2002

The therpaeutic value of recreational hand activities for older adults

Linda M. Simon
San Jose State University

Follow this and additional works at: https://scholarworks.sjsu.edu/etd_theses

Recommended Citation

Simon, Linda M., "The therpaeutic value of recreational hand activities for older adults" (2002). *Master's Theses*. 2296.

DOI: <https://doi.org/10.31979/etd.bx8y-6wbw>
https://scholarworks.sjsu.edu/etd_theses/2296

This Thesis is brought to you for free and open access by the Master's Theses and Graduate Research at SJSU ScholarWorks. It has been accepted for inclusion in Master's Theses by an authorized administrator of SJSU ScholarWorks. For more information, please contact scholarworks@sjsu.edu.

INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

**ProQuest Information and Learning
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA
800-521-0600**

UMI[®]

**THE THERAPEUTIC VALUE OF RECREATIONAL
HAND ACTIVITIES FOR OLDER ADULTS**

A Thesis

Presented to

The Faculty of the Department of Recreation and Leisure Studies

San Jose State University

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

By

Linda M. Simon

May 2002

UMI Number: 1408813

**Copyright 2002 by
Simon, Linda Marie**

All rights reserved.

UMI[®]

UMI Microform 1408813

**Copyright 2002 by ProQuest Information and Learning Company.
All rights reserved. This microform edition is protected against
unauthorized copying under Title 17, United States Code.**

**ProQuest Information and Learning Company
300 North Zeeb Road
P.O. Box 1346
Ann Arbor, MI 48106-1346**

© 2002

Linda Marie Simon

ALL RIGHTS RESERVED

**APPROVED FOR THE DEPARTMENT OF
RECREATION AND LEISURE STUDIES**

**Dr. Maureen Glancy, Professor of Recreation and
Hospitality Management, Graduate Coordinator,
Committee Chairperson**

**Dr. Gonzaga da gama, Assistant Professor and
Therapeutic Recreation Coordinator**

**Dr. Stan Butler, Associate Professor, Department of
Human Performance**

APPROVED FOR THE UNIVERSITY

ABSTRACT

THE THERAPEUTIC VALUE OF RECREATIONAL HAND ACTIVITIES FOR OLDER ADULTS

By Linda M. Simon

This thesis addresses the topic of benefits of recreational hand activities for older adults. It examines the various types of hand activities for recreational use as a therapeutic modality for assisting older adults with hand deficits.

Research on this subject reveals that recreational hand activities are efficacious for older adults in producing improvement in hand condition and state-of-mind. Subjects in the experimental group test scores validated the findings. Findings related to optimal experience gave evidence that subjects in this study experienced an elevated level of enjoyment while engaged in the therapeutic activities. Use of the Thera-Rod© created by the researcher for implementing exercises, along with arts and crafts activities, are recommended for practitioners in the field of therapeutic recreation.

Acknowledgments

I would like to give my most grateful appreciation to my family, friends and faculty. They were very instrumental in the production of this thesis. Each individual in these three components performed their roles, in a most effective manner.

I thank my husband Tony for the help he has been through this whole educational process both undergraduate and graduate school. Many nights he could be found transporting me to and from classes. Bearing with me during long hours of homework, late nights on the computer and late nights in the library.

Many thanks to my family and close friends. To my daughter Tonisha and son Marcel, thank you both for being understanding when dinner was not made. A special thanks to you Tonisha for assisting me in various areas of my educational pursuits. Your willingness to assist my classroom and with classroom duties allowed me to step away from my educational profession to perform my work as a graduate student. Your help in guiding me to sources to obtain needed data for my statistical operations has been most appreciated. Your and Grandma's (my mother-in-law, Clay Etta Simon) sweet smiles, cheers, prayers and encouragement along the way were the therapies I needed to endure this thesis process. To our best friends Ron and Robin Aaron, thank you for your support both in words and in deeds.

I thank my committee members, Dr. Maureen Glancy for the part she played as advisor, and Dr. Gonzaga da gama and Dr. Stan Butler for their guidance through this process. I would also like to thank Dr. Charles Whitcomb, Department Chairperson, for being accessible during this thesis procedure.

TABLE OF CONTENTS

	Page
Chapter I. Overview.....	1
Hand Anatomy.....	1
Older Adults and Recreational Hand Activities.....	2
Self-efficacy.....	3
Control.....	3
Research Design.....	4
Research Question.....	4
Scope.....	4
Assumptions.....	5
Delimitations.....	5
Limitations of the Study.....	6
Sample Size.....	6
Incomplete Data.....	6
Lack of Information on Questionnaire.....	7
Room Availability.....	7
Lack of Male Subjects.....	7
Operational Definitions.....	8
Summary.....	8
Chapter II. Review of Literature	10
Hand Deficits and Hand Therapy.....	11

Arthritis.....	11
Hand Activities as Therapy for Arthritis.....	12
Stroke.....	13
Deformity Prevention After Stroke.....	14
Recreational Hand Activities Used for Biomechanical Benefits.....	14
Hand Strengthening Activities.....	15
Exercise with Weights.....	15
Therapeutic Domestic Activities.....	16
Art as Therapy.....	16
The Mental Benefits of Recreational Hand Activities.....	17
Valued by Recreational Therapists.....	18
The Mental Therapy of Flow.....	19
Activities Induce a Sense of Control.....	20
Well-being.....	21
Self-efficacy.....	23
Medical Devices for Hand Therapy.....	24
Thermal Agents.....	24
Transcutaneous Electrical Nerve Stimulation (TENS).....	24
Transdermal Drug Delivery Methods.....	24
Conceptual Framework.....	25
Summary.....	26

Chapter III. Methodology.....	28
Research Design.....	28
Sample.....	28
Subjects.....	29
Setting.....	29
Description of the Intervention.....	29
Instrumentation.....	31
The Thera-Rod©.....	32
Validity and Reliability.....	32
Data Collection Procedure.....	33
Pre-test Administration.....	34
Post-test Administration.....	34
Data Analysis.....	34
Data Coding.....	34
Statistical Analysis Procedures.....	35
Sample Description.....	35
Hand Condition Analysis.....	35
State-of-Mind Analysis.....	35
Optimal Experience Analysis.....	36
Summary.....	36
Chapter VI. Results.....	37
Data Handling Procedures.....	37

Description of Study Groups.....	37
Hand Therapy Results.....	41
t-Test Analyses.....	41
State-of-Mind Results.....	42
Correlation Analysis.....	43
Optimal Experience Analysis.....	44
Summary.....	46
Chapter V. Discussion and Conclusion.....	47
Discussion.....	47
Hand-Therapy.....	47
Mind Condition.....	48
Efficacy of Recreational Hand Activities.....	48
Optimal Experience in Recreational Hand Activities.....	48
The Thera-Rod© as a Recreational Therapy Tool.....	49
Implications for Practice.....	49
Recommendations for Future Research.....	50
Summary.....	50
Conclusion.....	51
REFERENCES.....	52

APPENDICES.....	60
Appendix A - Consent Form.....	60
Appendix B - Recreational Hand Craft Activities.....	62
Appendix C -Thera-Rod© Exercise Program.....	63
Appendix D - Thera-Rod© Exercise Procedures.....	64
Appendix E - Questionnaire.....	67
Appendix F - Experimental and Control Groups Demographics Results.....	68
Appendix G - Experimental Group Score Results from Questionnaires.....	69
Appendix H - Control Group Score Results from Questionnaires.....	70
Appendix I - Difference in Pre-test and Post-test Scores.....	71

CHAPTER I

Overview

The elderly population today includes more than 25 million people living in the United States. This older-adult population, 65 years of age or older, comprises 12 percent of the United States population. The oldest-old are those who are at least 85 years of age. This group is the fastest growing population in the United States (Cooper, 1993). The baby boomers, those people who were born between 1946 and 1964, are soon to become the younger senior age group. The population growth of this age group indicates a need for activities that will assist the elderly in acquiring a true quality of life. Cooper (1993) affirmed that recreational hand activities can be a therapeutically beneficial treatment for degenerative hand diseases experienced by the elderly population. They may also aid in effectively responding to the anticipated senior population boom.

Hand Anatomy

The anatomy of the hand is created to carry out a variety of complex activities or tasks. The bony structure is shaped in conjunction with the soft tissues which contribute to complex kinesiology of the hand. Malfunction of any of the hand's structures can alter the overall function of the hand complicating therapeutic management (Moran, 1989).

The structure of the hand changes through life. However, its basic structure remains the same. The fingers, consisting of the carpometacarpal joints, metacarpophalangeal joints, and the proximal interphalangeal joints are usually affected in rheumatoid arthritis. The ligaments of these joints support and stabilize the hand. The volar plate, a fibrocartilaginous structure, is an attachment for ligaments. It is a confining

structure for synovial fluid (Moran, 1989). During older adulthood, the synovial fluid, which keeps the joints lubricated, is slowly depleted. Osteoarthritis is characterized by deterioration and abrasion of connected cartilage (Teague & MacNeil, 1997). The combination of intrinsic and extrinsic muscular structures are achieved by hand movement (Moran, 1989). About the fourth decade of life, the body may undergo progressive decrease in fibers and fiber bulk in muscles. The body becomes weaker and less flexible. However, strength training to maintain muscle capacity and endurance, along with weight-bearing activities and calcium supplements, can assist in preventing osteoporosis. Stretching and flexibility exercises can prevent deterioration of connective tissues in joints (Teague & MacNeil, 1997).

As people age, they tend to lose muscle mass and bone density. Muscles assist in supplying the elderly with strength to perform a task or an activity. Older Adults often suffer from the pain of arthritis, osteoarthritis, and other degenerative diseases that affect the hands. The hands are needed to perform many different activities for daily living. Using recreational hand activities for the elderly can assist in rehabilitating the muscles and bones. This will delay the various diseases and disabilities that accompany aging.

Older Adults and Recreational Hand Activities

The older adult population can benefit from recreational hand activities not only physically, but also mentally. Mental enhancement can be acquired by learning psychomotor tasks. According to Neistadt (1994), tasks or activities are involved in analyzing information along with response generation and feedback. Five strategies are used: (1) readying or relaxing and attending, (2) imaging or picturing oneself performing

or executing the task or activity, (3) concentrating or focusing on one relevant feature of the situation to avoid distractions, (4) performing or executing the task or activity, and (5) evaluating or using feedback that is available from the performance for learning better response patterns. Some tasks or activities that are both psychomotor and physical are various activities for daily living (ADLs) and recreational activities (Neistadt, 1994).

Self-Efficacy

Bandura (1977) introduced the concept of perceived self-efficacy in his philosophy of cognitive behavior modification. Self-efficacy gives one a sense of control over the environment. It is subjective. Its assessment affects how people feel, what they think, and what they do. Self-efficacy has become so appealing that it has been included in most health behavior theories (Shaw, 1999).

Control

Personal control or a feeling of well-being plays an important role in the life of older adults. As elderly people grow older, they may tend to give up personal control, become helpless, and lose the sense of purpose in life as well as the will to live (Teague & MacNeil, 1997). Recreational programs are likely to enhance a sense of control and competence. This is especially true among people whose sense of independent living has eroded because of various factors and circumstances (Searle, Mahon, Iso-Ahola, Sdrolas, & van Dyck, 1998).

Erik Erikson's final or late life stage of development is when the individual experiences the psychosocial conflict of ego integrity versus despair. This last stage occurs from the age 65 or so until the individual's death (Magill, 1993). During this stage,

older adults experience losses of various types. Some typical encounters are the loss of spouse, social associates, work relations, social roles, and income (Teague & MacNeil, 1997).

Research Design

An experimental research design was used with experimental and control groups to explore a research question. To complete the study, both groups completed pre-intervention and post-intervention self-report questionnaires, and the experimental group participated in the therapeutic intervention being tested.

