discussing one’s performance appraisal with an employer (Booth-Butterfield & Booth-Butterfield, 1982). Context-based CA refers to a fear of communicating in a particular context while experiencing no fear in other contexts. It differs from state/situational CA in that context-based CA is a “trait-like” response and is *consistently experienced in a given context*, such as in interpersonal conversations, group discussion, meetings, and public speaking. This thesis will address trait CA as well as CA experienced in these four contexts.

The effects of CA are numerous, far-reaching and sometimes debilitating, negatively impacting all aspects of a person’s personal and professional life: economic, academic, political, and social (McCroskey, 1984; Richmond & McCroskey, 1995). Prisbell (1982) found that CAs view themselves as less physically attractive. Other research has found that CAs view themselves as “less competent, less confident, and less understood in communication settings” (Colby, Hopf & Ayres, 1993, p. 221), have lower self-esteem (Ellis, 1995; McCroskey, Daly, Richmond & Falcione, 1977; Slone & Slane, 1990) and generally feel less positively about themselves (Ellis, 1995). They do not receive the rewards from communicating due to their withdrawal from and avoidance of

communication (McCroskey, Beatty, Kearney & Plax, 1985), and their communication effectiveness is perceived lower by others (Freimuth, 1976). They receive an overall lower perception by others (Boohar & Seiler, 1984; Richmond & McCroskey, 1995) and are often perceived and judged negatively by others, especially in the U.S. (Olaniran & Roach, 1994). CAs feel less satisfied in their job or career, interact less with others, have fewer dates and fewer close relationships (Daly & Leth, 1976; Daly & Stafford, 1984; Richmond, 1984).

One's level of CA has been found to predict a variety of important variables such as occupational choice, seating choices and interaction behavior in small groups, avoidance of competitive situations, as well as lowered trust in others' communicative attempts (McCroskey, Daly, Richmond & Falcione, 1977). It is estimated that 15-20 percent of college students experience severe communication problems from trait CA, and 20 percent of the general adult population also experience these types of problems (McCroskey, 1970; McCroskey, 1977; Richmond & McCroskey, 1995).

As this thesis attempts to expand treatment approaches for CA sufferers, an overview of current treatment methods is appropriate. Current methods include, but are not limited to, cognitive restructuring, systematic desensitization, skills training, and visualization.

Cognitive restructuring involves identifying negative self-talk used when confronted with a communication context and learning to replace it with positive coping statements. As a first step cognitive restructuring teaches participants to identify their self-talk (Ayes & Hopf, 1993). Some examples of this negative self-talk include "I can't

do it.” “I’ll make a fool of myself.” “I don’t have enough time to prepare.” The second step in cognitive restructuring then assists participants in developing new coping statements that moderate anxiety, such as the following that could be used to moderate the above statements given, respectively: “I’ve faced other challenges in my life, I’ll face this one too.” “I will prepare and do the best I can. No one can ask more from me, not even myself.” “I will make good use of the time I have, narrowing the subject to do a thorough, though maybe not perfect, job” (Ayers & Hopf, 1993, p. 25). The third step in cognitive restructuring is to apply these new statements when confronted with an anxiety producing communication event.

Systematic desensitization (SD) has been found to be an excellent method for overcoming CA (Rosenfeld, Grant & McCroskey, 1995). SD is a behavior therapy that involves deep muscular relaxation coupled with visualization (Richmond & McCroskey, 1995). SD teaches people to relax using deep muscle relaxation techniques. After learning to relax, participants are asked to imagine themselves in communication situations while remaining in a relaxed condition (Ayers & Hopf, 1993). The communication situations are given on a hierarchy of least to most fear producing.

Skills training involves just as its name implies - teaching an individual techniques and procedures for speech delivery and preparation, including organization, posture, eye contact, vocal variety and gestures. As a treatment option, skills training makes the presumption that people experience CA due to lacking delivery and preparation skills (Ayers & Hopf, 1993).

Visualization asks “speakers to imagine themselves composing an effective speech” (Ayers & Hopf, 1993, p. 31). Unlike cognitive restructuring it ignores negative thinking. Its goal is to have the speaker “associate positive images with public speaking in order to counter feelings of anxiety” (Ayers & Hopf, 1993, p. 31). It encourages people to think positively about communication.

Visualization is one technique that has incorporated the building of self-efficacy into its method with results that lessen CA and improve performances. Studies indicate that researchers interested in the treatment of CA may need to focus on strategies that attempt to increase a high CA’s feelings of personal efficacy. Personal or self-efficacy differs from self-esteem in that efficacy relates to the power, confidence or control a person has to produce a desired result or an intended effect, whereas, esteem relates to the worth, opinion, value, respect or level of regard one places on something (Colby, Hopf & Ayers, 1993; Richmond & McCroskey, 1995). The most successful intervention techniques have incorporated the building of self-efficacy into their methods.

The intent of such imagery [visualization] seems to be to increase feelings of confidence and control over environments - their self-efficacy. It is quite possible that these and other interventions could be made more efficient and effective by stressing the development of self-efficacy. (Colby, Hopf & Ayres, 1993, p. 227)

Intervention strategies like those discussed above help many people. The next section reviews the literature on EA which may also serve as an intervention strategy, but has not been directly explored, prior to this study, in this capacity.

Exercise Adherence

As its name implies, exercise adherence (EA) is the degree that a person adheres to an exercise program or engages in physical activity consistently. Exercise/physical activity is conceptualized in terms of frequency, intensity, and duration (Courneya & McAuley, 1994). These three components are necessary to achieve the physical and mental health benefits of exercise (Courneya & McAuley, 1994). Research shows that minimum criteria or thresholds needed to experience the benefits of exercise for these three components is as follows: frequency, every other day, duration, 30+ minutes, and intensity, 50 percent or more of individual maximal capacity (Courneya & McAuley, 1994). Thus, a participant could adhere to an exercise program “by attending the recommended number of sessions for the specified amount of time but fail to comply with the prescribed intensity” (Dishman, 1994b, p. 1087). “Recent estimates reveal that only 8-22 percent of U.S. adults participate in physical activities with sufficient intensity and regularity to satisfy conventional training guidelines for the improvement or maintenance of fitness” (Dishman, 1994b, p. 1087).

Studies have identified several barriers to exercise: injury, perceptions of excessive exertion demands, and lack of confidence in the ability to carry out a fitness program (Dishman, 1994b). In addition, special barriers as individuals age include activity limitations due to deteriorating health, lack of knowledge of the benefits of physical activity, lowered perception of control over exercise and health, limited access to activity programs, lack of support for participation, and the extent to which older persons view exercise as an appropriate activity for their age (Dishman, 1994c).

Yet even with barriers, thousands of individuals choose to exercise. In order to understand why people exercise, studies have attempted to identify the differing motivations for physical activity. The most common motivator for exercising is the beneficial effects exercise has on a person's social, emotional and cognitive aspects (Sachs, 1982). Exercise has been used to treat situational phobia and other ailments. As an effective treatment partner for depression, anxiety/fear and stress, exercise is well-established in literature (Otto, 1990; Sachs, 1982; Sedlock & Duda, 1995).

The concept of exercise as a cure for what ails you has been with us for a long time. As Dryden so eloquently noted three centuries ago: By chase our long-liv'd fathers earn'd their food; toil strung the nerves and purified the blood; but we, their sons, a pamper'd race of men, are dwindled down to threescore years and ten. Better to hunt in fields for health unbought than fee the doctor for a nauseous draught. The wise for cure on exercise depend; God never made His work for man to mend. (Sachs, 1982, p. 51)

However, some motivations for exercise vary considerably with factors such as age. Rutherford, Corbin & Chase (1992) found that support and feedback provided by others, such as a spouse, family and fellow workers, positively influence adherence to exercise. The number one reason more adults begin exercise is the advice of a physician. Dishman (1994c) cited easy access to facilities as influencing many and Gentle, Caves, Armstrong, Balding and Kirby (1994) found competitiveness to be a major factor in young people's exercise. The only significant difference related to age was that 50 percent of those over 65 not currently exercising were not planning to begin an exercise program (Dishman, 1994c).

Dzewaltowski (1994) proposes that knowledge of cognitive processes, plans, and strategies to exercise should be labeled “physical activity intelligence” as more information concerning reasons for exercising generally increases the motivation to exercise. He believes:

Researchers need to determine if habitual exercisers know when to monitor their social situations and when to attend to their stored cognitive structures in memory. If an individual has a strong and accessible self-efficacy expectation toward physical activity, then it may be appropriate for that person not to think and “just do it.” (Dzewaltowski, 1994, p. 1398)

This literature review has illustrated some of the barriers and motivations to exercise. Although no studies were located in this review of literature that have directly explored a relationship between CA and EA, there are studies that have used public speaking as a stressor in testing the effect of physical activity on stress response, trait and state anxiety. These studies give a basis for reasoning that the CA and EA may be linked (Otto, 1990; Schwartz & Kaloupek, 1987; and Sedlock & Duda, 1994). There is also the finding by Richmond and McCroskey (1995) linking general anxiety to CA.

As previously discussed, much attention has been focused on treatment approaches for alleviating CA. Sedlock & Duda (1994) studied, but did not find, a relationship between physical fitness level and either trait-anxiety or state-anxiety. They suggested that length of exercise involvement may have an effect. “The effect of fitness level on stress reactivity might be dependent on the length of time that an individual has been a regular participant in physical activity. In particular, fitness level may be linked to an attenuation of stress responses only in the case of individuals who are chronic exercisers” (Sedlock & Duda, 1994, p. 225).

In 1990, Otto conducted a study to provide a stronger foundation for using exercise as a mood manager when under or anticipating stress. The stressor used in Otto's study was a public speech. He found that exercise improved negative moods in stress. He also found that when exercise preceded a public speech, anxiety was reduced and self-efficacy feelings increased. This effect became most apparent when the negative mood was high, so exercise may benefit even those individuals who suffer the highest levels of CA. These conclusions found by Otto support Sach's (1982) earlier findings that exercise had a beneficial effect on a person's emotions and may therefore be useful in treating CA as the foundation for CA is emotional (Booth-Butterfield & Booth-Butterfield, 1994).

Otto (1990) went on to compare preparation time to exercise, by separating his subjects into two groups. One group was given preparation time and no exercise, the other exercise with no preparation time. The exercise group fared better than the group with preparation time in reduction of anxiety and increase in self-efficacy. The exercising group had less disfluency during the first three minutes, even though the number of words spoken did not differ between the groups. Otto concluded from these findings that the fluency was due to greater calmness in the exercise group.

These findings suggest that the use of exercise may bridge instructional and therapeutic approaches. Exercise may be used to diffuse apprehension in the short-term or could be part of a long-term therapeutic process. In looking at acute exercise combined with imaginable exposure as a technique for anxiety reduction, Schwartz & Kaloupek (1987) found that exercise helped process anxiety-causing material and

increased image clarity. This finding is not surprising considering the role exercise has played as a stress-moderator (Otto, 1990; Sachs, 1982; Sedlock & Duda, 1994). In fact, a number of psychotherapists have advocated the use of exercise as a therapeutic method for reducing the incidence of many ills (Gentle, Caves, Armstrong, Balding & Kirby, 1994; Sachs, 1982). People who perceive themselves as physically fit generally have a greater feeling of well-being (Otto, 1990; Sachs, 1982). They have higher levels of self-esteem, and self-efficacy (Otto, 1990; Sachs, 1982). McCroskey, Richmond, Daly & Falcione (1977) and Ellis (1995) found a clear negative relationship between self-esteem and CA. They found that low self-esteem is predictive of high CA across divergent populations. Richmond & McCroskey (1995) report these findings in their latest textbook. People with high self-esteem had low CA scores, and those with low self-esteem had high CA scores (McCroskey, Richmond, Daly & Falcione, 1977). Otto (1990) found that the positive effects on self-perceptions through exercise occurred even if the physical activity was not aerobically stressful. Gentle, Caves, Armstrong, Balding & Kirby (1994) confirmed this finding. It is important to note that adherence to an exercise program does not require vigorous exercise. Previous studies advocated vigorous exercise to reduce anxiety (Sachs, 1982); however, current studies advocate moderate exercise (Gentle, Caves, Armstrong, Balding & Kirby, 1994).

Continuing to support the possibility of a link between CA and EA are reviews of social cognitive research which illustrate that physical activity is associated with people's thoughts (Sachs, 1982) about their capabilities to perform human movements that lead to events that influence their lives.

Because of the self-efficacy/physical activity relationship, some investigators have attempted to integrate the construct into other theoretical perspectives. The ability of humans to anticipate outcomes provides a cognitive representation of a future event that motivates action. Individuals may be motivated to participate in physical activity to improve their health status, receive social approval, and experience self-satisfaction, respectively. (Dzewaltowski, 1994, p.1396)

In addition to Dzewaltowski's (1994) findings, Courneya & McAuley's (1994) research suggests that emotional or affective components might have an important influence on exercise participation. Thus knowing CA could be reduced through exercise could act as an intrinsic motivator to begin exercise and a reinforcer to maintain adherence to a program (Rutherford, Corbin & Chase, 1992). For those who do not currently exercise, they may have more to gain as Otto (1990) found the de-stress effect to be most pronounced in the physically unfit.

Another cognitive process interacting with self-efficacy and outcome expectations in determining physical activity is personal goals (Dzewaltowski, 1994). It is not difficult to project that CAs would like to reduce the negative effects of their communication experiences. Exercise literature has shown that "goals interact with cognitive self-reaction processes rather than directing action independently. The stronger the individual's feelings on probable outcomes from physical activity, the greater their physical activity participation" (Dzewaltowski, 1994, p. 1397).

In conclusion, there is evidence to suggest that EA, adherence to an exercise program, and the level of CA an individual experiences may be linked. If so, it appears feasible that exercise may serve to alleviate CA. Therefore, to further the research in treating CA, the following research questions were posited:

RQ1: Does an individual's level of EA - as measured by the four components of intensity, frequency, duration and longevity - significantly predict an individual's level of CA in the interpersonal conversations context?

RQ2: Does an individual's level of EA - as measured by the four components of intensity, frequency, duration and longevity - significantly predict an individual's level of CA in the group context?

RQ3: Does an individual's level of EA - as measured by the four components of intensity, frequency, duration and longevity - significantly predict an individual's level of CA in the meetings context?

RQ4: Does an individual's level of EA - as measured by the four components of intensity, frequency, duration and longevity - significantly predict an individual's level of CA in the public speaking context?

RQ5: Does an individual's level of EA - as measured by the four components of intensity, frequency, duration and longevity - significantly predict an individual's level of trait CA?

Chapter III

METHODOLOGY

The primary focus of this study investigated whether or not there is a predictive relationship between trait and contextual CA and EA. Additionally, due to the exploratory nature of this thesis demographics such as age and gender were also examined in supplemental analyses.

Trait (overall) and context CA were the dependent/criterion variables. Trait CA is a personality-type orientation toward communication that results in the sufferer avoiding communication. The four possible contexts for CA include interpersonal conversations, group discussion, meetings and public speaking (McCroskey, 1982; Richmond & McCroskey, 1995). As differentiated from reticence, shyness and willingness to communicate in the review of literature chapter, the foundation of CA is emotional - fear. It specifically refers to a person's level of fear or anxiety when communicating or anticipating communication with another person or group of persons (McCroskey, 1977). CA, rather than reticence, shyness or WTC, was chosen to investigate because it is a relatively enduring condition and after reviewing literature it appeared the potential for fruitful results was more likely.

The four components of EA were the primary independent/predictor variables. As the name implies, EA is the degree that a person adheres to an exercise program or engages in exercise/physical activity consistently. For this study's purposes four components of exercise were evaluated: intensity, how hard does the subject exercise

when exercising; frequency, how often does the subject exercise; duration, how long does the subject exercise at a given session; and longevity, how long has the person maintained the aforementioned exercise program. A 1990 Canadian survey found that adherence was deterred because people were either not willing or not able to practice physical activity that involved the recommended minimums for intensity, frequency, and duration as a whole (Stephens, 1990). Their level of success therefore depended on the particular component - intensity, frequency or duration - of exercise being measured (Stephens, 1990; Courneya & McAuley, 1994). Specifically, the commonly accepted minimum criterion or threshold for achieving a benefit for frequency (i.e., every other day) was met by 62 percent of the population. When the minimum duration (30+ minutes) was combined, the figure dropped to 49 percent. Finally, when the minimum intensity (50 percent or more of age-specific capacity) was added to the other two components, the percentage of adherents dropped to 11 percent.

Although accepted as components necessary for an exercise program, “research has not shed any light on the different determinants of frequency, intensity, and duration because those who have carried out the studies have rarely assessed the three distinct components separately” (Courneya & McAuley, 1994, p. 85). In an attempt to address the differing determinants, Courneya & McAuley found that intention and self-efficacy contributed unique variance to frequency and intensity, but that only intention contributed unique variance to duration. They also found that intention had a significantly higher correlation with duration than it did with intensity or frequency.

As mentioned, the three components of frequency, intensity and duration are commonly accepted necessities to achieve the physical and mental benefits of exercise. A fourth component, longevity, has been less explored. Although this review located no studies that had incorporated longevity into their conceptualization of physical activity, studies do suggest its importance (Dishman, 1994b; Dziewatowski, 1994; Sedlock & Duda, 1994). Therefore, the fourth component of longevity was added to the EA measure for this study. This study assesses the four distinct components separately to determine each component's individual predictability, if any, of a person's level of CA.

Subject Sample

To test the research questions, a survey methodology was employed. University subjects consisting of 300 students enrolled in physical education, English, mass communication, health and public speaking courses at the University of Nebraska at Omaha (UNO) who were never enrolled in a college level speech course were given the two measures for CA and EA together with a short list of demographic questions. Those students used from a public speaking class were surveyed within the first week of class to prevent skills training from confounding the results. Ages ranged from 17- 49. Subjects' selection depended on the willingness of instructors to participate. Instructors were sent a letter requesting permission to use their classes to recruit participants (Appendix B). A time was scheduled with the instructors who agreed to participate to conduct the study in their classes. Permission to conduct this study was requested and obtained from the

Institutional Review Board for the Protection of Human Subjects of the University of Nebraska (Appendix A).

Procedures

Data was collected through the completion of a questionnaire packet containing a letter to the student participants and three measuring devices on two separate sheets: the Personal Report of Communication Apprehension on one sheet (PRCA-24; McCroskey, 1982), and demographic information with the EA measure on the other sheet (Appendix C). Subjects completed all measures. Scores from the PRCA-24 served as the dependent/criterion variables. Scores from the EA measure served as the primary independent/predictor variables. Additionally, scores on the demographic factors of age and gender served as independent/predictor variables in supplemental analyses. Each subject's involvement was approximately 10 minutes.

The letter and measures given the subjects included written instructions (Appendix C). These instructions included a brief description of the project, authorization for its implementation, the assurance of participant anonymity, and the confidentiality of the results. In addition, the instructions were read aloud by the researcher to all participants prior to completing the forms. Subjects were told their involvement would require a 10 minute commitment. After all forms had been completed, participants were informed that the results of the study would be made available to them upon request after the data has been analyzed.

Measurement

This study used the Personal Report of Communication Apprehension (PRCA-24; McCroskey, 1982) to measure each subject's level of CA in four contexts as well as an overall apprehension level (Appendix C). These five components of CA specifically served as the dependent/criterion variables. The PRCA-24 was chosen as the measure for CA for several reasons: it "is the best available measure of traitlike CA" (Richmond & McCroskey, 1995 p. 44), and it also measures the four contexts for CA. "The obtained correlations between the PRCA-24 scores and the partial PRCA-24 scores ranged between .97 and .98" (McCroskey, Beatty, Kearney & Plax, 1985, p.171). Each context is represented by six items - three positively and three negatively worded items to avoid response bias (McCroskey, Beatty, Kearney & Plax, 1985).

The PRCA-24 instrument is a 24-item, 5-point, Likert-type questionnaire that measures CA in the four contexts of interpersonal conversations, group discussion, meetings, and public speaking. It also provides an overall (trait) apprehension score. Respondents express their degree of agreement (1=strongly agree to 5=strongly disagree) with 24 statements. Sample statements are "I dislike participating in group discussion" and "Generally, I am comfortable while participating in group discussion" (Richmond & McCroskey, 1995). Richmond & McCroskey (1995) reported the following alpha reliability scores in the four contexts: interpersonal conversations, .86; group discussion, .88; meetings, .91; and public speaking, .89. The overall score for trait CA had an alpha reliability of .95.

As independent/predictor variables, this study examined the relationship among four components of EA (intensity, frequency, duration and longevity) and four contexts of CA (interpersonal conversations, group discussion, meetings, and public speaking) and overall (trait) CA. To achieve an effect the commonly accepted minimum or threshold needed to obtain a benefit for frequency is every other day; for duration, 30+ minutes; and for intensity, 50 percent or more of age-specific capacity (Courneya & McAuley, 1994). This study used a modification of the EA instrument developed by Kutala, Viljanen, Taimela & Vitasalo (1993) that involves these three components as measures of physical activity (Appendix C). The instrument assesses leisure-time physical activity.

The modifications from the original scale were completed to strengthen the measure's power from ordinal to interval and to add a fourth component. These modifications consisted of having respondents specify the actual number of days they exercised to the point of perspiration or breathlessness, the actual number of days they exercised, the actual duration of their exercise session, and how long (specifying days, weeks, months or years) they had followed the program as specified in the preceding three questions. The original scale allowed the respondent to give more general answers, such as "a few times a year," "1 to 2 times a month," or "5 times a week or more." The fourth component question concerning longevity was added due to literature showing that "many physical activity outcomes are not experienced without continued participation in the behavior" (Dzewaltowski, 1994, p. 1396), and "substantial reductions in trait anxiety reportedly require about four months of exercise training" (Dishman, 1994b, p. 1092).

Data-Analysis

To assess the internal reliability of the five PRCA-24 scores, Cronbach's alpha was computed for the total PRCA-24 score and for each of the four separate contexts of the PRCA-24. Frequencies and other descriptive data for responses were also computed in order to more fully explore the nature of the data gathered in this study. Factor analysis using the principal component solution with orthogonal varimax rotation for the PRCA measure was conducted in order to check the stability of the PRCA-24 factor structure. The internal reliability of the EA measure was assessed using test-retest methods. Approximately 50 subjects were retested. The alpha level for significance of all tests was set at .05.

All data collected was subjected to SPSS-X stepwise multiple regression analyses to examine the five research questions with the four components of EA serving as the independent/predictor variables and the five CA scores as dependent/criterion variables. Additional supplementary analyses were conducted to increase understanding of any relationship discovered as well as investigate the interplay of demographics, such as gender and age. Tables were compiled to report findings.

Chapter IV

RESULTS

Introduction

The purpose of this thesis was to investigate if an individual's level of EA - as measured by the four components of intensity, frequency, duration, and longevity - could significantly predict an individual's level of CA overall (trait) and in four contexts (interpersonal conversations, group discussion, meetings, and public speaking). To accomplish this, 412 subjects were administered a questionnaire packet containing: the Personal Report of Communication Apprehension (PRCA-24; McCroskey, 1982), an EA questionnaire, and demographic questions regarding age and gender.