Research Question

This research study is an exploratory investigation designed to answer the question: To what extent are recreational hand therapies efficacious in increasing perceived hand condition and state-of-mind for older adults? Knowing the value of recreational hand activities and how to implement those activities can be therapeutic for elderly people. Assisting the elderly in delaying the aging process of the body both mentally and physically is a welcome task (Cooper, 1993). Some of the interventions or modalities for assisting therapeutically are exercise, arts, crafts, and cooking (Gooch, 1998). The physical value is revealed through the rehabilitation of hand-using activities. The mental value is revealed by the well-being which occurs during the recreational process in accomplishing an activity (Iso-Ahola, 1992).

Scope

The scope of this study consisted of determining what role recreational hand activities play as therapy for older adults. The findings are intended to provide

information that is important for use with older adults by practitioners of therapeutic recreation. As an experimental design, a pre-intervention questionnaire and a post-intervention questionnaire were developed and administered to 25 participants (12 in the control group and 13 in the experimental group). The participants were residents of a senior housing facility in Palo Alto, California. The participants' perceived therapeutic condition of their hands was investigated. The study is exploratory in nature since there was a lack of data to hypothesize results.

Assumptions

The main assumptions held for this study were:

1. Persons with hand deficits associated with the aging process were both physically and mentally able to perform the recreational hand activities.
2. Persons who consented to participate in the study were mentally capable of understanding the data-collection questions.
3. Voluntary beneficial action of a recreational nature was perceptible evidence of personal control.

Delimitations

The research study was designed to evaluate certain results (hand function, efficacy, personal control, and well-being) due to performing recreational hand activities. Adults aged 65 and older with self-defined hand deficits and residing in senior housing located in Palo Alto, California were candidates for this study. Potential participants included independent-living and assisted-living residents. Participants lived alone or with spouses. Persons who volunteered to participate were free of communicable disease (e.g.,

upper respiratory infection) at the time of the study and were mentally capable of understanding the human subject consent form (Appendix A).

Limitations of the Study

There were several limitations in this study. The limitations which will be discussed are: Missing data, the lack of certain information on questionnaires, room availability, and gender representativeness. Some causes for these limitations also are cited.

Sample size. The sample contained 25 subjects who were subdivided into experimental and control groups, thus reducing the number available for statistical analysis by group. Although state-of-the-art analysis can produce results for very small groups, generalizing the findings to the population at large should be done only with caution.

Incomplete data. Missing data were noted in 4 instances for subjects in each group after the research questions or items were input into the computer. Data results showed that one or two questions on a few of the surveys were left unanswered (i.e., in the control group).

The Statistical Package for the Social Sciences (SPSS) automatically dropped subjects for whom data were missing, so incomplete responses did not bias the analysis. Since the sample was small, these instances of incomplete data may have weakened results, thus reducing confidence in the findings. Some conceivable reasons for the omissions may have been the subjects' poor vision, lack of concentration, inability to understand the nature of some questions, or simply a failure to answer.

Lack of information on questionnaire. The last three questions used on the questionnaire to measure self-efficacy may have had a greater impact on the data volume if these questions had been given to both experimental and control groups during pre-testing and the post-testing. This would have allowed for additional group statistical analysis. Instead, there was a lack of data available to assess optimal experience in control group subjects for comparison to the experimental group. It would have been interesting to know whether the sense of optimal experience was similar in both groups or whether it, indeed, was a phenomenon attributable substantively to the therapeutic exercise and craft and art program. In addition, the number of optimal experience questions should have been increased to provide a more rigorous assessment of that psychological experience.

Room availability. Unanticipated outcomes such as room availability were another limitation. The researcher should have been made aware of situations that limited room availability where the program was administered. As it was, changes to the original intervention plan were necessary to adjust to unannounced room rescheduling. Thus, rather than conduct two types of intervention each day for 5 days, one intervention type of activity was administered for an extended period of time each day for the 5 days.

Lack of male subjects. The study consisted of mostly females. There were too few male subjects to do statistical analysis of the influence of gender. Females outnumber males in this society, mainly because women tend to outlive their male counterparts. This could be the reason why the facility that houses these older adults did not have an adequate number of males to engage in the study. However, gender has very little, if anything, directly to do with self-perceptions of hand function and state-of-mind.

Operational Definitions

“There is the need for definitional clarity... [and] consistency” in leisure research (Howe & Rancourt, 1990). For the purpose of this study the following definitions were used to elaborate elements of the research question.

Activity	The goal-directed use of time, energy, or attention that involves the active participation of the doer (Davis, 1993).
Deficit	A deficiency or lack; muscular or mental deficit (Davis, 1993).
Efficacy	Self-efficacy, a measure of self-confidence in one’s ability to perform specific physical tasks (Stewart, Kelemen, & Ewart, 1994).
Exercise	Activity performed by the muscles, especially to maintain fitness (Davis, 1993).
Recreation	Re-creation of the participant for work or other responsibilities. An activity with distinguishing needs-satisfying capacities (Howe & Rancourt, 1990).
Therapeutic	Results obtained from treatment, a healing agent (Davis, 1993).
Well-being	The balance, integration, and harmony of the physical, intellectual, emotional, and spiritual aspects of the human condition—wellness (Seaward, 1994).

Summary

A primary cause of disability in older adults is chronic diseases such as arthritis, stroke, and osteoarthritis. These diseases lead to disability by impairing physical ability in a manner similar to disuse or inactivity which also can impair physical activity.

Conducting experimental research would increase knowledge in order to improve therapeutic hand activities that are beneficial to the elderly who are seeking to engage in physical and mental types of recreation which rely on hand function. Specifically, research was performed to acquire knowledge to solve physical or mental problems during recreational activities requiring use of the hands. The assumptions, scope, and limitations of this research were acknowledged. In so doing, the results from the study will be applicable in clinical, community, and distance-learning therapeutic recreation settings that serve older adults with hand deficits related to aging or disease.

CHAPTER II

Review of Literature

Chronic degenerative diseases among the elderly population have risen above infectious diseases as a major health threat in the United States (Cooper, 1993).

Addressing the unique needs for assisting the elderly, both physically and mentally, through the use of recreational activities is an important goal for recreational therapists. Persons in the late stage of the life cycle have time available but not enough strength and vitality to engage in the arts and recreational activities. All the elderly need is an avenue to assist them toward a state of health and well-being both physically and mentally (Erikson, Erikson, & Kivnick, 1986). However, the social-psychological problem of perceived loss of control is a major debilitating factor emotionally and mentally for adults advancing in age. For many adults, the influence of not being in control of one's self may reduce the efficacy of the most well-designed medical rehabilitation prescription. Therapeutic recreation hand activities, in particular, are part of the avenue that can increase self-control and aid rehabilitation efforts. This literature review will discuss the adult life stage, personal control, therapeutic recreation, hand-related problems, hand activities administered as recreational therapy, and the mental state of well-being.

Older adults represent a portion of population whose control may be jeopardized by changes in their physiology and in their social environment. Leisure education intervention rooted in social learning theory may enhance a sense of well-being among elderly people (Searle et al, 1998). A 16-18 week study was done with 22 subjects to examine the long term effect of leisure on a sense of independence and psychological

well-being among elderly people. During the study the experimental group results substantiated that subjects experienced a greater sense of general control over their lives. The findings suggested that leisure education (which includes performing activities) has potential to significantly impact older adult sense of well-being (Searle et al, 1998).

Hand Deficits and Hand Therapy

There are a number of physical changes, including effects from certain diseases, which commonly appear in later adulthood. It is known that diseases which affect the hands include stroke, arthritis, and osteoarthritis (Smith & Yoshioka, 1992). The hands are vitally important to quality of life. They assist in many tasks, especially self-care and self-nurturing activities. It is difficult to manage without functional hands. Understanding how to help when deficits occur is important. Arthritis and stroke, as they pertain to the elderly population, will be discussed in this section along with hand activities for assisting in rehabilitation.

Arthritis

Arthritis is so prevalent among the aging population that 98 percent of this group will have developed it by the time they are 90 years of age (Teague & MacNeil, 1997). It is the most common crippling disease in this country (Smith & Yoshioka, 1992). Arthritis affects the joints where two or more bones articulate. Joints are structured with a variety of connective tissue. The three types of arthritis documented in this study were arthritis, rheumatoid arthritis, and osteoarthritis.

Arthritis affects small joints of the hands impairing total movement, strength, and flexibility. The fingers are affected, limiting one's ability to grasp, manipulate, and

control objects (Teague & MacNeil, 1997). Rheumatoid arthritis is a chronic systemic disease characterized by inflammatory changes in joints and joint-related structures that result in crippling deformities. It is the most severe form of arthritis. Pain and irritation are caused when the linings of the membrane thin and the bones scrape against one another.

Osteoarthritis is one of the leading causes of disability. Physical activity has a role in the prevention of osteoporosis. Evidence suggests that persons suffering from osteoarthritis can achieve both symptom relief and improvement in function with exercise or a combination of strength and endurance exercise. Even low-intensity training can be beneficial (Carlson et al., 1999).

Hand Activities as Therapy for Arthritis

According to Oldham and Stanley (1989), rheumatoid arthritis can be treated with exercise therapy. The use of exercise is important for maintaining range of motion (the range of movement of a joint) of the affected joints. To prevent contractures (fibrosis of connective tissue in skin, fascia, muscle, or joint capsule that prevents normal mobility of the related tissue or joint), passive exercise (exercising one's limbs with assistance) is needed, especially during warm-up or initial exercise treatments to limit stress on inflamed tissues or joints. Active exercise is used to maintain muscle strength and range of motion after inflammation has subsided. In their study of hand devices to rehabilitate an atrophied muscle (decrease in size) in a rheumatoid arthritic hand, improvement was shown to be associated with the hand strengthening activities that were tested.

A study conducted by Lyngberg, Danneskiold-Samsoe, and Halskov (1988) investigated whether patients with rheumatoid arthritis could receive graduated training without increasing the activity of the disease. The findings revealed that rheumatoid arthritis-patients with some hand dexterity could be involved in certain types of hand activity without aggravating the disease, even with chronically swollen joints.

A group of 120 patients with rheumatoid arthritis and osteoarthritis were subjects in another study. Two of the activities done in this study involved nonaerobic range of motion and grip strength. The findings documented the feasibility and efficacy of conditioning exercise for people with rheumatoid arthritis and osteoarthritis (Minor, Hewett, Webel, Anderson, & Kay, 1989).

Stroke

Although there is evidence of an increase in incidents of strokes among young middle-age adults, elderly adults are still represented as the largest proportion of stroke victims. Strokes, which cause sudden loss of consciousness followed by paralysis, may affect the mechanism or neuro-muscular movement of the hands. Rehabilitation for clients includes relearning sensorimotor relationships and improving functional performance. Valued leisure activities are identified, encouraged, and enabled by recreational therapists and other therapists for older adults who have suffered strokes (Boult, Brummel-Smith, & others, 1997). The older adult population is faced with various hand deformities. Different diseases caused by the aging process contribute to these deformities.

Deformity Prevention After Stroke

In a study of hand function in post-stroke patients, exercise was used to gain muscle flexibility and improve finger extension action (Trombly, et al., 1986). The exercises involved resist grasp, resist extension motions, and ballistic or rapid extension. The cumulative effect of these exercises resulted in hand function improvement.

Recreational Hand Activities Used for Biomechanical Therapy Benefits

There are many recreational activities where the hands are employed to increase functional ability. Some of these activities may be taken for granted by people who have full use of their hands. Common knowledge tells us that musicians, needle workers, and artists must maintain their hand fitness by engaging in their activity on a regular basis or suffer diminished success and satisfaction with their results. Recreation therapy utilizes various activities such as games, arts, crafts, or cooking to assist in rehabilitation. Particular activities are selected as interventions in declining or reduced muscle, bone, and movement conditions. For example, exercise is the number one factor for strengthening legs or improving balance and gait in games, dance, or drama which call for motor activity. Using various sizes of brushes for art when painting can assist in improving fine motor-skill function and can intervene in the debilitation process of the hands due to chronic illness or aging. Since the elderly population represents an increasing segment of the hand-therapy patient population (Cooper, 1993), it is important to administer recreational activities that are hand-activated to assist in rehabilitation.