Demographics of Research Participants/Subject Characteristics

Of the 412 undergraduate students sampled, 300 met the requirement of never having enrolled in a college level public speaking course. This requirement was necessary to reduce the chances of skills training confounding the results. These 300 usable questionnaires made up the research sample. The demographics of the 300 respondents only slightly deviated from the demographics of the UNO general population (Table I). Of the 300 undergraduate students sampled, 166 (55.3%) were female, and 134 (44.7%) were male; whereas, UNO's general population is 6,446 female (51.8%) and 6,000 (48.2%) male (UNO Institutional Research, 1996).

TABLE I
Demographics of Respondents

Characteristic	Percentage
Sex	
Female	55.3
Male	44.7
Age	
17	.3
18	8.3
19	20.7
20	7.7
21	9.7
22	11.3
23	8.7
24	7.3
25	5.0
26	2.7
27	2.7
28	3.7
29	1.0
30	1.0
31	1.3
32	.7
33	.3
34	.7
35	.7
36	.7
37	1.0
38	1.0
39	.7
40	1.3
42	.7
44	.3
47	.3
49	.3
n=300	

In terms of this study's age representation, ages ranged from 17 to 49 with most, more than 87 percent, between 18 and 28. A very small percentage, .3 percent, were younger than 18, and a few, 9.7 percent, were older than 28 (Table I). The 300 students represented undergraduates enrolled in introductory mass communication, health, physical education, English and public speaking courses who had never taken a college level speech course. Those queried from a public speaking class participated during the first week of the semester to prevent skills training from confounding the results.

Factor Analysis

The stability of the PRCA-24 factor structure was checked using the principal component solution with orthogonal varimax rotation. The factor analysis resulted in a slight variation in loading for six items from the theoretically specified factor structure (Appendix D). It was decided to use the theoretical factor structure for several reasons: 1) the variation was only slight and each variation, except in one case, continued to have its highest loading on the theoretically specified primary factor; 2) the PRCA-24 and its context subscales have consistently received high reliability estimates over years of study; 3) the PRCA-24 is the instrument of choice in CA research because of its demonstrated high reliability and validity in numerous research tests (Hackman & Barthel-Hackman, 1993; McCroskey, 1982; McCroskey, Beatty, Kearney & Plax, 1985; Richmond & McCroskey, 1995); and 4) use of the theoretical factor structure allows easier integration with previous research.

Instrument Results: Reliability Estimates and Descriptive Data

The 24-item version of the Personal Report of Communication Apprehension (PRCA-24) was used to measure the subject's apprehension level in four contexts - interpersonal conversations, group discussion, meetings, and public speaking. It also gives an overall score for trait CA (McCroskey, 1982). The internal reliabilities for the total score of the PRCA-24 (trait) and for each of the four context subscores were obtained using Cronbach's Alpha. All reliability scores were well over the accepted low of .80 with the lowest reliability being .86 for the group discussion context.

All 300 subjects used for the study were also used to determine scores for interpersonal conversations, group discussion, meetings, public speaking and trait CA. The overall score on the PRCA-24 for trait CA can range from 24 to 120. In this investigation, the trait scores ranged from 24 to 114. Each of the four context scores on the PRCA-24 (interpersonal conversations, group discussion, meetings, and public speaking) can range from 6 to 30. In the present study, each of the context scores did range from 6 to 30. Table II reports the Cronbach alpha reliabilities, means, standard deviations, medians and modes for all of the context and trait scores.

TABLE II
Summary of PRCA-24 Context and Trait CA Scores

variable	reliability	# of items	mean	SD	median	mode
interpersonal conv.	.88	6	14.94	4.80	14	12
group discussion	.86	6	16.04	5.15	15	12
meetings	.91	6	16.40	5.26	16	12
public speaking	.87	6	19.69	5.29	20	23
trait	.95	24	67.21	17.53	67	60

The four-item questionnaire used to measure the subject's EA level included all four components: intensity, frequency, duration and longevity. The reliabilities of these four components of the EA measure were assessed using test-retest methods. Four groups of students, combining for a sample total of 50, were given the EA measure twice at differing intervals (day after day, three days apart, one week apart, and two weeks apart). The elapsed time since previously completing the measure was then taken into consideration when assessing the reliability of the longevity question. All reliability scores were well over the accepted low of .80 with the lowest reliability being .98 for the frequency component.

All 300 subjects used for the study were used to determine EA scores. Two of the EA components, intensity and frequency, could range from 0 to 7. Possible ranges for duration and longevity were virtually endless. In this investigation intensity and frequency did range from 0 to 7; duration ranged from 0 to 240 minutes; and longevity ranged from 0 to 988 weeks. Table III reports the test-retest reliabilities, means, standard deviations, medians and modes for all of the EA components.

TABLE III
Summary of EA Scores

variable	reliability	# of items	mean	SD	median	mode
intensity (in days)	.99	1	2.73	1.89	3	3
frequency (in days)	.98	1	3.55	2.00	3	3
duration (in min.)	.99	1	49.14	35.37	45	30
longevity (in weeks)	.99	1	102.00	160.77	26	0

Research Question Results

SPSS-X stepwise multiple regression was used to answer the five research questions. The five CA scores functioned as criterion variables with the four exercise components as primary predictor variables.

Research question number one, testing whether an individual's level of EA - as measured by the four components of intensity, frequency, duration and longevity - significantly predicts an individual's level of CA in interpersonal conversations context, was not supported. A stepwise multiple regression analysis was used to analyze the interpersonal conversations score of the PRCA-24 for significant prediction with the EA components. No variables entered into the equation, thus no significant prediction was found.

Research question number two, testing whether an individual's level of EA - as measured by the four components of intensity, frequency, duration and longevity - significantly predicts an individual's level of CA in the group discussion context, was partially supported. A stepwise multiple regression analysis was used to analyze the group context score of the PRCA-24 for significant prediction based on the EA components. When the four components were entered in a linear fashion, the component of intensity entered as a significant predictor variable in the equation (Sig. $F = .0156$). This component accounted for nearly 2 percent of the variance (Table IV).

TABLE IV
Stepwise Multiple Regression of Group Discussion CA and EA Components

Variable	Beta	R	RSq.	F Ch.	Sig. F Ch.
Intensity	-.139965	.13996	.01959	5.91455	.0156

Research question number three, testing whether an individual's level of EA - as measured by the four components of intensity, frequency, duration and longevity - significantly predicts an individual's level of CA in meetings context, was partially supported. A stepwise multiple regression analyses was used to analyze the meetings score of the PRCA-24 for significant prediction based on the EA components. When the four components were entered in a linear fashion, the component of duration entered as a significant predictor variable in the equation. This component entered as significant, with Sig. F = .0036 and 2.8 percent of the variance accounted for (Table V).

TABLE V
Stepwise Multiple Regression of Meetings CA and EA Components

Variable	Beta	R	RSq.	F Ch.	Sig. F Ch.
Duration	-.167458	.16746	.02804	8.59763	.0036

Research question number four, testing whether an individual's level of EA - as measured by the four components of intensity, frequency, duration and longevity - significantly predicts an individual's level of CA in the public speaking context, was

partially supported. A stepwise multiple regression analyses was used to analyze the public speaking score of the PRCA-24 for significant prediction based on the EA components. When the four components were entered in a linear fashion, the component of intensity entered as a significant predictor variable in the equation. This component entered as significant with Sig. F = .0044 and accounting for 2.8 percent of the variance (Table VI).

TABLE VI
Stepwise Multiple Regression of Public Speaking CA and EA Components

Variable	Beta	R	RSq.	F Ch.	Sig. F Ch.
Intensity	-.165868	.16587	.02751	8.23250	.0044

Research question number five, testing whether an individual's level of EA - as measured by the four components of intensity, frequency, duration and longevity - significantly predicts an individual's level of trait CA, was partially supported. A stepwise multiple regression analysis was used to analyze the trait score of the PRCA-24 for significant prediction based on the EA components. When the four components were entered in a linear fashion, the component of intensity entered as a significant predictor variable in the equation. This component entered as significant, with Sig. F = .0027 and 3.1 percent of the variance accounted for (Table VII).

TABLE VII
Stepwise Multiple Regression of Trait CA and EA Components

Variable	Beta	R	RSq.	F Ch.	Sig. F Ch.
Intensity	-.175234	.17523	.03071	9.12378	.0027

Supplemental Analyses

Since this was an exploratory study, several supplemental analyses were conducted to better understand the relationships among the criterion and predictor variables and to better understand the potential roles of demographic factors like age and gender. Specific supplementary analyses conducted were: additional Stepwise Multiple Regressions using age and gender as predictor variables along with the EA variables, a Pearson r correlational analysis and an analysis of deviations from linearity of tested relationships.

Supplemental regression analyses with correlational matrix

The questionnaire enabled subjects to identify their specific age and gender. Using stepwise multiple regression, this demographic information was added to the exercise data as predictor variables for each of the five research questions to investigate what influence age and gender may or may not have on the results. This supplementary analysis essentially repeats the tests of the five research questions but with age and gender also included as independent variables.

Research question number one (interpersonal conversations): no significant prediction was found among the exercise, demographic and interpersonal conversations variables.

Research question number two (group discussion): no variables entered into the equation when they were added with the EA components in relation to group discussion.

Research question number three (meetings): In relation to meetings, gender entered into the regression equation in step two when demographic information was added. This component entered as significant with Sig. F = .0021 and 1.3 percent of the variance accounted for. The inclusion of the gender variable altered the significance of the duration variable to Sig. F = .0036 and its accountable variance to 2.8 percent, but did not replace duration being taken in the first step (Table VIII).

TABLE VIII
Stepwise Multiple Regression of Meetings CA, EA and Demographic Components

Variable	Beta	R	Rsq.	Rsq. Ch.	F Ch.	Sig. F Ch.
Duration	-.167458	.16746	.02804	.02804	8.59763	.0036
Gender	.118239	.20165	.04066	.01262	6.29406	.0021

Research question number four (public speaking): When demographics were added to the stepwise multiple regression, gender entered in step one, age in step two, and intensity in step three (Table IX). Gender entered as significant with Sig. F = .001 and 3.7 percent of the variance accounted for. Age entered as significant also with Sig. F = .0332

and 1.5 percent of the variance accounted for. The inclusion of the gender and age variables replaced intensity being taken in step one and altered the significance of the intensity component to Sig. F = .0194 and its accountable variance to 1.8 percent.

TABLE IX
Stepwise Multiple Regression of Public Speaking CA,
EA and Demographic Components

Variable	Beta	R	RSq.	RSq.Ch	F Ch.	Sig. F Ch.
Gender	-.191484	.19148	.03667	.03667	11.07594	.0010
Age	.177168	.22725	.05164	.01498	4.57961	.0332
Intensity	-.139747	.26353	.06945	.01781	5.53047	.0194

Research question number five (Trait): When demographics were added to the stepwise regression, intensity entered in step one and age in step two (Table X). The intensity component entered as significant with Sig. F = .0027 and accounted for 3 percent of the variance. Age entered as significant with Sig. F = .0331 and accounted for 1.5 percent of the variance. The inclusion of age did not replace the original predictor, intensity in this case, being taken in the first step.

TABLE X
Stepwise Multiple Regression of Trait CA, EA and Demographic Components

Variable	Beta	R	RSq.	RSq.Ch	F Ch.	Sig. F Ch.
Intensity	-.175234	.17523	.03071	.03071	9.12378	.0027
Age	-.410839	.21437	.04595	.01525	4.58650	.0331

To aid interpretation of the stepwise multiple regression analyses, a Pearson r correlational analysis of all criterion and predictor variables was conducted to measure associations among the variables, including demographics. Table XI contains the results of this correlational analysis. As expected, strong intercorrelations were found among the CA variables and the three original EA variables (intensity, frequency and duration). Selective references will be made to the table in the discussion section.

TABLE XI
Correlation Coefficients

Factor	N2 (gender)	N3 (age)	N5 (intense.)	N6 (freq.)	N7 (dur.)	N8 (long.)	Group Discussion	Meetings	Interp. Conver.	Public Speak.	Trait
N2	1.0000										
N3	-.1187*	1.0000									
N5	-.2841**	-.0820	1.0000								
N6	-.1799**	-.0880	.7485**	1.0000							
N7	-.3121**	-.1317*	.5119**	.4663**	1.0000						
N8	-.1431*	.2379**	.1871**	.1955**	.0637	1.0000					
GRPDISC	.0472	-.0752	-.1400**	-.1189*	-.0973	-.0211	1.0000				
MEETINGS	.1509**	-.0619	-.1608**	-.0977	-.1675**	.0526	.7455**	1.0000			
INTERCON	.0428	-.0637	-.0825	-.0622	-.0774	-.0251	.6479**	.6763**	1.0000		
PUBSPK	.1915**	-.1438*	-.1659**	-.1241*	-.1612**	-.0266	.5978**	.6424**	.5399**	1.0000	
TRAIT	.1380*	-.1080	-.1752**	-.1325*	-.1599**	-.0465	.8749**	.8985**	.8327**	.8154**	1.0000

* - Signif. LE .05

** - Signif. LE .01

Supplemental analysis of deviations from linearity

To further aid interpretation of the supplemental regressions and Pearson r correlation coefficients, an analysis of deviations from linearity for examined relationships was conducted using all predictor and criterion variables. Significant deviations from linearity were found in three cases: age and interpersonal conversations, age and

meetings, and age and trait. These deviations can be visually seen in the scatterplots (Appendix E).

In relation to interpersonal conversations, the age variable does not appear to have a linear relationship. The linearity result did not emerge as significant (.2476) while the deviation from linearity was highly significant (.0006). See Table XII.

TABLE XII
Deviation from Linearity for Age on Interpersonal Conversations

Variable	Eta	Eta Sq.	Sig. Linearity	Sig. Dev.from Linearity
Age	.4264	.1818	.2476	.0006

In relation to meetings, the age variable again showed a significant deviation from linearity (.0241) while the linearity result was not significant (.2715). See Table XIII.

TABLE XIII
Deviation from Linearity for Age on Meetings

Variable	Eta	Eta Sq.	Sig. Linearity	Sig. Dev.from Linearity
Age	.3756	.1411	.2715	.0241

In relation to trait, the age variable again had a highly significant deviation from linearity (.0044). The linearity result (.0557) was not significant though it did approach significance (Table XIV).

TABLE XIV
Deviation from Linearity for Age on Trait

Variable	Eta	Eta Sq.	Sig. Linearity	Sig. Dev.from Linearity
Age	.4158	.1729	.0557	.0044

CHAPTER V

DISCUSSION AND RECOMMENDATIONS

Introduction

The primary motivation for conducting this study was to investigate a new treatment option for alleviating CA. Due to its exploratory nature, supplemental analyses were also conducted investigating the role of demographics such as age and gender. In the preceding chapter, the results of this investigation concerning CA and EA were reported. In this chapter, the research questions for this study are examined in light of these results. In addition, strengths and limitations of the research study and recommendations for future research involving these variables are discussed.

Interpretation of Research Question Results

The stepwise multiple regression results yielded partial support for research questions two, three, four and five. These findings were all supported by the Pearson r correlations. The inclusion of demographic data altered the findings for each of the five research questions in some manner. To facilitate understanding, the following interpretations incorporate the initial stepwise results with all supplemental analyses. An explanation regarding the findings for CA and EA measures will be addressed first, followed by a discussion concerning the effect demographic variables had on the CA/EA findings and any overall explanations for the findings.

The analysis of RQ1, which asked if an individual's level of EA - as measured by the four components of intensity, frequency, duration, and longevity - significantly predicts an individual's level of CA in the interpersonal conversations context, did not support the researcher's expectation that higher levels of CA would be found in non-exercising or less-exercising undergraduate students. This result was consistent with the Pearson r correlations which also indicated no significant linear relationships among these variables (see Table XI). The lack of statistical significance among these variables requires some consideration. One possible explanation for this finding may be that different levels or different types of exercise (aerobic vs. anaerobic) are necessary to influence CA in this particular context. More specifically, Sach's (1982) deduced that in order for exercise to have a reducing effect on anxiety, the exercise must be cardiovascular or aerobic (requiring oxygen consumption over an extended period of time without building an oxygen debt) in nature. He specifically cited running, bicycling, and swimming. Anaerobic exercise would include team sports and weight training where oxygen consumption is required but is of short duration. Anaerobic activities create a significant oxygen debt due to their off-again/on-again nature and prevent an extended duration of activity being sustained. A person cannot bench press weights for 30 minutes without a rest. The muscle becomes too exhausted from lack of oxygen. This explanation is speculative due to no data regarding the nature of the physical activity engaged in being available. Ways for obtaining this information will be given in a later section.

The addition of demographic data did not change the initial findings. In supplemental regression analysis, neither age nor gender entered into the equation. In

testing for deviations from linearity, however, a significant deviation (.0006) was found between interpersonal conversations and age. These deviations from linearity showed several hills and valleys with the sharpest upward curve in CA levels at age 35. The nonlinear deviations can be seen in the scatterplot in Appendix E. These increases of CA may be due life situations, such as school, marital, career or family problems. For instance, according to the United States Census Bureau four in 10 marriages end in divorce. It could be speculated that such a traumatic occurrence could result in high CA in the interpersonal conversations context as people grapple with regaining their identity and contemplate establishing another relationship. It is difficult to speculate as to the reason for these hills and valleys due to the concentration of the subject samples' ages between 18 and 28. However, the significant deviation from linearity could partially account for why age did not enter the regression equation. Recommendations for addressing these deviations in linearity in future research will be made in a later section.

It is possible that the test of RQ1 was not significant due to the overall complexity of the relationships among the included variables (EA, CA and demographics) as well as some that were not included (e.g. self-efficacy and self-esteem). Studies have already reported a strong negative relationship between self-esteem and CA (Ellis, 1995; McCroskey, Richmond, Daly & Falcione, 1977) and EA studies have implied the role of self-efficacy influencing exercise behavior (Courneya & McAuley, 1994; Dzewaltowski, 1994). This issue will be discussed more fully in a later section. The significant deviation from linearity for age supports such an explanation. Another possible explanation could be that the sensitivity of the EA measure was not high enough to reveal a relationship.

This has to do with a self-report instrument and its development. The EA measure will be discussed more fully in recommendations for future research.

The analysis of RQ2, which asked if an individual's level of EA - as measured by the four components of intensity, frequency, duration, and longevity - significantly predicts an individual's level of CA in the group discussion context, partially supported the researcher's expectation. More specifically, intensity entered the regression equation significantly. This result seems to indicate that the degree of intensity of how one exercises (whether or not to a point of perspiration or breathlessness) is a significant predictor of an individual's CA level in the group context. This finding was partially supported by the Pearson r correlations, (Table XI) in which intensity and frequency were found to significantly correlate with group discussion. Intensity did have the stronger correlation at $-.1400$ (significant at $.01$ level), whereas frequency was $-.1189$ (significant at $.05$ level). The Pearson r results indicate a negative relationship with group discussion. As the intensity and frequency of exercise increases, group discussion CA decreases or vice versa.

One possible explanation for finding intensity as the more significant predictor could be that the intensity of exercise has the most fear or anxiety reducing effect. More specifically, stress - be it psychological, physical, or emotional - releases certain hormones such as adrenaline. It could be speculated that the hormone released during intense exercise more closely mirrors the level of stress hormones released in a group discussion. This conclusion would coincide with Sach's (1982) findings: "It would appear that for a physical activity to be most effective in reducing anxiety..., the activity should be of a

vigorous nature (p. 52).” The frequency of experiencing intense exercise may be a secondary predictor in that the more often this hormonal release is experienced the quicker adaptation in a CA situation.

When age and gender were added, neither demographic had a significant relationship to group discussion CA. The addition of demographics to the stepwise equation also resulted in the removal of intensity as a significant predictor. The removal of intensity as significant may have been due to the wider dispersion caused by the additional two variables. Investigation into deviations from linear relationships found no significant deviation from linearity among any of the variables.

As explained in the discussion for RQ1, the lack of significant relationships found among the variables could be attributed to many causes: the complexity of the relationships, the lack of sensitivity in the EA measure, or the influence of a confounding variable such as self-esteem or self-efficacy which may operate as the best predictor of CA. Again, previous studies have already reported a relationship between self-esteem, self-efficacy and CA and EA (Courneya & McAuley, 1994; Dzewaltowski, 1994; McCroskey, Richmond, Daly & Falcione, 1977; Ellis, 1995). The tentativeness of conclusions that can be drawn in this exploratory study regarding RQ2 is supported by the fact that when intensity entered the original regression equation it only accounted for two percent of the variance. Such a low percent of explained variance leads to a conclusion that the relationship between EA and group context CA was unstable in this study.

The analysis of RQ3, which asked if an individual's level of EA - as measured by the four components of intensity, frequency, duration, and longevity - significantly predicts an individual's level of CA in meetings context, partially supported the researcher's expectation. This result seems to indicate that duration of exercise (how much time is actually spent exercising in a typical exercise session) may be a significant predictor of an individual's CA level in the meetings context. This finding was supported by the Pearson r correlations in which duration and intensity were found to significantly correlate with meetings CA. Duration had the strongest correlation at $-.1675$, followed closely by intensity at $-.1608$. These correlations were both significant at the $.01$ level. These results indicate a negative relationship between meetings CA and duration and intensity. As the duration and intensity of exercise increases, meetings CA decreases and vice versa.

One possible explanation for this finding could be that a similarity exists in the magnitude of stress hormone secretion needed to sustain and endure the stress of exercise which more accurately mirrors the hormone level needed to sustain attention and endure stress in meetings. From an exercise perspective it seems plausible that as one experiences longer sessions, be it exercise or meetings, it becomes necessary to hold oneself at a level of stress while waiting until the exercise session is over or it's time to speak. The duration of exercise would be the component of EA, whereas meetings would be the context of CA to practice a "holding pattern of stress."

The addition of demographics resulted in gender entering the stepwise equation in step two. This was also supported by the Pearson r correlations in which gender was

found to correlate with meetings CA at .1509 (significant at .01 level). The results seem to indicate that men have lower levels of CA in meetings than women. To speculate, this could, for instance, be due to the added burden career women feel in supplementing or providing an income while still bearing the major responsibility for maintaining a home. In investigating deviations from linear relationships, a significant deviation from linearity between meetings and age was found. As seen in the scatterplot (Appendix E) CA levels have several hills and valleys at different ages. As explained in RQ1 these increases of CA may be due to a variety of reasons: school, marital, career or family problems. For instance, the high level of CA in the early years could be due to inexperience or the stress of beginning college or a new marriage. It is difficult to speculate as to the reason for these hills and valleys due to the concentration of the subject samples' ages between 18 and 28. However, the significant deviation from linearity could partially account for why age did not enter the regression equation. Recommendations for addressing these deviations in linearity in future research will be made in a later section.

It is again important to mention that the variance accounted for by any of the tested relationships was very low (2.8 for duration and 1.3 for gender). So at this point any conclusions must be tentative. As discussed previously, the low amount of variance explained may be due to the complexity of relationships among the variables involved as well as variables not included, such as self-efficacy or self-esteem. The low amount of explained variance reported could also be due to the sensitivity of the EA measure not being high enough to reveal a stronger relationship among the variables. For example, knowing what type of exercise - aerobic or anaerobic - may have been helpful.