Hand Strengthening Activities

There are different devices that can be used for strengthening the hands. Gripper and pincher devices hooked up to a computer game were tools used in a study. The devices created a purposeful activity while strengthening the hands (King, 1993). Hand-grip strength is important for the older adult population because it is needed not only in performing recreational activity but also activities for daily living (ADL's).

Exercise With Weights

Implementing exercises with weights for an elderly population has also been shown to be beneficial. The utilization of high-intensity exercise training was shown to be a feasible and effective means of counteracting muscle weakness and physical frailty in very elderly people. These changes were accompanied by improvement in mobility and an increased level of spontaneous physical activity (Fiatarone et al., 1994). Resistance training (using light hand and or ankle weights) can provide a variety of benefits to frail elderly patients. A study by Barry, Rich, and Carlan (1993) revealed an increase in the elderly patients' muscle strength and mass. Weight-bearing exercise for elderly subjects resulted in increased bone density, an increase in bone and joint strength, and a decreased risk of osteoporosis (Seiger & Henson, 1994). Other research showed that strength-training produces functional benefits for elderly people (Young & Skelton, 1994). Adequate perceptual-motor ability and muscular strength has been validated by research as necessary precursors to functional independence (Mobily, Mobily, & Lane 1998), suggesting that some or a minimum level of strength, flexibility, and dexterity must exist or be achieved before undertaking activities dependent upon use of one's hands. Joint

mobility results in other benefits such as physical fitness (Keller & Turner, 1986); exercise was the process that generated joint mobility.

In addition to improving fitness, physical exercise may promote positive perceptions of psychological well-being among the elderly. Psychological well-being seemed to be an important predictor in advanced ages for staying physically active (Ruuskanen & Ruoppila, 1995). The elderly benefit both physically and mentally from physical activity.

Therapeutic Domestic Activities

Domestic activities such as cooking are therapeutic for the hands. Bread making could be classified as a domestic activity. According to Gooch (1998) dexterity of the hand was improved by the act of bread making. The kneading and pounding of the dough warmed and exercised the fingers. Taking this finding further, one can imagine a variety of recipes that include mixing, rolling, and pressing as recreation and therapy simultaneously (Gooch, 1998).

Activities such as quilting or other home arts and handcraft hobbies done earlier in life could be both therapeutic and recreational for older adults. Knitting and sewing were found to be two other therapeutic activities for hand therapy (Stohr, 1993).

Art as Therapy

Involving the hands in art activity brings about therapeutic results, meaning art, offers healing media that can be used in different therapeutic frameworks. Picking up small objects can improve hand dexterity (Neistadt, 1994), and manipulation, pressing, pulling, or guiding objects are found in a variety of craft processes.

For instance, painting, drawing, collage, and clay sculpture were listed as different types of art forms used for hand rehabilitation by occupational or rehabilitation therapists (Anderson & Gold, 1998). Tabletop activities, such as a parquetry puzzle, can provide focused training in fine motor coordination. The healing power of art has been recognized in virtually all major health-care institutions across the country. Where art therapists have worked in activity labs or at the bedsides of patients who were drawing, painting, sculpting, or using other art as therapy for recovery, they have provided experiences that counter stress and humanize the environment. Patient and therapist interactions provided positive distractions and lent social support in an environment that could have been isolating and frightening (Ridenour, 1998). Art activities with creativity and stimulation can greatly enrich the elderly both intellectually and aesthetically (Erikson, et al., 1986). However, the focus of research on the therapeutic values of art experience has centered on psychological, attitudinal, and physical outcomes with no evidence of hand therapy protocols in particular.

The Mental Benefits of Recreational Hand Activities

The mental value of hand activities can be viewed as how a person feels during the activity or after being engaged in an activity. The activity involved with exercise can trigger the release of endorphins (endorphins occur naturally in the body and effect the brain) which act as natural pain killers and allow greater ease of motion (Pothier & Allen, 1990). Prolonged rhythmic exercise in a study was shown to activate central opioid systems that are present in the brain. (Thoren, Floras, Hoffmann, & Seals, 1990).

Other mental benefits in exercising has been cited by observing the cerebral function. Participation in a body mechanics conditioning class was shown to speed color recognition and improved other measures of cerebral function. An increase of cerebral arousal contributed to the participant's feeling better (Shepard, 1990).

A recreational activity that is self-selected, directed toward personal goals, and promises moment-to-moment feedback on those goals allows the participant to lose himself or herself mentally in the activity. Subsequently the participant can observe challenges, accomplishments, and rewards in the process. It provides a controlled outlet for the release of tensions that otherwise might be directed inward or toward others; it is as if the mind lets go when it has an enjoyable challenge on which to focus. As early as 1962, Felix was reported to have formulated the idea that a recreational activity offers a means whereby the participant can acquire and put into practice a feeling of satisfaction and accomplishment at having mastered a skill or compensated for a disability (Teague & MacNeil, 1997). This sounds like a description of the flow experience.

Valued by Recreational Therapists

Recreational therapy has been advocated and used in hospitals for mentally ill persons since the moral era of psychiatry in the early 19th century. Recreational therapists are found working in almost every psychiatric hospital. They work as part of the interdisciplinary team. Studies also have demonstrated the efficacy of activity therapies for developmentally-disabled clients (Corrigan, Liberman, & Wong, 1993).

Certified therapeutic recreation specialists use recreational activities for purposive intervention. These interventions promote growth and development of the client. Interests

and activities, including hobbies, games, sports, the arts, and other recreational activities are assessed for appropriateness and the ability of the client to participate. Clients are educated in adapted recreation or sports, new leisure skills, and social interests (Weber, Fleming, & Evans, 1995).

Therapeutic recreation is the provision of treatment services and the provision of recreation services to persons with illnesses or disabling conditions. The primary purposes of treatment services, which are often referred to as recreational therapy, are to restore, remediate, or rehabilitate in order to improve functioning and independence as well as to reduce or eliminate the effects of illness or disability. The primary purpose of recreation services is to provide recreation resources and opportunities in order to improve health and well-being. The American Therapeutic Recreation Association states that therapeutic recreation is provided by professionals who are trained and certified, registered, and or licensed to provide therapeutic recreation (Brasile, Skalko, & Burlingame, 1998).

The Mental Therapy of Flow

A person is in a mental state of flow when totally emotionally immersed in an activity (Csikszentmihalyi, 1990). One's mental health is improved by the flow experience. Moreover, right-brain functioning is associated with an enjoyable state of being and is also the pathway to experience the self-satisfying effects of flow (Ellis, Witt, & Aguilar, 1983).

A flow experience can occur mentally while creating in the arts, hands-craft, or other medium like playing an instrument or rolling out a pie crust. In fact, any mentally

involving activity can produce a happy feeling due to self-enjoyment. When the participant is moving along in creating the craft, psychic energy or the energy of the mind flows effortlessly. Worry is needless. The participant feels competent about being engaged in the activity (Csikszentmihalyi, 1990). This optimal experience--one's skill and understanding as one advances successfully to meet the situational challenges the medium provides--is due to the state of flow, and the individual forgets about self-worries and pays strict attention to the task at hand. It occurs when there is perfect balance between one's skill and the challenges presented in an activity. The activity will have clear goals, a sense of knowing what one is doing. Receiving immediate feedback from the environment often lets one know how well she or he is performing. Seeing, smelling, touching, hearing, comparing, sensing in so many ways feed information to the mind that prompts adjusted action and or self-satisfied pride. The activity excludes distractions. The level of skill required by the activity must be matched by the individual's capability to make decisions and perform as needed (Csikszentmihalyi, 1996).

Activities that are challenging or novel were stated as being positively related to life satisfaction for elderly people (Duellman, Barris, & Kielhofer, 1986). When seeking to enhance flow, consideration should be given to the senior's level of expertise in preferred activities (Ellis et al., 1983), meaning that they need to have been taught the skills and techniques to perform these activities.

Activity Induces a Sense of Control

Engaging enjoyably in a challenging activity can induce a sense of control and responsibility over one's behavior and environment which may transfer to life in general

and entire life (Glasser, 1984; Iso-Ahola, 1992). A seeming sense of control when in flow is what Csikszentmihalyi (1990) referred to as experiencing a paradox of control.

Research indicated activities that enhanced older adults' perceived control also had a positive effect on physical activity, socialization, and other phases of well-being (Voelkl, 1990). Shary and Iso-Ahola (1989), citing previous studies, revealed that perceived control is strongly associated with cognitive functioning among older people. In particular, older adults experienced a sense of mastery, or control, when engaged in creative art activity (Harlan & Hawkins, 1992). Reinforcing elderly people's dignity is needed in their lives when things and people closest to them are dying. They need to feel good about something every day that can be an accomplishment. Recreational hand activities allow the participant to experience control while engaged in an activity. The participant can achieve flow, improving performance as it provides intrinsic rewards (Csikszentmihalyi & Csikszentmihalyi, 1992). According to Glasser (1984), having previous encounters with activities that allow for some degree of control will increase confidence that more control can be gained over time.

Well-being

Wellness is the presence of physical, mental, emotional, spiritual, intellectual, and social well-being. Based on the needs, interest, and abilities of older individuals, wellness-enhancing activities can enable adults to grow, realizing their creative potential (Keller & Turner, 1986). A positive view of life that includes positive illusion, perception of control, and optimism may contribute to psychological well-being (Lindo & Nordholm, 1999). There is a consistently positive relationship between measured health

status and life satisfaction (Girzadas, Counte, Glandon, & Tancredi, 1993). Older adults live a more fulfilling life because of their perceived good health enriched by their well-being.

Improving magnitude of well-being in middle and later life is associated with meaningful leisure pursuits (Kivett & Orthner, 1980). For example, it has been observed that when leisure participation is increased, threats to older adult psychosocial well-being can be decreased (Dunn & Wilhite, 1997). Older adults displaying symptoms of depression and withdrawal found pleasant activities to be valuable in their treatment (Voelkl & Herman, 1993). In spite of one's disability, intervention in a person's life has a positive impact on improving one's overall attitude toward a genuine quality of life (Blake, 1991). Thus, engaging in leisure activities offers a means to treating the mental as well as the physical states associated with the effects of aging.

Some older adults with mental deficits may have a marginally significant lower perceived satisfaction with life than younger adults. The results of a study to examine life satisfaction for aging adults with mental retardation revealed a lower sense of personal satisfaction among the aging adult population than younger people in that same population (Hawkins, 1993). Psychological well-being can be determined by the effects of a leisure education program on perceived leisure control, perceived leisure competence, and self-esteem. Finding in a study conducted among 44 elderly patients in a day hospital indicated a positive connection between leisure and psychological well-being (Searle, & Mahon, 1993). Activities can enhance adult patients with depressed moods.

Hospitalized adult participants in a ropes course activity session were shown to decrease transient depressed mood (Chakravorty, Trunnell, & Ellis, 1995).

Self-efficacy

Social support and perceived self-efficacy were related to health promoting behaviors such as exercise and physical activity. A study was done involving 44 middle to older adult age subjects to examine relationships among social-support, self-efficacy, and ongoing exercise behavior. Findings revealed that self-efficacy thoughts serve a mediational role in the relationship between social support and health-promoting behaviors in the context of an at-risk population such as sedentary middle-aged men and women. Behavioral functioning may improve across a wide range of activities when self-efficacy is enhanced (Duncan & McAuley, 1993). Recreational therapists can engage participants in activities that will enhance self-efficacy.

A theoretical framework was embraced to assess how psychosocial variables, such as self-efficacy influenced by exercise, could be examined. The study designed by McAuley (1992) examined prospectively the possible roles played by perceptions of personal efficacy in determining the exercise behavior of adults. Self-efficacy cognitions were shown to predict adoption of exercise behavior; however, previous behavior proved to be the strongest predictor of subsequent exercise participation. It may be that previous exercise behavior results in self-efficacy which can in-turn prompt subsequent participation.

Medical Devices for Hand Therapy

There are medical devices for the hand to assist in rehabilitation or therapy. These devices or medical procedures help in managing pain and range from external tissue interventions to some reaching deeper into tissues, including drug therapy.

Thermal Agents

These agents are used to manage a variety of clinical conditions in the hands. Some of these heating agents include hot packs and paraffin. Cryotherapy techniques include ice bags and ice massage and also improve hand conditions, reduce swelling, nerve irritation, and improve circulation.

Transcutaneous electrical nerve stimulation (TENS)

Stimulation consists of the use of externally applied electrical stimulation. The surface electrodes transmit electrotherapy which suppresses pain. Electrical stimulation was also used successfully in edema (water retention) control and wound-healing (Fedorczyk, 1997).

Transdermal Drug Delivery Methods

These methods are used to reduce pain and inflammation. The medication enters the local tissue circulation. It then enters the general systemic circulation. Transdermal drug delivery helps in direct application of the medication which results in a higher level of medication to the inflamed target tissue area. One potential risk in this method is that injections are often painful (Fedorczyk, 1997).

Conceptual Framework

The conceptual frameworks for this study are self-efficacy and biomechanics. The theory of self-efficacy is based on social cognitive theory which has to do with how people attempt to predict and explain their behavior (Resnick, & Jenkins, 2000). The expectations of self-efficacy are defined as an individual's judgment of confidence to carry out explicit behaviors. Physiological information is one of the four sources of information identified by Bandura that influence the individual's cognitive appraisal of efficacy expectations. Physiological information is important to this research along with other affective cues experienced during an activity such as pain or anxiety (Resnick, & Jenkins, 2000).

The biomechanical frame of reference has its theoretical base in the physical sciences of kinesis, kinematics, and medicine (Hopkins, 1988). Recreational therapy has been known to offer a broad treatment scope when used in concert with other therapies. The biomechanical frame of reference is important because it deals with the movement of the muscles and joints of the hands which work together to enable one to function independently. When hand function is hindered because of poor range-of-motion or a disability, one may need relief. Performing physical activities to assist in therapy for the hands of elderly people is beneficial. Recreational therapy uses biomechanics (muscles and body movements) when assisting participants in recreation activities for therapeutic results.

The purpose of this study is to examine the extent to which recreational hand therapies are efficacious in increasing perceived hand condition and well-being for older

adults. A therapeutic tool like the Thera-Rod©, which is utilized in this study, can assist in exercising the fine muscles and control of the fingers and hands, working joints for easier movement. The muscles of the hands are also strengthened.

Summary

The literature, although limited on the subject, revealed some connection between the physical and mental therapeutic value of hand activities for elderly people. Some hand improvements were shown from being engaged in hand exercises, using apparatuses, and making recreational handcrafts. Mental benefits were associated with activities that produced flow or optimal experience. Personal control in an activity was also found to enhance the life of older adults.

It is clear that a variety of hand activities could be used as therapy such as participation in arts, instrument playing, weaving, puppetry, crafts, needle work, resistance exercises, and cooking. The finger manipulating processes and devices in hand activities provide therapeutic value to the hands and to the mental state of the elderly.

The elderly live with different physical and mental body degeneration issues. Knowing how to cope with these disabilities by way of therapy can assist adults in this life stage in attaining a better quality of life. The elderly are living longer because of better health care.

Mental benefits of hand activities were explained as optimal experience or flow, the sense of well-being, perceived control, and wellness. It is expected that the benefit that comes from an optimal experience can help disabled older adults achieve positive self-perceptions beyond marginal satisfaction.

Research findings in the literature review offer many implications for the recreation therapy professional. Using therapeutic hand activity interventions to assist the older adult population is of value to them. Physical rehabilitation can be presented to the elderly through exercises and other hand-activated modalities. Mental therapy can be accomplished through an activity that produces a flow experience. Flow builds the self-confidence which allows the participant to develop skills and make meaningful contributions to humankind (Csikszentmihalyi, 1990). Activities done with the hands can result in both physical healing and mental rewards for elderly people.

In comparison with other social sciences and applied disciplines, leisure science is in its infancy. Unlike other disciplines such as sociology, psychology, and biology which promote an array of theories about aging, recreation professionals and leisure scientists have not done much research on the subject of recreational therapy and the aging process. In fact, there is no evidence of empirically based therapeutic recreation protocol for recreational hand therapy. Therefore, there is a basis for research to examine the efficacy of a protocol to increase hand-functional deficits which may lead to improved perception of personal control and well-being.

CHAPTER III

Methodology

Research Design

This research was designed as an experimental study, using pre-intervention and post-intervention data collection. The purpose of this study was to investigate to what extent recreational hand activities are efficacious in producing therapeutic results for older adults with hand-function deficits. Review of related literature revealed that recreational hand activities are instrumental both physically and mentally as therapy for older adults, but there was a dearth of research published on the benefits of therapeutic hand activities. Thus, this was an exploratory study, using data collected over a 5-day period from a group of subjects residing in senior housing. The data were analyzed to ascertain to what extent recreational hand activities generate both physical and mental therapeutic benefits.

Sample

The sample was selected purposively in that every attempt was made to be inclusive and representative of individuals with a hand disability or some hand deformity resulting from a stroke, arthritis, osteoarthritis or some similar physical defect. Participants for this sample were selected from a senior citizen housing facility in Palo Alto, California. Participants had to meet the following criteria: Age sixty-five and over, available for a minimum of five days, two hours each day, familiar with recreation programs, and retired. Subjects were recruited for participation in this research experiment either by telephone or personal visits.

Subjects

Subjects consisted of 25 people who were residents in a senior housing facility located in California. Thirteen subjects were in the experimental group, utilizing the recreation therapy intervention of hand exercises and a hand craft activity, and 12 subjects formed the control group. The age-range of subjects was 65 to 97. Both males and females of various nationalities participated in this research.

Setting

Treatment intervention took place in the senior housing facility. Arrangements were made to use the auditorium, but some sessions were held in the dining room adjacent to the auditorium because of a schedule conflict. While involved in the exercise component of the intervention, subjects were seated in chairs arranged in concentric curved rows. They were seated at long tables for the craft activity. Adequate lighting was available in the room. Temperature setting in the room was regulated for the comfort of the participants.

Description of the Intervention

A recreational hand therapy program was designed, pre-tested with senior adults, and empirically tested with residents in senior housing. Although prior arrangements had been confirmed, the subjects met in the dining room on the first day of the study to engage in the activities because the auditorium (the preferred location) was being used for another activity. This happened unexpectedly 3 days out of 5 during which treatments were provided for the experimental group. Conflicting time, room availability, and suitability made it necessary for the researcher to alter the program. Therefore, instead of

two activities each day (hand conditioning and hand crafts), only one activity was administered each of the 5 days. See Appendix B for description of craft activities.

The second day's activity was exercising with the Thera-Rod©, utilizing the exercises and procedures designed by the researcher (Appendix C and D). One subject whose deficit was caused by a stroke did not have use of her right arm. She exclaimed, after exercising with the Thera-Rod©, that she experienced therapeutic results. To grasp the Thera-Rod©, she used her left hand to place the Thera-Rod© in her right hand. Her right hand was always in a grasping position, and the Thera-Rod© was lightweight and an appropriate diameter for her natural grasp. During different intervals, the researcher directly assisted her in various exercises with the Thera-Rod©. She, along with other subjects talked about the benefits and enjoyment derived from the Thera-Rod© exercises. Self-efficacy was shown in the manner which the subjects felt empowered by their success in performing an activity after being introduced to it and experiencing a noticeable, positive outcome.

The activity on the third day was a craft creation. The literature review in chapter 2 stated that a puzzle could provide focused training in fine motor coordination because picking up objects improved hand dexterity (Neistadt, 1994). The subjects created a design of their choice on a valentine-shaped puzzle. One subject expressed how much she enjoyed being engaged in the recreational hand-craft activity. She said that she enjoyed doing these activities. She went on to state, "I put life into my years and not years into my life!"

The subjects performed exercises with the Thera-Rod© on the fourth day of activities. The exercise time was extended to compensate for the lack of the second activity (two activities were planned to be held each day, a craft activity and an exercise activity) each day as scheduled. The extended Thera-Rod© sessions lasted 45 minutes to an hour versus 30 minutes as planned. The extended time allowed for additional warm-up exercises and added repetitions of some of the exercises. The fifth and last day of the program, the subjects created napkin holders (for a single place setting) and containers for storing them. The researcher assisted subjects in learning to make adjustments to improve their ability to participate. For example, the researcher aided one subject with lack of mobility in her hand and arm by adapting the work area for the craft project. The researcher also demonstrated skills for painting and creating with the use of only one hand.

Instrumentation

Subjects were given a questionnaire to fill out to determine their perceived physical and mental condition. The questionnaire consisted of 14 questions. Six questions assessed the physical status of the subject's hands, and five questions assessed their personal control and sense of well-being--their mental state. The post-test questionnaire for the experimental group, unlike the control group, included three additional questions.

To provide self-reported data, the semantic differential scale was selected because it provided a method for assessing the perceived condition of subjects' hands. The semantic differential scale included a list of bipolar dimensions which represented key concepts related to hand function and mental state of being. The scales were used to

differentiate and express personal experience that could be compared and compiled across subjects. Similar to a Likert scale, the 5-point semantic differential scale was assigned numbers. Each of the five possible valuation positions represented a singular value, or number, ranging from 1 (high) to 5 (low). Assessment stems were followed by a series of bipolar scales. An example of the response format is: “My hands feel” Flexible [1] [2] [3] [4] [5] Stiff. Subjects checked a number in the box for each quality dimension to reflect their physical or mental state of being (Appendix E).

The Thera-Rod©

The Thera-Rod© is a lightweight hand-exercise tool created by the researcher. It is made out of a heavy-duty cardboard tube, measuring 3 1/4 feet long and 2 1/2 inches in diameter and weighing approximately 5 ounces. The tube is wrapped with wood-grain print contact paper that creates a smooth texture. It offers a therapeutic gripping instrument for hand mobility exercises that fit the hand well, is lightweight, and offers sufficient surface to engage in variety of manipulative hand and finger exercises.

Validity and Reliability

The validity of this study can be assessed in several ways. Foremost is the fact that the study is grounded in empirical information and guided by theory. Essential elements of the study question were operationalized using definitions from authoritative literature. In addition, the five-day experimental study period was short enough to limit the effects of maturation and history which might influence the sample subjects (Campbell & Stanley, 1963). No subject in the experimental group dropped out of the study, once the study was under way; however, three subjects from the control group did

fail to complete the post-test. Overall, the study succeeded in providing evidence to answer the research question so it can be inferred that the research examined what it purported to do. Subjects made unsolicited claims in praise of their improved hand function after completing the exercise sessions.

In an effort to assure reliability, the instrument or tool (Thera-Rod©) was utilized for a year, during design, development, and pilot test phases. Exercises were carefully designed with a conceptual basis in scientific literature and were recorded to permit repetition without variation. Therefore, it is assumed that the instrument, exercises, and other activities can be repeated by other researchers with the same results produced in this study.

Data Collection Procedure

Following permission and approval from Human Subjects-Institutional Review Board of San Jose State University, visits were made to potential subjects' apartments, requesting their participation in this study. Subjects received verbal and written reminders pertaining to information about meeting time and place. Upon obtaining their agreement, subjects were informed in regard to where and when to meet for the study.

Participants were randomly placed in the control group (n=12) or the experimental group (n=13). The pre- and post-questionnaires were administered to both groups. For both research groups, the first procedure was to issue each subject a questionnaire to be completed. Subjects in the experimental group performed hand exercises with Thera-Rod© and engaged in three recreational craft activities utilizing their hands. Following the intervention on the fifth day, subjects in the experimental group completed the post-

intervention assessment. Control group subjects were administered the following-up assessment either in a group meeting or individually in their apartments as desired.

Pre-test Administration

Subjects were seated at long tables in the dinning room. The questionnaire response system was explained using an enlarged view of a question and answer form that was given to each person. Subjects received questionnaires and pencils to record their perceived conditions. Individual help was given when requested.