Replication and expansion of the study is necessary; suggestions for improving the current study will be given in the recommendations for future research section.

The analysis of RQ4, which asked if an individual's level of EA - as measured by the four components of intensity, frequency, duration, and longevity - significantly predicts an individual's level of CA in the public speaking context, partially supported the researcher's expectation. The result of intensity entering the regression equation significantly seems to indicate once again that Sach's 1982 conclusion was insightful, and the vigorous nature or intensity of exercise (whether or not to a point of perspiration or breathlessness) has the most fear or anxiety reducing effect. This finding was supported by the Pearson *r* correlations in which intensity, duration, and frequency were all found to correlate significantly with public speaking CA. Intensity correlated at $-.1659$ (significant at $.01$ level), followed closely by duration at $-.1612$ (significant at $.01$ level), and frequency at $-.1241$ (significant at $.05$ level). The Pearson *r* analysis indicated negative relationships among CA and intensity, duration, and frequency. As intensity, duration, and frequency increase, public speaking CA decreases and vice versa.

An additional issue to consider is that the significant intercorrelations among duration, frequency and intensity could indicate that duration and frequency support a primary predictor like intensity (since intensity entered the regression equation significantly). More specifically, the intercorrelations among the three components - intensity, duration and frequency - were solid: intensity and duration $.5119$; intensity and frequency $.7485$ (Table XI). Correlations such as these could indicate that how long (duration) and how often (frequency) the intense exercise is experienced appears to

contribute to the anxiety reducing effect of how hard (intensity) one exercises.

Conclusions such as this are very speculative at this point, however. Direction and possibility of causality cannot be assumed from a correlation analysis.

The inclusion of demographics resulted in gender and age entering the stepwise equation, in steps one and two respectively. This result was also supported by the Pearson r correlations in which gender and age were found to correlate significantly with public speaking CA. Gender had the strongest correlations at .1915 (significant at .01 level) and age correlated at -.1438 (significant at .05 level). This may indicate that gender is the better predictor in public speaking CA when compared against EA components. It may also be speculated that in regard to public speaking CA, increases could be due to the potential impact on one's career and the desire of the individual to attain certain goals before retirement or death. More specifically, women seemed to have higher levels of CA than men in this context. This could be due to the proverbial "glass ceiling" that many women are trying to break through adding to a woman's anxiety level. The correlation for age indicated a negative relationship; as age increases CA decreases and vice versa. This confirms an earlier finding (Dwyer, 1995). Experience would be a plausible explanation for the reduction in CA as one ages or possibly a growing comfort with one's own identity and accomplishments. A significant deviation from linearity between public speaking and any other variable was not found.

Relating RQ4 to RQ2, both group discussion and public speaking may present more intense pressure for talk and greater attention on the speaker by more people than exists in meetings or interpersonal conversations. This increased pressure, real or

imagined, may translate into more intense fear, accounting for the intensity of exercise being the most significant predictor in these contexts. Reverberating an earlier statement, stress - be it psychological, physical, or emotional - releases certain hormones such as adrenaline. The amount of hormone released during intense exercise may more closely mirror the quantity of hormone released in public speaking as it did in group discussion. Therefore, greater intensity of exercise may allow the CA individual a better opportunity to adjust chemically and behaviorally to coping with the higher intensity of stress experienced in a CA situation. Again, this speculation is done cautiously due to the low variance accounted for and the exploratory nature of this study.

The analysis of RQ5, which asked if an individual's level of EA - as measured by the four components of intensity, frequency, duration and longevity - significantly predicts an individual's level of trait CA, partially supported the researcher's expectation. This result of intensity entering the regression equation seems to indicate once again that the intensity of exercise (whether or not to a point of perspiration or breathlessness) is a significant predictor of an individual's trait CA level. This finding was supported by the Pearson r correlation in which intensity, duration, and frequency were found to significantly correlate with trait CA. Intensity was found to have the strongest correlation at $-.1752$ (significant at $.01$ level). Duration correlated at $-.1599$ (significant at $.01$ level), and frequency at $-.1325$ (significant at $.05$ level). These results indicate that intensity, duration and frequency are negatively related to trait CA. As the intensity, duration and frequency of exercise increases, trait CA decreases and vice versa. Sach's 1982 finding may be the best explanation for this result in that the intensity of exercise has the most

fear or anxiety reducing effect. Duration and frequency may operate, as previously discussed, as supports in allowing the effect to be experienced longer and more often, thus increasing one's copeability. Again, conclusions based on the correlation analysis must be tentative at this point because causality cannot be assumed.

When demographic variables were added, age entered the stepwise equation in step two. The inclusion of age in RQ5 may relate to life stages or could be the result of a cumulative effect considering age had been significant in the interpersonal conversations and meetings contexts. In testing for deviations from linear relationships, a significant deviation from linearity between trait CA and age was found. More specifically, a highly significant deviation from linearity (.0044) was reported but the linearity result, though not significant at the .05 level, did approach significance at .0557 (Table XIV). Whatever the relationship, linear or non-linear, it can be seen through the use of a scatterplot (Appendix E). These deviations from linearity for trait CA followed the same pattern as those found in interpersonal conversations and meetings. As noted previously in discussing the conversations and meetings cases, the hill and valley nature of the deviations from linearity is difficult to interpret at this exploratory stage of research.

In regards to all stepwise regression analyses, one plausible explanation for this test not finding significance with more exercise predictors and criterion variables may be the nature of stepwise regression analysis or the type of exercise affecting CA (aerobic: running, bicycling, swimming, etc. versus anaerobic: team and racquet sports, weightlifting, etc.). The stepwise results do not negate the theorized necessity for any of the original three components, but suggest that their roles in affecting CA are very

complex. Longevity, the added component for this study, was not found to be as well correlated with intensity (.1871), frequency (.1955), and duration (.0637) as these three had with each other. These weaker intercorrelations may indicate, unlike the speculation from previous research that accounted for its inclusion, that longevity is not as necessary a component to experience the benefits of EA as intensity, frequency and duration (Dishman, 1994; Dzewaltowski, 1994). Again, conclusions must be tentative at this point. These issues are covered in more detail in the limitations section as well as the section on recommendations for future research.

Strengths of the Study

This section explores a number of strengths associated with this study. A major strength of this study is its exploratory nature. This study has opened a new area of investigation for the treatment and alleviation of CA as well as the interplay of demographics, for instance regarding the deviations in linearity that occur at various ages for interpersonal conversations, meetings, and trait CA. This will be explored more in the recommendations for future research.

Operationalization of the research questions constituted a significant strength in that the scales used to operationalize the research questions had high internal reliabilities. To measure CA, the PRCA-24 was used and the obtained internal reliability for the total score of the PRCA-24 was .95. The reliabilities of the four sub-scores of the PRCA-24 were: interpersonal conversations = .88, group = .86, meetings = .91, and public speaking

= .87. Use of this measure also increased the ability of this research to be integrated with existing research since the measure has been extensively used in previous research.

Another strength associated with the PRCA measure was that a wide range of PRCA scores was obtained from the sample. This strength led to the obtained means for the PRCA-24 in this study (see Table II) being similar to the reported norms for the PRCA-24: “total score, 65.6; interpersonal, 14.5; group, 15.4; meeting, 16.4; and public, 19.3” (Richmond & McCroskey, 1995, p. 130). This indicates that the sample used was similar to samples used in previous studies in terms of the PRCA scores.

In addition to reliabilities being high for the PRCA-24, they were also high for the EA measure. Although reliability testing is uncommon in the exercise literature when using self-report measures, it was decided to use test-retest methods to receive some idea of the reliability of the EA measure. Again, reliabilities were high. They were: frequency = .98, intensity = .98, duration = .99 and longevity = .99. Internal reliability scores of .80 or above are generally considered acceptable. The reliabilities obtained in this study were far above the .80 criterion. The measure used in this study was patterned after a measure developed by Kutala, Viljanen, Taimela & Vitasalo (1993). The measure was strengthened from ordinal to interval data, and the fourth component of longevity was added. Using this measure allowed a greater reliability than many exercise diary self-reporting measures as it enabled consistency in data collection; however, ways to further improve this measure will be discussed in limitations and recommendations.

An additional strength of this study was that a representative sample of University of Nebraska at Omaha (UNO) students was obtained. As reported in the results section,

the demographic characteristics of the subjects in this study were representative of the characteristics of the overall student enrollment at UNO. Thus, the results as reported here would be more generalizable to the student population at UNO, but less generalizable to other universities. Ways of increasing the generalizability will be discussed in limitations and recommendations.

In terms of data analysis, a significant strength was using multiple stepwise regression. The aim of this study was prediction, and stepwise regression is considered a sure path to a strong prediction equation (Tabachnick & Fidell, 1989). Also, the supplemental analyses conducted added valuable insights into understanding the associations among the predictor, demographic and criterion variables. However, like any statistical analysis approach, certain assumptions are made in regression analysis. Unfortunately, these assumptions often impose limitations which will be discussed in the next section. For instance, deviations from linearity were explored for all tested relationships to address one of the inherent limitations of stepwise regression - the assumption of linearity.

Limitations of the Study

As is the case with most research, this investigation also had some limitations. Some of these limitations may seem to contradict strengths that were just discussed; however, it is important to realize that though an aspect of a study may be a strength, the very nature of that same strength may impose a limitation. Such is the case for the measures and statistical analyses used in this investigation.

Though an improvement on many instruments used in exercise data collection, the instrument used to gather the exercise information only involved a single-item to measure each component of EA and is still classified a self-reporting measure. Nearly all research information concerning physical activity comes from self-report measures (Dishman, 1994). “Evidence for the validity of the self-reports of activity used in past studies is either weak or unreported. It is recognized that the validity of self-report methods of measuring physical activity are expected to be the least accurate for persons who are sporadically active” (Dishman, 1994, p. 1387). Inaccurate data could significantly alter the findings of this study. An implication of self-report measures, especially regarding the sporadically active, is that future research in this area should look at developing an instrument that addresses these concerns. Suggestions for addressing this limitation will be made in the recommendations for future research section. In addition, the EA scale did not include a question that would have provided data on the type of exercise one participated in - for example, aerobic (running, bicycling, or swimming) or anaerobic (weight-lifting, team sports, or racquet games). Otto (1990) and Gentle, Caves, Armstrong, Balding and Kirby (1994) found that the positive effects on self-perceptions through exercise occurred even if the physical activity was not aerobically stressful. Sachs (1982) as well as Sedlock and Duda (1994) infer in their study that in order to have an anxiety reducing effect the physical activity must be cardiovascular (aerobic) in nature. It is therefore unknown if the results of this investigation were affected by some or all subjects engaging in anaerobic exercise or if all subjects were engaging in aerobic

exercise. This weakness will be further discussed in the recommendations for future research section.

As an aside, it should be noted that the PRCA-24 would also be considered a self-report measure; however, key differences between EA and CA prevent this from being as serious a limitation as for EA: 1) the measure has been extensively studied for validity and reliability in previous research, 2) unlike the EA measure the PRCA-24 does not contain single-item scales; it contains six statements per context, and 3) the measure is assessing feelings and internal states rather than behavior only.

Another limitation of this study is in the demographic information. As reported in the results section, 87 percent of the study's sample was between the ages of 18-28. This concentration of the sample makes discussion of the role age may play in the CA/EA relationship difficult to apply to younger and older people. Even the deviations in linearity are more difficult to interpret due to the high concentration of subjects in the 18-28 age range. Also, because the sample consisted exclusively of undergraduate students at UNO, generalizability to a greater population or even another University is hindered. The homogenous nature of the sample could be one factor contributing to the low variances accounted for. This limitation is discussed further in the recommendations for future research section.