Post-test Administration

Following the activity on the last day of the experiment, the participants completed a post-test. Again, the enlarged copy of the instrument was used to assist in explaining the response system.

Data Analysis

The following section explains the procedures that were carried out to analyze the data from the questionnaires. To answer the research question: To what extent are recreational hand therapies efficacious in increasing perceived hand condition and state-of-mind? Several statistical analysis procedures were used. A t-test was used to compare the difference in gains and losses for the experimental and control groups. Bi-variate correlations were used to learn if, indeed, use of the Thera-Rod© and hand craft activities could predict positive self-evaluations and improved well-being. The conventional level of significance was used to judge minimum significance (.05).

Data Coding

The data obtained from the questionnaires were coded and entered into a

data set for analysis using the SPSS program (Statistical Package for the Social Sciences).

The associations between variables in the data set were addressed to ensure the accuracy of frequency distribution and percentages obtained from the questionnaire responses.

The personal variables gender and age were coded as interval level variables, so gender was coded as 0 for females and 1 for males. Age was coded as the number of years reported. Disabilities were grouped into nominally scaled categories for hand disabilities, specifically arthritis, stroke, and others were coded into a disability group using codes 1, 2, or 3. Questions 1 to 11, which assessed hand and mind conditions, were reverse-coded so that 1=5, 2=4, 3=3, 4=2, and 5=1. The highest values reflected the desired quality in each variable pair. In the post-test questions 1, 2, and 3 were also reverse-coded (1=5, 2=4, 3=3, 4=2, and 5=1), so higher values reflected the more desirable assessment.

Statistical Analysis Procedures

Sample description. Personal or demographic variables were analyzed to describe the sample group. Sample bias was examined using chi square and t-test procedures.

Hand-condition analysis. Mean scores for the 6 hand-condition indicators were summed to create a new, composite variable for pre-test and post-test reports from each group. Differences between the pre-test and post-test means were tested using t-tests. Level of statistical significance was documented.

State-of-mind analysis. Data were summed and pre-test and post-test means were calculated for each group. The significance of pre-test and post-test difference was ascertained using t-tests.

Optimal experience analysis. Data from optimal experience assessments were summed and mean scores were calculated for the three indicators (additional questions on the experimental post-test). Correlation coefficients were calculated to observe the relationships between optimal experience, age, hand condition, and state-of-mind.

Summary

This chapter described the methodology used to study efficacy in increasing perceived hand condition and sense of well-being through recreational hand activities as therapy for older adults based on other research studies. The research question about the extent to which recreational hand therapies are efficacious in increasing perceived hand condition and sense of well-being were addressed through an empirically valid research design. Statistical data on subjects' perceived hand condition and state-of-mind were analyzed. Results of the findings obtained are presented in the following chapter.

CHAPTER IV

Results

This chapter reports the sample description and statistical treatment of data. Findings are summarized which describe the sample and self-assessments of hand function and state-of-mind. The overall value of hand therapy for recreational purposes is analyzed.

Data Handling Procedures

All home visits, telephone inquiries, data coding, entry, and analysis were managed by the researcher. To insure confidentiality of respondents, several steps were taken. The names on the questionnaires were exchanged for numerical codes. Following data entry of coded information on surveys, completion of data analysis and all statistical information needed for data entry, the list was destroyed. The surveys were kept in a safe place and locked away when not in use for data entry. Anonymity was guaranteed by means of these procedures.

Description of Study Groups

The original sample total consisted of 32 subjects, 6 males and 26 females, divided into an experimental group and a control group. The experimental group consisted of 14 females and 2 males, and the control group consisted of 12 females and 4 males. Seven subjects were deleted from the study, resulting in 13 subjects in the experimental group (13 females) and 12 subjects in the control group (10 females and 2 males). Sample reduction occurred in the following ways. Three subjects voluntarily declined to participate after being selected. An additional three subjects were unavailable to take the

post-test. Another male subject (age 46) assigned to the experimental group was dropped from the analysis because he did not meet the age requirement (65 years and older) although he met the other requirements such as hand deficit (an arthritic thumb) and he was a resident of that facility. The results of his participation were deleted from the study and its findings. Thus, the total number of subjects for this research was reduced to 25 (see table 1).

Table 1

Frequency Distribution of Subjects by Gender

<i>Group</i>	<i>Male</i>	<i>Female</i>
Experimental (n=13)	0	13
Control (n=12)	2	10

When comparing the two groups in regard to gender, significant difference was observed. There were only women in the experimental group. The control group had 2 males. Overall, explaining the difference in regard to gender, both groups were considered similar in that they were composed of all or mostly all women. Based on the preponderant representation of women in the sample, it was decided to drop gender from all further analysis.

The ages of subjects ranged from 70 to 97 years. The mean age for the control group was 85.7 and for the experimental group, it was 85.0 (see table 2). There was not a significant difference between groups based on age; they were considered comparable

based on age. This similarity in age between the control group and the experimental group reduces bias, thus presenting a clearer representation related to their capabilities to do hand activities.

Table 2

Age Range and Mean

<i>Group</i>	<i>Age Range</i>	<i>Mean Age</i>
Experimental	70-95	85
Control	70-97	85.7

t-value = .087, N. S., *p* = .931.

There were several different hand deficits used in the assessment: Little-to-no hand pain, arthritis, carpal tunnel (which can effect the palmar side of the thumb, index finger, radial half of the ring finger, etc.), neuropathy (a disease of the nerves which can cause subjects' fingers to feel numb), stroke, and a category called other (Appendix F). The category or hand deficit described as "little-to-no hand pain" was created to include subjects with unidentified hand deficits because of the number of volunteers with somewhat pain-free hand deficits. Subjects selected this category if they reported minor weakness, poor fine-muscle control, or other bothersome ailments that were medically undiagnosed and were not markedly painful. Parkinson's Disease and tremors and were included in the 'other' category. In the experimental group, the greatest proportion of hand deficits was arthritis (45.0%) followed by the other category (29.0%) with smaller proportions in the remaining categories of little-to-no pain (16.0%) and stroke (10.0%). A similar distribution was found among subjects in the

control group; arthritis (50.0%) was the most frequent diagnosis with the remaining categories of little-to-no pain (16.7%), carpal tunnel (17.0%), neuropathy (8.3%), and other (8.3%).

The five hand-deficit categories were reduced to three: arthritis, neural, and other (see table 3). This was done because of similarities in deficits and the small number of subjects in several categories. The new category that was created called neural included stroke, carpal tunnel, Parkinson's, tremor, and neuropathy since these hand deficits are all related directly or indirectly to the nervous system. The other category included subjects whose hands were described with little-to-no pain. After collapsing the hand-deficit categories from 5 to 3, there was some apparent difference between groups in regard to hand deficits and an analogous distribution of the deficits was found in the control and in the experimental or treatment groups. A chi square analysis was not calculated since 50% of the cells contained fewer than 5 subjects.

Table 3

Frequency Distribution of Hand Deficits by Group (N=25)

Group	Arthritis	Neural	Other
Experimental	5	6	2
Control	7	3	2
Total	12	9	4

Hand Therapy Results

Hand therapy was studied using bi-polar adjectives (semantic differential scales) to describe state-of-hand and state-of-mind in five dimensions. The scales assessed the subjects' perceived physical and mental condition (Appendices G and H). To compare means within groups and gain score differences between groups, *t*-tests were conducted.

t-Test Analyses

Pre-test scores for the experimental group averaged 22.8. The subjects perceived their hands were to some extent in better than neutral condition (assuming 3.0 would be neutral on a scale 1 = low or negative to 5 = high or positive). The higher the mean or test results, the better the subjects perceived their hands, suggesting that members of the experimental group evaluated their hand condition more positively after treatment. The scores increased on the post-test (mean = 25.3), indicating improvement. The results in table 4 show an increase of 2.5 for subjects who were engaged in the treatment process (the recreational activities); that is, these subjects perceived their hands to be in better condition. In comparison, control group subjects reported a decline in hand assessment during the study period. The difference between the experimental and control group mean scores for hand condition assessments is significant at the .05 level ($p = .018$). See Table 4. This suggests that the experimental group showed an important degree of improvement in hand condition compared to results for the control group.

Table 4

Hand Condition--Comparing Experimental and Control Groups Mean Scores Difference

Group	~Mean~			t-Value	p-Value
	Pre-test	Post-test	Difference		
Experimental (13)	22.8	25.3	2.5	2.542	.018
Control (12)	21.7	20.4	-1.3		

State-of-Mind Results

The subjects' state-of-mind were assessed in this study using bi-polar adjectives.

Five qualities of the mind regarding their perceived mental state were assessed on a 5-point semantic differential scale, and the findings were recorded (Appendices G and H).

The experimental group pre-test revealed that they increased their perceived state-of-mind from a moderately positive state (mean = 18.1) to a highly positive state (23.0) out of a possible 25. The experimental group showed a major increase when comparing pre-test and post-test mean scores, revealing that the subjects experienced an improvement in their state-of-mind. For the control group, however, the difference between pre-test and post-test mean scores was much less (-1.8) compared to the experimental group (4.9), see Table 5.

Table 5

State-of-mind Comparison by t-test for the Experimental Group and Control Group

Group (n)		Mean Pre-test	Mean Post-test	Difference	df	<i>p</i> - Value
Experimental	(13)	18.1	23.0	4.9	23	.030
Control	(12)	18.2	20.0	-1.8		

Comparing the difference scores for the experimental group and the control group, the t-test results were statistically significant at the .05 level (*p*-value .030). The findings supported the research question about the efficacy of recreational hand activities as therapy for older adults.

Correlation Analysis

A bivariate (Pearson) correlation was conducted to see the relationship between optimal experience, age, hand difference and mind difference for the experimental group. Findings showed that there was a significant correlation between mind and hand assessments. Improvement in a person's state-of-mind is clearly associated with the improvement of their hand condition (see table 6). No correlation was found between optimal experience and either hand condition or state-of-mind. However, the experimental group results revealed that the subjects had encountered the optimal experience while engaging in the recreational hand activities, see Appendix I, because subjects' scores ranged between 12 and 15 with 15 being the highest possible value. No explanation can be offered for this finding.

Table 6

Correlation Results for Hand Difference and Mind Difference

Correlation	Significance
.475	.019

Optimal Experience Analysis

Optimal experience (Csikszentmihalyi, 1990) occurs when the leisure state of mind is experienced, and up to eight (8) attributes can characterize a person's sense of acting in a challenging environment. Those attributes are: (1) A challenging activity that requires skills, (2) merging of action and awareness, (3) clear goals, (4) feedback, (5) concentration on the task at hand, (6) paradox of control, (7) loss of self-consciousness, and (8) transformation of time. However, Csikszentmihalyi asserted that experiencing three or four of those attributes probably indicate the highly desirable flow state of mind. Three of the attributes were included in this study to form the optimal experience concept. Based on analysis of this data, optimal experience was achieved by most of the subjects.

One of the key criteria of an optimal experience is losing track of time. Time is transformed. Time sense is altered in that hours seem to pass by in minutes. During the flow experience one's sense of time does not equate to the actual passage of time. In the case of the subjects in the experimental group, the mean score for lost track of time was 4.7 with 5 being the highest value possible (see table 7). This can be interpreted to mean that almost 80 percent of the participants lost track of time while engaged in the recreational hand activities. The other 23% reported they lost track of time frequently. No

other responses were found for the alteration of time. This revealed that all of the subjects were mentally in a time-altered state during all or most of the activity engagement.

Another element of optimal experience was examined by asking the subjects to what extent did they feel that they had improved themselves through the hand therapy and craft therapy sessions. The findings revealed that 69% of the participants reported the highest value possible, thus, most of the subjects felt that they accomplished important self-improvement.

The final element of optimal experience included in this study had to do with the sense of personal control subjects may have felt while engaged in the program. Responses to this item or question showed that 11 of the 13 subjects (85%) indicated they felt in control during the activities, and 2 subjects evaluated their sense of control in the good and neutral categories (16%). Therefore, for most subjects, a good-to-great sense of personal control accompanied the experimental recreation program. Overall, it can be said that optimal experience was likely for most subjects.

Table 7

Experimental Group Post-test Results for Optimal Experience/Self-Efficacy

<u>Attribute</u>	<u>Ranking High to Low</u>					Total %	Total n
	5	4	3	2	1		
Time Altered	10 (77%)	3(23%)	0	0	0	100%	13
Personal Growth	9 (69%)	3(23%)	1(8%)	0	0	100%	13
Personal Control	11(85%)	1(8%)	1(8%)	0	0	101%	13

Summary

This chapter reported findings related to the subjects' perceived hand condition, state-of-mind, and their experiencing flow—the optimal experience. Findings revealed that, in the experimental group, there was significant improvement in the subjects' state-of-mind. The participants also reported that the condition of their hands was much improved compared to those in the control group. Along with improved hand condition, the state-of-mind was improved. The hand exercises and crafts were found to be efficacious in the process of producing optimal experience or well-being, a recreational therapeutic value. In the process of engaging in the therapeutic program, they observed themselves experiencing an altered time-sense, personal growth, and a sense of control. While engaged in the activities the researcher gave positive feed back to the participants. There were clear goals--the subjects knew what to do during the recreation sessions to complete each creative activity. It can be said that increasing one's hand function and using one's hands and mind in a creative process can result in the rewarding state-of-mind known as optimal experience.

CHAPTER V

Discussion and Conclusions

This research investigated the efficacy of recreational hand therapies in increasing perceived physical and mental conditions. The purpose of this chapter is to elaborate on the interpretation of the findings and evaluate limitations in the study. Conclusions provide useful concepts that can advance the theory and professional practice of therapeutic recreation. There are suggestions for replication of the study and further research.

Discussion

Hand-Therapy

Comparing the results of the test for difference in mean scores for the experimental group and for the control group, findings revealed a decline in control group hand function; whereas, subjects in the experimental group showed positive results which were attributed to the recreational therapy program. The experimental group's gain in scores confirms the idea that recreational hand activities are instrumental as therapy for hand-function improvement.

It is apparent from the findings that utilizing hand recreational activities can increase a person's movement in their hands for better flexibility. The findings further suggested that, when the elderly are engaged in art projects, the hands attain a relaxed state because of the various finger manipulations. Muscle use leads to improved hand strength. This finding has major implications for the practice which will be discussed later in this chapter.

Mind Condition

Perceptions of state-of-mind for the control group were shown to have improved minimally during the study period, but this gain improved was far out-shadowed when compared to gain reported by the experimental group. In fact, many of the subjects' reports indicated their minds were activated, stimulated, focused, positive, and contained pleasant thoughts. Overall, improvement observed in the perceived mental and physical condition was significant. Findings revealed that recreational hand therapies are efficacious and can be well-designed to improve clients' mind-states.

The Efficacy of Recreational Hand Activities

Recreational therapy has a goal to provide recreational resources and opportunities in order to improve health and well-being. The main purpose of this profession is to restore, remediate or rehabilitate in order to improve functioning and independence as well as reducing or eliminating the effects of illness or disability. Understanding the role self-efficacy plays in participants' perceived hand and mind condition is helpful to the recreation therapist. The therapist can use this information to enhance the participation of the client, knowing what activities are efficacious.

The Optimal Experience in Recreational Hand Activities

Optimal experience which is also known as flow, is a needed component in recreational therapy if the leisure state-of-mind is to be achieved. Clearly, the participants achieved a sense of well-being or a higher level of inner harmony—a happy feeling. In fact, the participants became so totally involved in the activities that time passed without their taking note of it. They commented on how their hands felt better and that they were

pleased with their finished products. They seemed to be suggesting a feeling of control because they were able to master and complete a work of art. Physical control was also observed because they were able to steady their hands through the exercises with the Thera-Rod©. Perhaps the factor which most contributed to the self-assessed optimal experience was the amount of challenge participants recognized in the activities. Their unsolicited comments actually could be interpreted as statements verging on amazement. It may be that therapists and other professionals who work with the elderly offer their clients less than optimal challenges. This idea is worth studying in the future.

The Thera-Rod© as a Recreational Therapy Tool

The Thera-Rod© was instrumental as a tool or device in assisting the subjects with exercising their hands. Unlike most common devices, the Thera-Rod© served as recreational equipment when performing the various exercises. It was implemented as a bat (when performing the bat grip exercise), an oar (when used for boat rowing), and a baton (throwing it from one hand to the other hand). Its design makes it easy for it to be maneuvered when performing the exercises. The weight of the Thera-Rod© enables it to be handled in an effortless manner. Its shape caters to the grip of the hands. Subjects' hands glided across and around the smooth texture of its cylindrical contour and surface.

Implications for Practice

The findings of this investigation provide useful information for recreation therapists. Recreation therapists need to be aware of the part that efficacy plays in mental and physical activities performed by the participant. If the participants are empowered to perform an activity, they may also be absorbed in it, bringing about rehabilitation and

well-being. These findings can assist recreational therapists in planning treatment programs to bring about therapeutic value to the participants or clients. Therapists will profit in a rewarding manner as they implement activities that are enjoyable and advantageous therapeutically for the hands of the older adult population.

Based on this research, it is possible to schedule activities that will produce improved hand condition, state-of- mind and generate optimal experiences.

Understanding or being made aware of the different hand deficits that cause a lack of participation in the older adult population can help the therapist increase methods to solve the dilemma. Therapists can also gain skills in adapting different activities to meet the participants' hand deficits.

Recommendations for Future Research

This exploratory study needs to be replicated with more male participants so that broader implications can be drawn for practitioner use. Other demographics such as ethnic groups, socio-economic status, and educational attainment could be added to see the effect on perceived hand condition and state-of-mind as they relate to self-efficacy. These various personal variables may be mitigating factors, relating to how a person may view their hand condition and state-of-mind during an activity.

Summary

This study answered the question to what extent are recreational hand therapies efficacious in increasing perceived physical and mental conditions? The therapeutic value of hand activities can be beneficial for anyone needing assistance because of a physical or mental deficit, especially people of matured age. As older people mature, they tend to

lose the use of their five senses. This also corresponds with their cognitive processes. This study incorporating arts and crafts in conjunction with exercises for the hand was conducted as a means of finding therapeutic recreational activities that would serve to assist the older adult population both physically and mentally.

The arts, the crafts and the exercises were selected as recreational devices to bring about predictable therapeutic changes. The movement of the finger joints when performing various brush strokes and wrist and finger exercises were acknowledged in this study to be a benefit for older adults with various hand deficits. All subjects observed their hands to be in better condition after the recreational therapy activities.

Another component of this study was assessment optimal experience. It was evident by the results that flow—optimal experience, had taken place for everyone involved in the exercise and craft program.

Conclusion

Performing recreational hand activities were shown to be therapeutic for older adults. An important conclusion is that providing worthwhile recreational challenges can result in improved mental outlook and sense of personal capability to perform.

Overall, this study was valuable as a test of a new therapeutic tool, the Thera-Rod®. Therapeutic knowledge gathered from the findings of this study will be added to leisure philosophy and to the practice in the field of recreational therapy.

References

Anderson, L., & Gold, K. (1998). Creative connections: The healing power of women's art and craftwork. Women and Therapy, 21(4), 15-35.

Bandura, A., & Adams, N. E. (1977). Analysis of self-efficacy theory of behavioral change. Cognitive Therapy and Research, 1, 287-304.

Barry, H. C., Rich, B. S., & Carlan, R. T. (1993). How exercise can benefit older patients: A practical approach. Physician and Activity Sportsmedicine, 21(2), 124-140.

Blake, J. G., (1991). Therapeutic recreation assessment and intervention with patients with quadriplegia. Therapeutic Recreation Journal, 25(4), 71-75.

Boult, C., Brummel-Smith, K., & the Clinical Practice Committee of the American Geriatrics Society, (1997). Post-stroke rehabilitation guidelines. Journal of the American Geriatrics Society, 45(7), 881-883.

Brasile, F., Skalko, T. K., Burlingame, J. (1998). Conceptual development of recreational therapy. Perspectives In Recreational Therapy. Ravensdale, WA: Idyll Arbor, Inc.

Campbell, D. T., Stanley, J. C. (1963). Experimental and quasi-experimental designs for research. Chicago, IL: Rand McNally.

Carlson, J. E., Ostir G. V., Black, S. A., Markides, K. S., Rudkin, L. & Goodwin J. S. (1999). Disability in older adults 2: physical activity as prevention. Behavioral Medicine, 24(4), 157-168.

Chakravorty, D., Trunnell, E. P., & Ellis, G. D. (1995). Ropes course participation and post-activity processing on transient depressed mood of hospitalized adult psychiatric patients. Therapeutic Recreation Journal 2, 104-109.

Cooper, C. (1993). Maximizing therapist effectiveness with geriatric and patients. Journal of Hand Therapy, 6, 205-208.

Corrigan, P. W., Liberman, R. P., & Wong, S. E. (1993). Recreational therapy and behavior management on inpatient units: Is recreational therapy therapeutic? Journal of Nervous and Mental Disease, 181(10) 644-646.

Cress, M. E., Conley, K. E., Balding, S. L., Hansen-Smith, & Fagkonczak, J. (1996). Functional training: Muscle structure, function, and performance in older women. Journal of Orthopedic Sports Physical Therapy, 24(1), 4-10.

Csikszentmihalyi, M. (Interview of 1996). The secret of peak performance: Learn how to go with the flow. Men's Health, 11(11), 58-59.

Csikszentmihalyi, M. (1990). Flow. NY: Harper & Row.

Csikszentmihalyi, M., & Csikszentmihalyi, I. S. (1992). Optimal Experience. NY: Cambridge.

Davis, F. A. (1993). Tabler's cyclopedic medical dictionary. Philadelphia, PA: F. A. Co.

Duellman, M. K., Barris, R., & Kielhofner, G. (1986). Organized activity and the adaptive status of nursing home residents. American Journal of Occupational Therapy, 40, 618-621.

Duncan, T. E., & McAuley, E. (1993). Social support and efficacy cognitions in exercise adherence: A latent growth curve analysis. Journal of Behavioral Medicine, 16, 199-218.

Dunn, N. J., & Wilhite, B. (1997) The effect of a leisure education program on leisure participation and psychosocial well-being of two older women who are home-centered. Therapeutic Recreation Journal, 31(1), 53-67.

Ellis, G. D., Witt, P. A., & Aguilar, T. (1983). Facilitating "flow" through therapeutic recreation services. Therapeutic Recreation Journal, 17(2), 6-15.

Erikson, E. H., Erikson, J. M., & Kivnick, H. Q. (1986). Vital involvement in old age. New York, NY: W. W. Norton & Co.

Fedorczyk, J. (1997). The role of physical agents in modulating pain. Journal of Hand Therapy, 10(2), 110-121.

Fiatarone, M. A., O'Neill, E. F., Ryan, N. D., Clements, K. M., Solares, G. R., Nelson, M. E., Roberts, S. B., Kehayias, J. J., Lipsitz, L. A. & Evans, W. J. (1994). Exercise training and nutritional supplementation for physical frailty in very elderly people. The New England Journal of Medicine, 330(25), 1769-1775.

Girzadas, P. M., Counte, M. A., Glandon, G. L., & Tancredi, D. (1993). An analysis of elderly health and life satisfaction. Behavior, Health, and Aging, 3(2), 103-117.

Glasser, W. (1984). Control theory. NY: Harper & Row.

Gooch, K. (1998). Cooking can provide exercise and tasty results. Accent on Living 42(4), 108-109.

Harlan, E. J., & Hawkins, B. A. (1992). Terminal illness, aging and development disability: A therapeutic art intervention. Therapeutic Recreation Journal, 26(3), 49-53.

Hawkins, B. A. (1993). An exploratory analysis of leisure and life satisfaction of aging adults with mental retardation. Therapeutic Recreation Journal, 2, 98-107.