Limitations in terms of data analysis involve both stepwise regression and Pearson r correlations. Both of these tests assume linearity and emphasize the use of quantitative statistical criteria. Minor differences such as the addition or deletion of a variable, can have a profound effect on the apparent importance of a predictor variable (Tabachnick &

Fidell, 1989). This effect can be seen through the Pearson r correlations where, for instance, the frequency component of EA as shown by the Pearson r analysis correlated with three of the five criterion variables, but less strongly than intensity or duration and therefore did not enter into the stepwise equations. Also, because all data were used to develop the predictive model, a cross-validation was not performed to check if the predictive model was “successful.”

An unknown limitation may be the time of year this study was conducted which was early spring and summer (April - June). It is conceivable that people exercise more when the weather is warmer. Ways to address this limitation will be presented in the future research section.

Finally, the most significant limitation of this study must be considered the low variance accounted for by the predictor variables. No predictor variable accounted for more than three percent of the variance. Although several results were statistically significant, the practical significance with such a small variance explained is minimal. As mentioned intermittently in the discussion of each research question, this small amount of explained variance calls into question the “stability” of relationships and makes them more difficult to interpret.

Recommendations for Future Research

This section addresses areas for future research. One implication of this study for future research is to develop a reliable and valid instrument to assess the exercise habits of the population being studied. This is necessary to address the limitations of self-report

measures of exercise as well as the fact that an exercise program could feasibly change yearly, monthly, weekly, or even daily. As mentioned in the limitations section, the PRCA-24 is also a self-report measure but has been extensively studied in terms of validity and reliability. It also focuses more on internal states than the EA measure.

One possible way to accomplish the collection of more valid and reliable EA data would be through an experimental field study. A field study could incorporate more objective measures for EA, such as taking a physiological measure of stress. Additional questions could address type of physical activity (aerobic vs. anaerobic), gender and life situations such as marital status. More objective reporting of exercise could be obtained by using a pedometer or device on the arm that monitors limb movement. Research assistants could be employed to monitor and record the exercise activity of each individual subject as well as to conduct in-depth interviews as needed. All these steps would address the limitations of self-reporting, not knowing the nature of the physical activity (aerobic or anaerobic), as well as gender and life situations. An experimental field study would also improve upon the current study by incorporating test and control groups. Both groups would initially consist of non-exercisers at the pre-test stage (where an EA and CA measure would be given). Subsequent to the pre-test the sample would be divided randomly into an exercise (test) and nonexercise (control) group. These two groups would then be post-tested at mid-way through a pre-set exercise program of at least 16 weeks as well as at the end of the program to further address any associations among longevity and CA scores. This pre, mid and post-test approach with a test and control group could provide valuable information concerning the effect of exercise on CA

and whether or not the effect increases, decreases or plateaus over time thus addressing any role of longevity. Segregating the data analysis further by gender should also lead to more information regarding the sex factor.

It is recommended that careful consideration be given to obtaining a wide age span for any future research. This wide age span would enable further investigation into the deviations from linearity reported earlier. It is in this area that using the qualitative method of in-depth interviewing may give the most valuable insight into what is occurring in these people's lives that may or may not be causing an increase in CA level. Also, incorporating individuals from the general population would increase generalizability of the findings. Coupled with a wider age span, incorporating people from the general population should address the homogeneous nature of the current study and ensure a more heterogeneous mix.

Using the above proposed model, this study could be carried out at opposing times of the year to address the question as to whether exercise habits change from season to season. Also, retesting three to six months after the study is completed could address the question as to whether exercise benefits have lasting effects on CA, especially regarding those who may have ceased exercising at the study's end.

To verify the success of the predictive model, one possibility in replicating this study in future research is for one-third of the sample to be used to derive the predictive model, and two-thirds of the sample be used for cross-validation purposes. Saving two-thirds of the data for cross-validation purposes would enable a majority of the data to be used for checking the successfulness of the predictive model. "At the very least, separate

analyses of two halves of any available sample should be conducted, with conclusions limited to results that are consistent for both analyses (Tabachnick & Fidell, 1989; p. 147).”

Finally, it is also recommended that further investigations take into account the role of other factors such as self-efficacy, self-esteem, and self-confidence. Studies have shown a clear relationship between these factors and both CA and EA (Courneya & McAuley, 1994; Dishman, 1994b; Dzewaltowski, 1994; Ellis, 1995; McCroskey, Richmond, Daly & Falcione, 1977). This recommendation is made primarily due to the low variance accounted for by the EA components. This low explained variance may be a strong indicator that several factors are at work in complex ways in affecting a person’s level of CA. Therefore, the best treatment program to alleviate this fear and anxiety could be to incorporate several factors holistically. It is highly reasonable that a multi-dimensional approach to reducing CA, that includes exercise as one aspect, would and could be the most effective treatment for CA sufferers.

REFERENCES

- Ayers , J. & Hopf, T. (1993). *Coping with Speech Anxiety*. Norwood, New Jersey: Ablex Publishing Corporation.
- Biggers, Thompson & Masterson, John L. (1984). Communication apprehension as a personality trait: An emotional defense of concept. *Communication Monographs*, 51, 381-390.
- Boohar, R. & Seiler, W. (1982). Speech communication anxiety: An impediment to academic achievement in the University classroom. *Journal of Classroom Interaction*, 18, 23-27.
- Booth-Butterfield, Melanie & Booth-Butterfield, Steve (1992). Communication apprehension and avoidance in the classroom. Edina, MN: Burgess Publishing.
- Bruskin Associates (1973). What are Americans afraid of? The Bruskin Report, no. 53.
- Buss, A. H. (1984). A conception of shyness, In J. A. Daly, & J. C. McCroskey (Eds.), *Avoiding communication: Shyness, reticence, and CA*. Beverly Hills, CA: Sage.
- Colby, Noelle; Hopf, Tim & Ayres, Joe, (1993). Nice to meet you? Inter/Intrapersonal perceptions of CA in initial interactions. *Communication Quarterly*, 41, (2), 221-230.
- Courneya, Kerry S. & McAuley, Edward, (1994). Are there different determinants of the frequency, intensity, and duration of physical activity? *Behavioral Medicine*, 20, (2), 84-90.
- Daly, John A., & Leth, S. (1976). Communication apprehension and the personnel selection decision. Paper presented to the International Communication Association Convention, Portland, OR.
- Daly, John A., & McCroskey, James C., (Eds.). (1984). *Avoiding Communication: Shyness, reticence, and CA*. Beverly Hills, CA: Sage.
- Daly, John A. & Stafford, S (1984). Correlates and consequences of social-communicative anxiety. In J.A. Daly & J. C. McCroskey. (Eds.), *Avoiding Communication: Shyness, reticence, and CA*. Beverly Hills, CA: Sage.
- Dishman, Rodney K., (1994). The measurement conundrum in exercise adherence research. *Medicine and Science in Sports and Exercise*, 26 (11), 1382-1390
- Dishman, Rodney K.,(1994b). Prescribing exercise intensity for healthy adults using perceived exertion. *Medicine and Science in Sports and Exercise*, 1087-1094.

- Dishman, Rodney K., (1994c). Motivating older adults to exercise. *Southern Medical Journal*, 87, (5), 79-82.
- Dwyer, Karen Kangas, (1995). Communication Apprehension and individual learning style preference: correlations and dimensions. *A dissertation*.
- Dzewaltowski, David A., (1994). Physical activity determinants: A social cognitive approach. *Medicine and Science in Sports and Exercise*, 26, (11),1395-1399.
- Ellis, Kathleen, (1995). Apprehension, self-perceived competency, and teacher immediacy in the laboratory-supported public speaking course: Trends and relationships. *Communication Education*, 44, 64-78.
- Freimuth, Vicki S., (1976). The effects of CA on communication effectiveness. *Human Communication Research*, 2, 289-298.
- Hackman, Michael Z. & Barthel-Hackman, Tammy A., (1993). Communication apprehension, willingness to communicate, and sense of humor: United States and New Zealand perspectives. *Communication Quarterly*, 41, (3), 282-291.
- Gentle, Peter; Caves, Richard; Armstrong, Neil; Balding, John & Kirby, Brian, (1994). High and low exercisers among 14 and 15 year old children. *Journal of Public Health Medicine*, 16, (2), 186-94.
- Godin, Gaston, (1994) .Theories of reasoned action and planned behavior: Usefulness for exercise promotion. *Medicine and Science in Sports and Exercise*, 26, (11),1391-1394.
- Littlejohn, Stephen, W., (1989). *Theories of Human Communication*, 3rd ed. (p. 83) Belmont, CA: Wadsworth.
- McCroskey, J., (1970). Measures of communication-bound anxiety. *Speech Monographs*, 37, 269-277.
- McCroskey, J., (1977). Oral CA: A summary of recent theory and research. *Human Communication Research*, 4, 78-96.
- McCroskey, J., (1982). Oral CA: A reconceptualization. *Communication Yearbook*, 6, 136-170.
- McCroskey, J., (1992). Reliability and validity of the willingness to communicate scale. *Communication Quarterly*, 40, (1), 16-25.

- McCroskey, J.; Beatty, Michael J.; Kearney, Patricia & Plax, Timothy G., (1985). The content validity of the PRCA-24 as a measure of communication apprehension across communication contexts. *Communication Quarterly*, 33, (3), 165-173.
- McCroskey, J.; Richmond, Virginia P.; Daly, John A.; & Falcione, Raymond L., (1977). Studies of the relationship between CA and self-esteem. *Human Communication Research*, 3, 269-277.
- McGuire, John; Stauble, Cherise; Abbott, David & Fisher, Randy, (1995). Ethical Issues in the Treatment of CA: A survey of communication professionals. *Communication Education*, 44, 98-109.
- Olaniran, Bolanle A. & Roach, David, (1994). CA and classroom apprehension in Nigerian classrooms. *Communication Quarterly*, 42, (4), 379-389.
- Otto, Jurgen., (1990). The effects of physical exercise on psychophysiological reactions under stress. *Cognition and Emotion*, 4, 341-357.
- Phillips, Gerald M. (1968). Reticence: Pathology of the normal speaker. *Speech Monographs*, 35, 39-49.
- Prisbell, Marshall (1982). Heterosocial communicative behavior and communication apprehension. *Communication Quarterly*, 30, 251-258.
- Reno, Raymond R. & Kenny, David A., (1992). Effects of self-consciousness and social anxiety on self-disclosure among unacquainted individuals: An application of the social relations model. *Journal of Personality*, 60 (1), 79-94.
- Richmond, Virginia P. (1984). Implication of quietness. In J.A. Daly & J. C. McCroskey. (Eds.), *Avoiding Communication: Shyness, reticence, and CA*. Beverly Hills, CA: Sage.
- Richmond, Virginia P. & McCroskey, James C., (1995). *Communication: Apprehension, avoidance, and effectiveness*. Scottsdale, AZ: Gorsuch Scarisbrick.
- Rosenfeld, Lawrence B.; Grant, Charles H. III; & McCroskey, James C.,(1995). Communication apprehension and self-perceived communication competence of academically gifted students. *Communication Education*, 44, 79-86.
- Rutherford, William, J.; Corbin, Charles B. & Chase, Lisa A., (1992). Factors influencing intrinsic motivation towards physical activity. *Health Values*, 16, (5), p. 19-23.
- Sachs, Michael L., (1982). Exercise and running: Effects on anxiety, depression, and psychology. *Humanistic Education and Development*, 21, 51-57.

Schwartz, Sandra G.; Kaloupek, & Danny G., (1987). Acute exercise combines with imaginal exposure as a technique for anxiety reduction. *Canadian Journal of Behavioral Science*, 19, (2), 151-166.