Hopkins, H. L. (1988). Current basis for the theory and philosophy of occupational therapy. Occupational Therapy. Philadelphia, PA: Lippincott.

Howe, C. Z. & Rancourt, A. M. (1990). The importance of definitions of selected concepts for leisure inquiry. Leisure Science, 12, 395-406.

Iso-Ahola, S. E. (1992). Perceived control and responsibility as mediators of the effects of the therapeutic recreation on the institutional aged. Therapeutic Recreation Journal, 4(1), 36-43.

Kaufman, S. R. (1986). The ageless self, Madison, WN: The University of Wisconsin Press.

Keller, M. J., & Turner, N. H. (1986). Creating wellness programs with older people: A process for therapeutic recreators. Therapeutic Recreation Journal, 20(4), 6-15.

King, T. I. (1993). Hand strengthening with a computer for purposeful activity. American Journal of Occupational Therapy, 47, 635-637.

Kivett, V. R., & Orthner, D. (1980). Activity patterns and leisure preferences of rural elderly with visual impairment. Therapeutic Recreation Journal, 14(2), 49-57.

Lindo, G., & Nordholm, L. (1999). Adaptation strategies, well-being, and activities of daily living among people with low vision. Journal of Visual Impairment and Blindness, 93(7), 434-446.

Lyngberg, K., Danneskiold-Samsøe, B., & Halskov, O. (1988). The effect of physical training on patients with rheumatoid arthritis: Changes in disease activity, muscle strength and aerobic capacity. A clinically controlled minimized cross-over study. Clinical & Experimental Rheumatology, 6, 253-260.

MacNeil, R. D. (1988). Leisure program and services for older adults: Past, present, and future research. Therapeutic Recreation Journal, 22(1), 24-33.

McAuley, E. (1992). The role of efficacy cognitions in the prediction of exercise behavior in middle-aged adults. Journal of Behavioral Medicine, 15, 65-88.

Minor, M.A., Hewett, J. E., Webel, R. R., Anderson, S. K., & Kay, D. R. (1989). Efficacy of physical conditioning exercise in patients with rheumatoid arthritis and osteoarthritis. Arthritis & Rheumatism, 32, 1396-1405.

Mobily, K. E., Mobily, P. R., & Lane, B. K. (1998). Using progressive resistance training as an intervention with older adults. Therapeutic Recreation Journal, 31(1), 42-69.

Moran, C. A. (1989). Anatomy of the hand. Physical Therapy, 69(12), 1007-1013.

Neistadt, M. E. (1994). The effects of different treatment activities on functional fine motor coordination in adults with brain injury. American Journal of Occupational Therapy, 48(10), 887-882.

Oldham, J. A., & Stanley, J. K. (1989). Rehabilitation of atrophied muscle in the rheumatoid arthritic hand: A comparison of two methods of electrical stimulation. The Journal of Hand Surgery, 14B, 294-297.

Pothier, B., & Allen, M. E. (1990). Kinesiology and the degenerative joint. Rheumatic Disease Clinic of North America, 16, 989-1002.

Resnick, B. & Jenkins, L. S. (2000). Testing the reliability and validity of the self-efficacy for exercise scale. Nursing Research, 49, 154-159.

Ridenour, A. (1998). Creativity and the arts in health care settings. The Journal of the American Medical Association, 279, 399-401.

Ruuskanen, J. M., & Ruoppila, I. (1995). Physical activity and psychological well-being among people aged 65 to 84 years. Age and Aging, 24(4), 292-296.

Searle, M. S., & Mahon, M. J. (1993). The effects of a leisure education program on selected social-psychological variables: A three month follow-up investigation. Therapeutic Recreation Journal, 1, 9-19.

Searle, M. S., Mahon, M. J., Iso-Ahola, S. E., Sdrolas, H. A., vanDyck, J. (1998). Examining the long term effects of leisure education on a sense of independence and psychological well-being among the elderly. Journal of Leisure Research, 30, 331-339.

Seaward, B. L. (1994). Managing stress: Principles and strategies for health and wellbeing. Boston, MA: Jones and Bartlett Publishers.

Seiger, L. H., & Hesson, J. (1994). Walking for fitness (2nd ed.). Dubuque, IA: William C. Brown.

- Shepard, R. J. (1990). The scientific basis of exercise prescribing for the very old. Journal of the American Geriatrics Society, 38, 62-70.
- Shary, J. M., & Iso-Ahola, S. E. (1989). Effects of residents' perceived competence and self-esteem.. Therapeutic Recreation Journal, 23(1), 7-15.
- Shaw, C. (1999). A framework for the study of coping, illness behavior and outcomes. Journal of Advanced Nursing, 29, 1246-1255.
- Smith, S. A., & Yoshioka, C. F. (1992). Recreational functioning and depression in people with arthritis. Therapeutic Recreation Journal, 26(4), 21-29.
- Stewart, K. J., Kelemen, M. H., & Ewart, C. K. (1994). Relationship between self-efficacy and mood before and after exercise training. Journal of Cardiopulmonary Rehabilitation, 14, 35-42.
- Stohr, S. (1993). The quilting club: Quilting as recreational therapy for the elderly. Nursing, 23(3), 64.
- Teague, M. L. & MacNeil, R. D. (1997). Institution-based case and the delivery of leisure services. Aging and leisure vitality in later Life (2nd ed.). Madison, WI: Coulee Press.
- Thoren, P., Floras, J. S., Hoffmann, P., & Seals, D. R. (1990). Endorphins and exercise: Physiological mechanisms and clinical implications. Medicine and Science in Sports and Exercise, 22, 417-425.
- Trombly, C. A., Thayer-Nason, Bliss, G., Girard, C. A., Lyryst, A., & Brexa-Hooson, A. (1986). The effectiveness of therapy in improving finger extension in stroke patients. The American Journal of Occupational Therapy, 40, 612-617.

Voelkl, J. E., (1990). The challenge skill ration of daily experience among older adults residing in nursing homes. Therapeutic Recreation Journal, 24(2), 7-17.

Voelkl, J. E., & Hermann, C. (1993). Therapeutic recreation assessment and intervention with an older adult displaying symptoms of dementia and depression. Therapeutic Recreation Journal, 27(1), 51-57.

Weber, D. C., Fleming, K. C., & Evans, J. M. (1995). Rehabilitation of geriatric patients. Mayo Clinic, 70(12), 1198-1204.

Young, A., & Skelton, D. A. (1994). Applied physiology of strength and power in older age. International Journal of Sports Medicine, 15, 149-151.

San José State
UNIVERSITY

**Department of Recreation
and Leisure Studies**

One Washington Square
San José, CA 95192-0060
Voice: 408-924-3000
Fax: 408-924-3081
E-mail: saboyd@email.sjsu.edu

Appendix A

Agreement to Participate in Research

Responsible Investigator(s): Linda M. Simon

Title of Protocol: The Therapeutic Value of Recreational
Hand Activities for Older Adults

1. I have been asked to participate in research to improve hand function through exercises and recreational activity.
2. I understand that this research program will be held for about two hours each day for five days. I will be asked to perform 15 hand exercises utilizing a Thera-Rod® (the rod measures 40 inches, is two and one-half inches in diameter, and weighs around five ounces). I will also be asked to perform a recreational hand activity (arts, crafts, finger manipulating game, etc.). I will fill-out a questionnaire form before and on the last day of participation in this research to determine my perceived hand condition. The study will take place in the Auditorium, in the city of Palo Alto, CA each afternoon for five days, starting April 30, and ending May 4, 2001.
3. No foreseeable risks or discomfort to the participant are anticipated other than mild joint and/or muscle pain in the hands which would normally result from engaging in hand activity. This discomfort should lessen as a result of continuing participation in the program.
4. There are possible benefits from participating in this study. Improved hand function may occur. Feelings of personal well-being and self-efficacy may occur.
5. Alternative procedures are not to participate and use time as one pleases.
6. The results of this study (when published) will not include information that could identify the study participants.
7. There is no compensation for participation in this study.

Subject's Initials

8. Any questions regarding the research may be addressed to the principal investigator: Linda M. Simon. Complaints about the research may be presented to the Department Chair: Dr. Charles Whitcomb at (408) 924-3000. Questions about research, subjects' rights, or research-related injury may be presented to Dr. Nabil Ibrahim, Associate Vice President for Graduate Studies and Research, at (408) 924-2480.

9. No service of any kind, to which a subject is otherwise entitled, will be lost or jeopardized if subject chooses to not to participate in this study.

10. The participant's consent is given voluntarily. Subject may refuse to participate in the study or in any part of the study. Any time during the study the subject is free to withdraw without

11. .prejudice to the subject's relations with San Jose State University or any other participating institutions.

11. Subject has received a signed and dated copy of this consent form.

- The signature of a subject on this document indicates agreement to participate in the study.
- The signature of a researcher on this document indicates agreement to include the above named subject in the research and attestation that the subject has been fully informed of his or her rights.

Signature

Date

Investigator's Signature

Date

Note: If consent form is more than one page each non-signature page must be initialized by subject.

Appendix B

~Recreational Hand Craft Activities~

Napkin Holder (for a single place setting)

Materials: Cardboard paper towel spools (pre-cut 3-inch pieces)
Acrylic liquid paints
Glue
15 Pre-cut apple design (made from paper or felt)
Scissors (optional)

Directions: Paint 3" spool and add or glue decals or a pre-cut apple design made from felt pieces on each napkin holder. Subjects may choose to cut their own craft pieces (depending on the flexibility of the hands). This craft may take two days to complete.

Coin Bank

Materials: 15 one-quart soya milk containers
Colorful tissue paper or other type of materials
Glue

Directions: Utilizing empty one-quart soya milk container, design a covering for the box. Use tissue paper or other material to cover the outside of the box. This craft takes one day to complete.

Jigsaw Puzzle

Materials: 15 pre-cut cardboard jigsaw puzzles
Acrylic liquid embroidery paints
Colorful fine felt-tip markers
Tracing paper with various designs (optional)

Directions: Create a picture on pre-cut cardboard jigsaw puzzle pieces. Paint or draw picture(s) with acrylic liquid embroidery paints or fine felt-tip markers. This craft may take two days to complete.

Appendix C

~Thera-Rod© Exercise Program~

<u>Time</u>	<u>Category</u>	<u>Exercise</u>
5 minutes	Warm-ups:	<ol style="list-style-type: none"> 1. Piano Playing 2. Thumb & finger tap 3. Wrist flexion
20 minutes	Thera-Rod© Exercises	<ol style="list-style-type: none"> 1. Finger walk-up & down 2. Wrist Deviation 3. Hand & Eye Coordination in relation to the body. 4. Row Row (to the side) 5. Front/back Press 6. Batter-up Hand Grasp 7. Finger/loop manipulation 8. Open Hand Grip Climb 9. Top-over Stretch 10. Hand Massage
5 minutes	Cool-downs:	<ol style="list-style-type: none"> 1. Hand Clasp 2. Finger message 3. Joint Flexion

Appendix D

~Thera-Rod ©~ Exercise Procedures

Each participant will sit upright in a straight-back chair or wheelchair while performing the following exercises.

Warm-up Exercises:

Piano Playing Mime- Fingers of both hands are positioned in mid-air. Elbows are bent at waist, and the baby finger, then each of the next three fingers and the thumb are used in forward and reverse order. The fingers of both hands move through the air at the same time as if striking piano keys in rising and falling scale. Repeat the “scale” sequence five times.

Thumb/Finger Tap- With both right and left hands, simultaneously touch/tap each finger to thumb. The count is, 1-2-3-4, 2-2-3-4, 3-2-3-4, 4-2-3-4, 5-2-3-4, 6-2-3-4, 7-2-3-4, 8-2-3-4.

Counting slowly for a total of eight times for each finger.

Wrist Flexion- Turn palms of both hands face-down. Roll hands to a palm-up position. Repeat ten times, moving slowly.

Thera-Rod© Exercises:

1. Finger Walk- Hold Thera-Rod© in the right hand in a vertical position one inch from the bottom. Move the fingers one at a time up the Thera-Rod © in an ascending order to the top of the Thera-rod©. On reaching the top, walk fingers in descending order back down the Thera-Rod©. Walk fingers up and down two more times. Repeat with the left hand.
2. Wrist Flexion and Extension- Positioned in the front of the chest hold Thera-Rod© horizontally with arms extended and hands 2 feet apart. Palms are facing downward. Do a wrist

curl with fingers rolling down, slowly forward, and downward, and back upward (so knuckles point to ceiling) ten times.

3. **Hand & Eye Coordination** - Hold Thera-Rod© with right hand in a vertical position with arms extended in front of the chest. Position right hand midway on the Thera-Rod©. Toss Thera-Rod© from right to left hand ten times. Next close the eyes and repeat the exercise with eyes closed.

4. **Row, Row-** Position Thera-Rod© to right side of the body, hold in a paddling position. Hold the rod with left hand palm down on top end and the right hand grasping around the rod at the bottom. Paddle on the right side ten times. Change sides and repeat on the left side.

5. **Front/Back Press-** Hold Thera-Rod© horizontally with hands 2 feet apart, and the rod touching the chest. Elbows are folded in touching waist. Press Thera-Rod© forward to full elbow extension and backward to the chest (wrist flexion and extension movements) ten times very slowly.

6. **Batter-Up-** Hold Thera-Rod© in vertical position in front of body. Place right hand wrapped around Thera-Rod© 1/2 inch from bottom. Ascend Thera-Rod© with hand-over-hand movements. When the top is reached, descend Thera-Rod© using the same motion. Repeat the exercise twice.

7. **Finger Loop Manipulation-** Place Thera-Rod© in vertical position. Assemble the thumb and the index finger in a circular position. Hold Thera-Rod© 1/2 inch from the bottom of its base. Ascend the Thera-Rod© alternating finger loops of left and right hands. After reaching the top of the Thera-Rod©, descend to the base/bottom. Repeat the exercise twice.

8. **Open Hand Grip Climb**- Position Thera-Rod© mid-way in front of body in a vertical position. Place palm of opened hand (fingers together/side by side). Ascend to top of Thera-Rod© with sliding motion and clasped thumb. Alternate hands as they climb/slide along Thera-Rod©. Repeat up and down twice.
9. **Top-Over Stretch**- Elbows extended and hands 2 feet apart, position Thera-Rod© overhead in horizontal position. Move/stretch to right side then to left side. Sway side to side ten times on each side. Next, while in the same position make short circles above the head ten times. Then hold Thera-Rod© with middle three fingers and stretch side to side.
10. **Hand Massage**- Place Thera-Rod© on lap. Roll Thera-Rod© up and down lap/legs (forward and backward motion) ten times.

Cool-Downs:

Hand Clasp- Fold hands, press them together and then release, five times. Place palms together with fingers extended in prayer-type position. Press or apply pressure (palm against palm) hold to the count of five and release. While hands are pressed palm-to-palm rise to center (in front of chest), then move to right side, return to center then to the left side. Repeat five times.

Finger Massage- With thumb and index finger of right hand slowly grasp the base of the left hand's first finger, slide with a light grip down to the tip. Repeat this massage on all fingers. Change hands and repeat the exercise on the right hand.

Joint Flexion - Hold all fingers down in a fist with thumb on each hand. Next, release the little finger of both hands and wiggle them up and down five times. Repeat with each finger on both hands simultaneously, ending with the thumbs.

Appendix E

Recreational Hand Activity Therapy Questionnaire

Complete each statement below by drawing the letter X on the number which best reflects how your hands feel, and then how you feel mentally. The scale is numbered from 1 to 5.

Right now, my hands feel:

Very Warm	[1]	[2]	[3]	[4]	[5]	Very Cold
Stiff	[1]	[2]	[3]	[4]	[5]	Flexible
Pain-free	[1]	[2]	[3]	[4]	[5]	Painful
Shaky	[1]	[2]	[3]	[4]	[5]	Relaxed
Strong	[1]	[2]	[3]	[4]	[5]	Weak
Numb	[1]	[2]	[3]	[4]	[5]	Revived

Right now, my mind is:

Activated	[1]	[2]	[3]	[4]	[5]	Sleepy
Bored	[1]	[2]	[3]	[4]	[5]	Stimulated
Focused	[1]	[2]	[3]	[4]	[5]	Distracted
Negative	[1]	[2]	[3]	[4]	[5]	Positive
Pleasant	[1]	[2]	[3]	[4]	[5]	Unpleasant (thoughts)

Gender: Male _____ Female _____

Age: _____ **Hand Deficit** _____

(Post-test only) When participating in the Hand Study sessions, I:

Lost track of time	[1]	[2]	[3]	[4]	[5]	Worried about time
Improved myself	[1]	[2]	[3]	[4]	[5]	Notice no improvement
Was in Control	[1]	[2]	[3]	[4]	[5]	Was not in control

Appendix F

Experimental and Control Groups Demographics Results

Control Group						
Participant's Code No.	Age	Male	Female	Hand Deficit	Control Group Total Score	
					Pre	Post
2	70		x	Little to no hand pain	41	44
3	92		x	Arthritis	33	39
6	86	x		Little to no hand pain	43	46
7	76		x	Carpal tunnel	45	50
18	82		x	Arthritis	31	43
20	89		x	Arthritis	42	40
21	92		x	Arthritis	34	27
23	96	x		Arthritis	40	28
25	74		x	Arthritis	33	37
29	83		x	Other	45	44
30	97		x	Neuropathy	35	39
31	92		x	Arthritis	39	31
Mean	85.7	2	10		38.4	39.0

Experimental Group						
Participant's Code No.	Age	Male	Female	Hand Deficit	Exp. Group Total Score	
					Pre	Post
1	92		x	Other	33	48
5	86		x	Little to no hand pain	34	53
8	95		x	Arthritis	40	51
9	92		x	Stroke	37	45
11	91		x	Little to no hand pain	44	44
12	79		x	Arthritis	36	53
13	79		x	Arthritis	45	45
15	75		x	Other	55	54
16	91		x	Arthritis	30	35
17	88		x	Arthritis	50	54
19	88		x	Other	38	49
27	70		x	Stroke	31	39
28	80		x	Other	43	53
Mean	85	0	13		39.6	47.9

Appendix G

Experimental Group Score Results from Questionnaires

Experimental Group - Pretest Results - N=13								
Positive Adjectives	Participant N	1 N %	2 N %	3 N %	4 N %	5 N %	Negative Adjectives	
Right now, my hands feel:								
Very Warm	13	1 8	8 62	2 15	1 8	1 8	Very Cold	
Flexible	13	3 23	7 54	1 8	0 0	2 15	Stiff	
Pain-free	13	5 39	7 54	0 0	0 0	1 8	Painful	
Relaxed	12	4 33	6 50	1 8	1 8	0 0	Shaky	
Strong	11	2 18	5 46	2 18	1 9	1 9	Weak	
Revived	13	2 15	7 54	3 23	0 0	1 8	Numb	
Right now, my mind is:								
Activated	13	1 8	6 46	3 23	2 15	1 8	Sleepy	
Stimulated	12	2 17	8 67	0 0	2 17	0 0	Bored	
Focused	13	1 8	8 62	2 15	2 15	0 0	Distracted	
Positive	13	1 8	10 76	0 0	2 15	0 0	Negative	
Pleasant	13	3 23	7 54	1 8	2 15	0 0	Unpleasant (thoughts)	
Experimental Group - Posttest Results - N=13								
Positive Adjectives	Participant N	1 N %	2 N %	3 N %	4 N %	5 N %	Negative Adjectives	
Right now, my hands feel:								
Very Warm	13	8 62	3 23	1 8	1 8	0 0	Very Cold	
Flexible	13	7 54	3 23	2 15	1 8	0 0	Stiff	
Pain-free	13	8 62	2 15	1 8	2 15	0 0	Painful	
Relaxed	13	5 39	5 39	3 23	0 0	0 0	Shaky	
Strong	13	5 39	4 31	3 23	1 8	0 0	Weak	
Revived	13	8 62	2 15	2 15	1 8	0 0	Numb	
Right now, my mind is:								
Activated	13	9 69	3 23	0 0	1 8	0 0	Sleepy	
Stimulated	13	10 77	2 15	1 8	0 0	0 0	Bored	
Focused	13	11 85	1 8	0 0	1 8	0 0	Distracted	
Positive	13	8 62	3 23	2 15	0 0	0 0	Negative	
Pleasant	13	10 77	2 15	1 8	0 0	0 0	Unpleasant (thoughts)	
When Participating in the Hand Study Sessions, I:								
Lost track of time	13	10 77	3 23	0 0	0 0	0 0	Worried about time	
Improved myself	13	9 69	3 23	1 8	0 0	0 0	Noticed no improvement	
Was in Control	13	11 85	1 8	1 8	0 0	0 0	Was not in control	

Appendix H

Control Group Score Results from Questionnaires

Control Group - Pretest Results - N=12								
Positive Adjectives	Participant N	1 N %	2 N %	3 N %	4 N %	5 N %	Negative Adjectives	
Right now, my hands feel:								
Very Warm	12	0 0	8 67	4 33	0 0	0 0	Very Cold	
Flexible	11	0 0	6 55	4 36	1 9	0 0	Stiff	
Pain-free	12	3 25	2 17	5 42	2 16	0 0	Painful	
Relaxed	11	3 27	6 55	1 9	1 9	0 0	Shaky	
Strong	12	1 8	6 50	3 25	2 17	0 0	Weak	
Revived	12	0 0	7 58	4 33	1 8	0 0	Numb	
Right now, my mind is:								
Activated	12	1 8	7 58	1 8	3 25	0 0	Sleepy	
Stimulated	12	1 8	5 42	5 42	1 8	0 0	Bored	
Focused	11	1 9	6 55	2 18	2 18	0 0	Distracted	
Positive	12	2 17	6 50	2 17	2 17	0 0	Negative	
Pleasant	12	1 8	6 50	3 25	2 17	0 0	Unpleasant (thoughts)	
Control Group - Posttest Results - N=12								
Positive Adjectives	Participant N	1 N %	2 N %	3 N %	4 N %	5 N %	Negative Adjectives	
Right now, my hands feel:								
Very Warm	12	0 0	9 75	2 17	1 8	0 0	Very Cold	
Flexible	11	2 18	3 27	2 18	3 27	1 9	Stiff	
Pain-free	12	4 33	1 8	2 17	1 8	4 33	Painful	
Relaxed	12	4 33	4 33	2 17	2 17	0 0	Shaky	
Strong	12	3 25	1 8	4 33	2 17	2 17	Weak	
Revived	12	1 8	3 25	5 42	2 17	1 8	Numb	
Right now, my mind is:								
Activated	12	5 42	0 0	5 42	2 17	0 0	Sleepy	
Stimulated	11	2 18	5 46	3 27	1 9	0 0	Bored	
Focused	12	7 58	3 25	2 17	0 0	0 0	Distracted	
Positive	12	6 50	3 25	2 17	1 8	0 0	Negative	
Pleasant	12	6 50	3 25	2 17	1 8	0 0	Unpleasant (thoughts)	

Appendix I

Difference in Pre-test and Post-test Scores

Subject #	Group: Experimental = 1 Control = 2	Hand Score Difference	Mind Score Difference	Optimal Experience (Experimental Group Only)
001	1	7	8	15
002	2	3	0	
003	2	-3	5	
005	1	6	11	15
006	2	2	1	
007	2	5	0	
008	1	6	5	15
009	1	3	5	11
011	1	-1	1	14
012	1	6	11	15
013	1	2	1	15
015	1	-1	0	15
016	1	9	5	
017	1	0	4	13
018	2	4	8	
019	1	4	6	
020	2	-4	2	
021	2	-6	2	
023	2	-11	-5	12
025	2	2	-1	15
027	1	2	6	
028	1	4	6	
029	2	3	4	
030	2	-2	4	
031	2	-4	3	