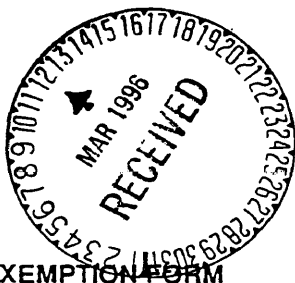
Sedlock, Darlene A. & Duda, Joan L., (1994). The effect of trait anxiety and fitness level on heart rate and state anxiety responses to a mental arithmetic stressor among college-age women. *International Journal of Sport Psychology*, 25, 218-229.

Slone, J. & Slane, S. (1990). Personality correlates of anxiety about public speaking. *Psychological Reports*, 67, 515-522.

Stephens T. & Craig C. (1990). *The Well-Being of Canadians: Highlights of the 1988 Campbell's Survey*. Ottawa: Canadian Fitness and Lifestyle Research Institute.

Tabachnick, Barbara G. & Fidell, Linda S. (1989). *Using Multivariate Statistics: Second Edition*. New York: Harper & Row

Appendix A
IRB Request and Approval



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IRB# 121-96EX

EXEMPTION FORM

SECTION I: APPLICATION DATA

TITLE OF RESEARCH PROPOSAL: COMMUNICATION APPREHENSION & EXERCISE ADHERENCE: AN EXPLORATORY STUDY

STARTING DATE: APRIL-- as soon as possible

PRINCIPAL INVESTIGATOR: JANETTE THOMAS CARR

SECONDARY INVESTIGATOR(S): N/A

DEPARTMENT/COLLEGE: COMMUNICATION DEPARTMENT

(home address: 12967 MEREDITH AVE. OMAHA, NE. 68164)
ADDRESS: ARTS & SCIENCES HALL, UNO ZIP CODE: 68102

TELEPHONE: (402) 498-8372

SECTION 2: CERTIFICATION

CERTIFICATION OF PRINCIPAL INVESTIGATOR: Signature certifies that the research project as described will be conducted in full compliance with University of Nebraska Regulations governing human subject research as stated in the IRB Guidelines for the Protection of Human Subjects. It is understood that the IRB will be notified of any proposed changes which may affect the exempt status of the research.

Signature of Principal Investigator: Janette Carr
Date: 3-11-96

Position: Student and M.A. candidate

ADVISOR APPROVAL: Student investigators are required to obtain approval from their advisor. Signature of approval certifies the research proposal has been approved and recommended for submission to the IRB.

Signature of Advisor: Randall A. Rose
Date: 3/12/96

Printed Name of Advisor: Randall A. Rose

The IRB requires submission of an original and one (1) copy of the Exemption Form.

Page 2 Exemption Form for Janette Carr

Research Proposal Title: Communication Apprehension and Exercise Adherence: An Exploratory Study

Section 3: Review Information

I. PURPOSE OF THE STUDY. The purpose of this study is to explore exercise adherence as a treatment method for communication apprehension.

II. CHARACTERISTICS OF THE SUBJECT POPULATION.

- a. AGE RANGE. The age range of the subjects will include the normal age range for students attending the University of Nebraska at Omaha.
- b. SEX. Subjects will include both males and females.
- c. NUMBER. The number of subjects who will participate in the study is estimated to be 300.
- d. SELECTION CRITERIA. The subjects will be a sample of students enrolled in introductory communication (excluding speech) and health courses. (Introductory psychology and sociology classes will be used also if necessary).

III. METHOD OF SUBJECT SELECTION.

Selection will be based upon faculty willingness to participate. Students in the selected classes will be invited to participate in a communication study that will be investigating exercise activities and feelings about communication.

IV. STUDY SITE. The study site will be the classrooms at the University of Nebraska at Omaha campus.

V. DESCRIPTION OF PROCEDURES. Instructors will read a script that invites students to complete a questionnaire packet. The packet contains a letter to the student with written instructions. See attached questionnaire packet.

VI. CONFIDENTIALITY. Students will be instructed NOT to write their name on the questionnaires. An identification number will be assigned for test-retest purposes. The number to be used will be the student identification number. Students will be informed that their identification number is for statistical analysis purposes only. The data from the questionnaires will be entered directly into the computer.

VII. INFORMED CONSENT. This study will NOT require informed consent because students can choose to participate or not participate, and all answers will be kept confidential.

VIII. JUSTIFICATION OF EXEMPTION. See section 4, page 3.



Institutional Review Board
For the Protection of
Human Subjects

University of Nebraska Medical Center
Eppley Science Hall 3018
600 South 42nd Street
Box 986810
Omaha, NE 68198-6810
(402) 559-6463
Fax (402) 559-7845

March 15, 1996

Janette Thomas Carr
12967 Meredith Avenue
Omaha, NE 68164

IRB #: 121-96-EX

TITLE OF PROTOCOL: Communication Apprehension and Exercise Adherence: An Exploratory Study

Dear Ms. Carr:

The IRB has reviewed your Exemption Form for the above-titled research project. According to the information provided, this project is exempt under 45 CFR 46:101b, category 3. You are therefore authorized to begin the research.

It is understood this project will be conducted in full accordance with all applicable sections of the IRB Guidelines. It is also understood that the IRB will be immediately notified of any proposed changes that may affect the exempt status of your research project.

Sincerely,



Ernest D. Prentice, PhD
Vice Chairman, IRB

EDP:jljg

Appendix B
Faculty Letter



College of Arts and Sciences
Department of Communication
Omaha, Nebraska 68182-0112
(402) 554-2600
Broadcasting (402) 554-2520
Journalism (402) 554-2520
Speech (402) 554-2600

April 1, 1996

Dear Faculty Member:

I am a UNO graduate student seeking my Master of Arts in Communication. I am preparing a research study to complete work for my thesis and need your help. To complete the study I need to survey UNO students enrolled in introductory communication, psychology, sociology, health and physical education courses during the 1996 spring semester.

The study will investigate whether there is a relationship between exercise adherence (consistently engaging in physical activity) and communication apprehension. Communication apprehension is a trait-like anxiety that has been shown to have detrimental effects on a sufferers' personal and professional life. This study will attempt to expand treatment options for those suffering from this condition.

Participation will require a one time commitment where two measuring scales will be completed by each participant. The entire process, with directions, requires approximately 10 minutes.

If you are willing to allow me to survey your class, please contact me as soon as possible at (402) 498-8372. My goal is to complete all surveys by mid-April.

Thank you for your time and consideration of this matter. Your prompt response is greatly appreciated.

Respectfully,

Janette Carr
UNO graduate student

Appendix C
Questionnaire Packet



College of Arts and Sciences
Department of Communication
Omaha, Nebraska 68182-0112
(402) 554-2600
Broadcasting (402) 554-2520
Journalism (402) 554-2520
Speech (402) 554-2600

April 1996

Dear UNO Student:

I am a UNO graduate student nearing the completion of my Master's degree in communication. I am collecting data for my thesis which is investigating exercise activities and feelings about communication. I appreciate your help by taking part in this study. The questionnaires you are about to complete should only take 10 minutes. You will find an answer sheet attached to the last questionnaire, use this sheet to record your responses to this questionnaire only.

Please take your time and respond to each item in an honest fashion. Only identify yourself by your student number. Names are unnecessary. Your answers will be totally confidential. Your student number is necessary for statistical analysis purposes only.

Thank you very much for your time and cooperation.

Sincerely,

Janette Carr
UNO graduate student

Identification number: _____

DIRECTIONS: Please complete the following background questions in the spaces provided as it applies to you.

1. GENDER _____ Male
 _____ Female

2. AGE _____ years old
(write in current age)

3. Have you previously taken or are you currently enrolled in a college level public speaking class? _____ yes _____ no

DIRECTIONS: Please complete the following regarding exercise in the spaces provided as it applies to you.

1. How many times per week do you exercise to the point of perspiration or breathlessness?
_____ (0-7 days per week)

2. How many times per week do you participate in physical exercise?
_____ (0-7 days per week)

3. What is the average duration of your typical physical exercise session? (do not include time used for clothing, washing, or traveling to training place)
_____ (specify in minutes)

4. How long have you maintained the exercise program summarized in your answers to the first three questions above?
_____ (specify days, weeks, months, years)

USE THE ATTACHED ANSWER SHEET FOR THIS QUESTIONNAIRE ONLY

DIRECTIONS: This instrument is composed of 24 statements concerning your feelings about communication with other people. Please indicate on the attached answer sheet the degree to which each statement applies to you by marking the corresponding number for whether you (1) strongly agree, (2) agree, (3) are undecided, (4) disagree, or (5) strongly disagree with each statement. There are no right or wrong answers. Many of the statements are similar to other statements. Do not be concerned about this. Work quickly, just record your first impression.

1. I dislike participating in group discussions.
2. Generally, I am comfortable while participating in group discussions.
3. I am tense and nervous while participating in group discussions.
4. I like to get involved in group discussions.
5. Engaging in a group discussion with new people makes me tense and nervous.
6. I am calm and relaxed while participating in group discussions.
7. Generally, I am nervous when I have to participate in meetings.
8. Usually I am calm and relaxed while participating in meetings.
9. I am very calm and relaxed when I am called upon to express an opinion at a meeting.
10. I am afraid to express myself at meetings.
11. Communicating at meetings usually makes me uncomfortable.
12. I am very relaxed when answering questions at a meeting.
13. While participating in a conversation with a new acquaintance, I feel very nervous.
14. I have no fear of speaking up in conversations.
15. Ordinarily I am very tense and nervous in conversations.
16. Ordinarily I am very calm and relaxed in conversations.
17. While conversing with a new acquaintance, I feel very relaxed.
18. I'm afraid to speak up in conversations.
19. I have no fear of giving a speech.
20. Certain parts of my body feel very tense and rigid while giving a speech.
21. I feel relaxed while giving a speech.
22. My thoughts become confused and jumbled when I am giving a speech.
23. I face the prospect of giving a speech with confidence.
24. While giving a speech, I get so nervous I forget facts I really know.

Appendix D

Factor Analysis PRCA-24

Four Factor Orthogonal Varimax Rotation Factor Analysis of
Personal Report of Communication Apprehension (PRCA-24; McCroskey)

Factor Loadings				
	Factor 1 (Inter. Conv.)	Factor 2 (Grp. Disc.)	Factor 3 (Meetings)	Factor 4 (Pub. Spkg.)
Q1	.10127	.21283	.15107	.68730
Q2	.28739	.22095	.18328	.73780
Q3	.32994	.40037	.25347	.44285
Q4	.09970	.20579	.18862	.78907
Q5	.35800	.36437	.35829	.32243
Q6	.27634	.49563	.19374	.52277
Q7	.23151	.71154	.29883	.17486
Q8	.27256	.74857	.25607	.26031
Q9	.18874	.74418	.25356	.22532
Q10	.34852	.47989	.20982	.43845
Q11	.35341	.61148	.25205	.35815
Q12	.24730	.73516	.24832	.19917
Q13	.66616	.22721	.21462	-.02203
Q14	.56219	.22993	.28448	.34463
Q15	.79861	.19927	.04948	.28260
Q16	.75693	.21387	.12889	.26971
Q17	.73029	.24165	.27659	-.01551
Q18	.66061	.18705	.16024	.41385
Q19	.16253	.29300	.70742	.21771
Q20	.11172	.18727	.69622	.02374
Q21	.10800	.32242	.75341	.18228
Q22	.17389	.13105	.72880	.11094
Q23	.12296	.17611	.66761	.27487
Q24	.31729	.14129	.68692	.18316

Appendix E

Scatterplots

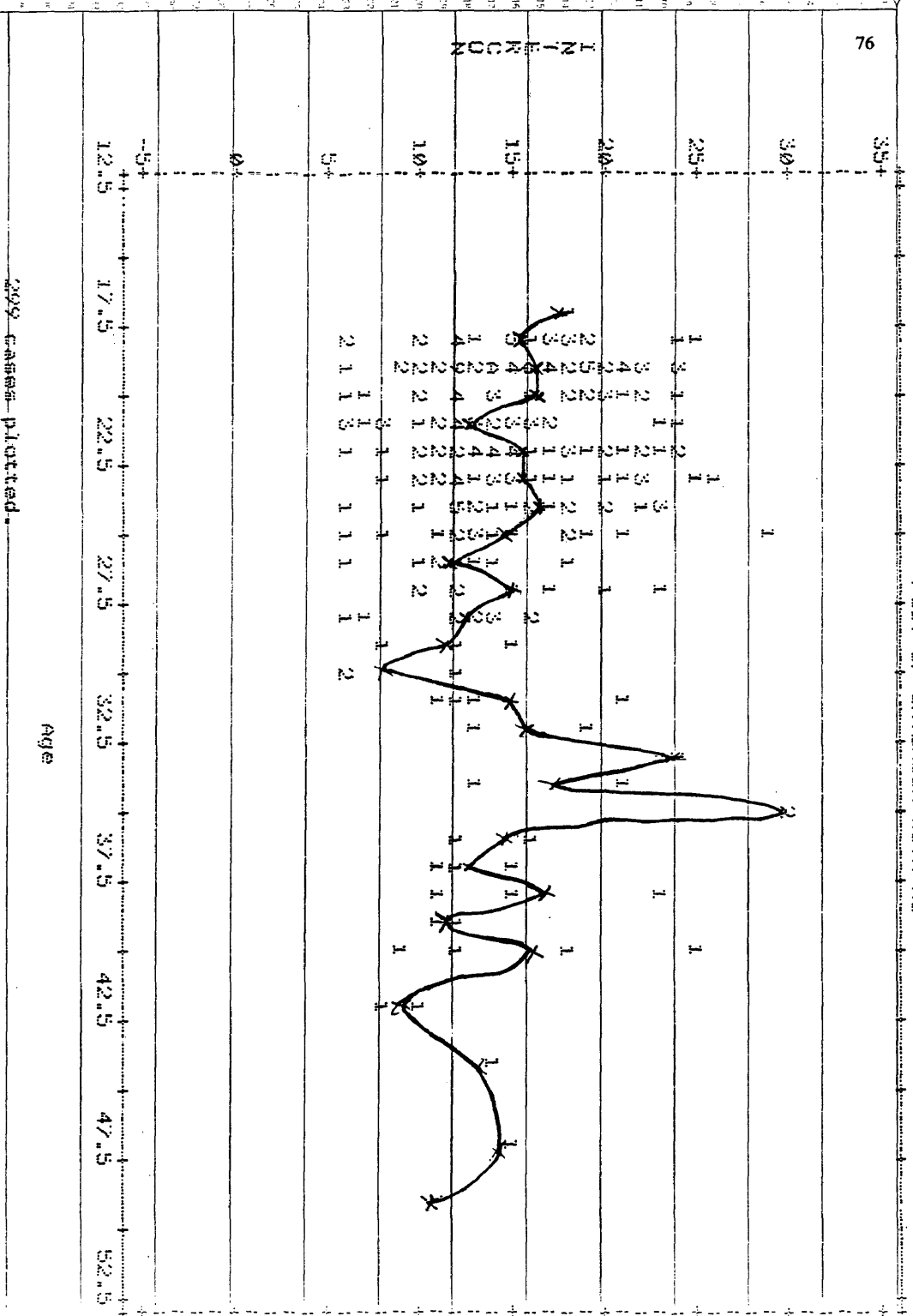
24-Oct-96
12:57:11

Scarf for Janette Carr
SP95 VAX/VMS UNO

ON ZEUS: :

VMS V5.5

PLOT OF INTRCON WITH NS



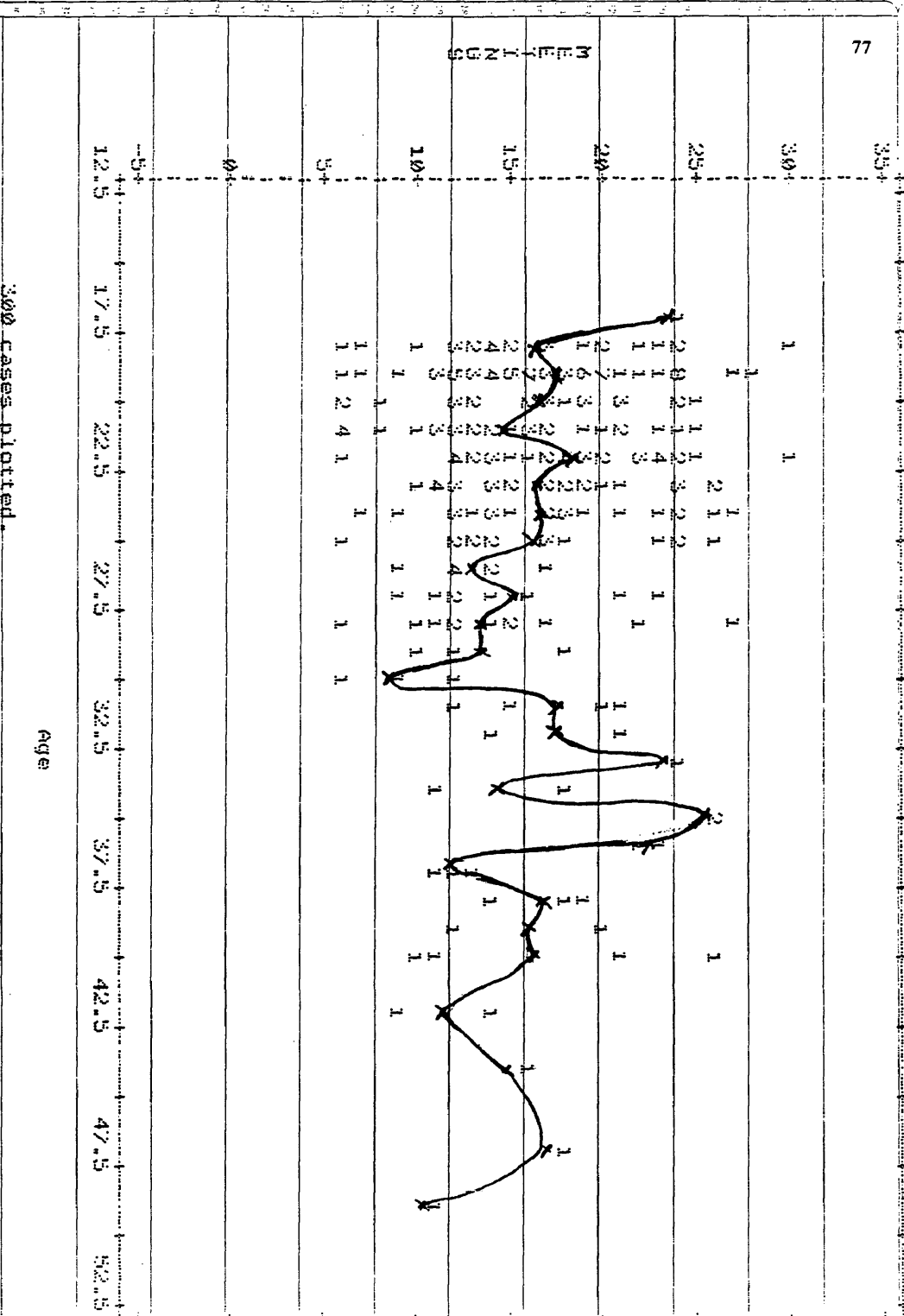
24-Oct-96
12:57:10

Stuff for Japette Carr
SPSS VAX/VMS UNO

ON ZEUS::

ONS 05.5

PILOT OF MEETINGS WITH NS



300 cases plotted.

Age

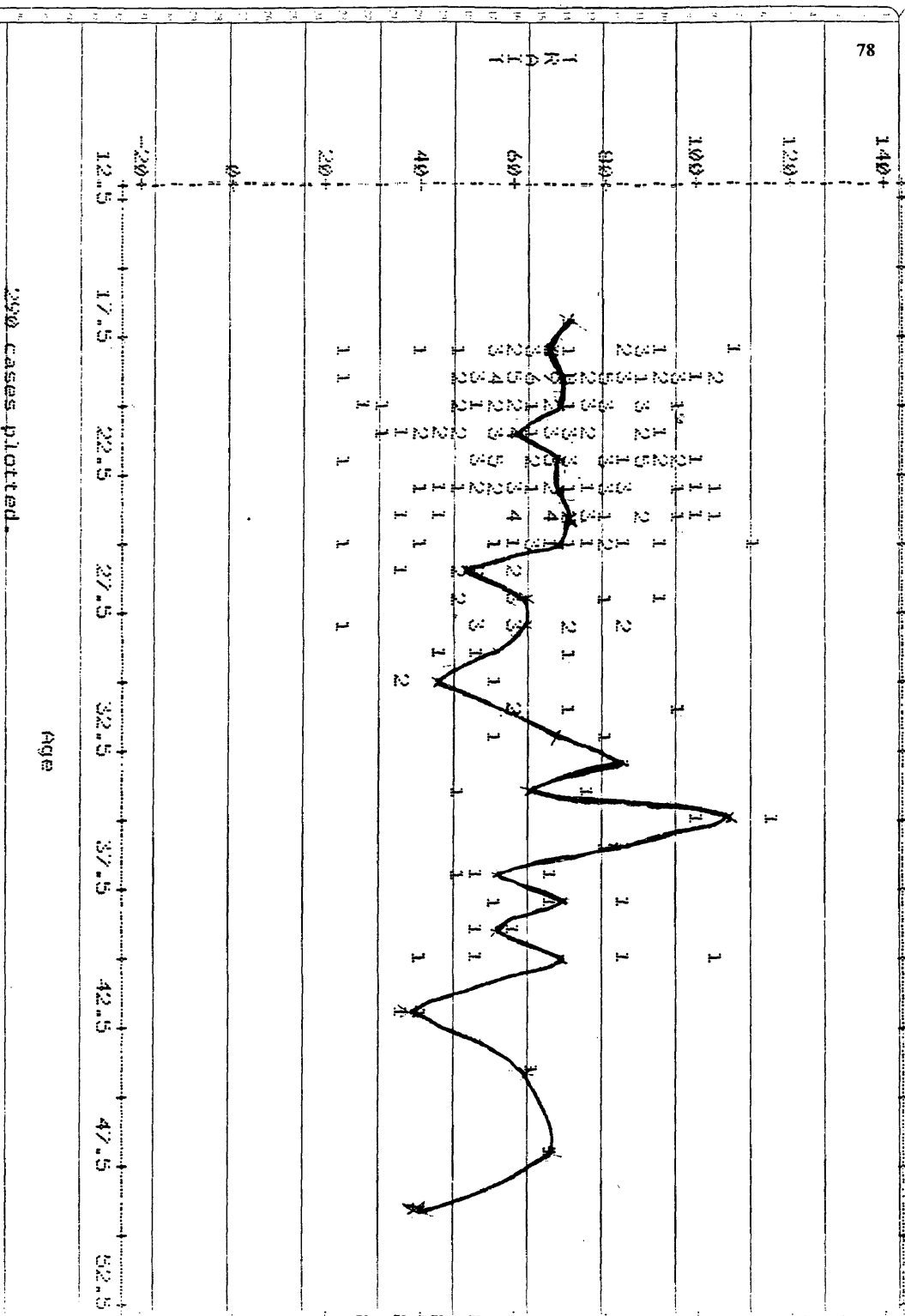
24-Oct-96
12:57:14

Stuff for Janette Carr
SPSS VAX/VMS UNO

ON ZEUS::

VMS 05.5

PLOT OF TRAIT WITH NS



250 cases plotted.