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A PILOT STUDY OF THE EFFECTS OF MARTIAL ARTS TRAINING ON
CHILDREN'S SYMPTOMS OF PSYCHOPATHOLOGY

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ABSTRACT

The following study was performed for the purpose of examining the effects of martial arts training on children's symptoms of psychopathology and self-esteem. 3rd, 4th, and 5th graders and their parent(s) from two schools responded to questionnaires regarding their symptoms of psychopathology [the Child Behavior Checklist (CBCL; Achenbach and Rescorla, 2001) and the Revised Child Anxiety and Depression Scale (RCADS; Chorpita, Yim, Moffitt, Umemoto, and Francis, 2000)] and self-esteem [the Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965)] both before and after a 5-week period of training in Shotokan Karate. Specific hypotheses regarding the effects of Karate training over time were as follows: 1) CBCL Internalizing and Externalizing scores will decrease over time, 2) RCADS Total Anxiety and Depression scores will decrease over time, and 3) RSE scores will increase over time. Hypotheses were partially supported, with RCADS Depression scores exhibiting a significant decrease over time.

TABLE OF CONTENTS

| | |
|-----------------------------------|-----|
| Abstract | iii |
| List of Tables | v |
| Chapter 1: Introduction | 1 |
| Background Research | 1 |
| Current Study | 9 |
| Chapter 2: Method | 11 |
| Overview | 11 |
| Participants | 11 |
| Measures | 14 |
| Procedure | 17 |
| Hypotheses | 18 |
| Chapter 3: Results | 20 |
| Chapter 4: Discussion | 23 |
| Limitations | 24 |
| Future Research | 28 |
| Appendix A | 30 |
| Appendix B | 37 |
| Appendix C | 43 |
| Appendix D | 45 |
| References | 50 |

LIST OF TABLES

| <u>Table</u> | <u>Page</u> |
|--|-------------|
| 1. Synopsis of Measurements and Informants | 47 |
| 2. Mean Pre- and Post-Experimental Data | 48 |
| 3. Summary of Hierarchical Regression Analysis for Determining Predictive Ability of Subjective Measure (Appendix C) on RSE Post- Experimental Scores | 49 |
| 4. Summary of Hierarchical Regression Analysis for Determining Predictive Ability of Subjective Measure (Appendix C) on CBCL Internalizing Post-Experimental Scores | 49 |
| 5. Summary of Hierarchical Regression Analysis for Determining Predictive Ability of Subjective Measure (Appendix C) on CBCL Externalizing Post-Experimental Scores. | 50 |
| 6. Summary of Hierarchical Regression Analysis for Determining Predictive Ability of Subjective Measure (Appendix C) on RCADS Total Anxiety Post-Experimental Scores | 50 |
| 7. Summary of Hierarchical Regression Analysis for Determining Predictive Ability of Subjective Measure (Appendix C) on RCADS Depression Post-Experimental Scores | 51 |

CHAPTER 1: INTRODUCTION

Kazdin, Siegel, and Bass (1990) noted that psychological research on alternative, “non-behavioral” techniques to address mental health and behavioral concerns is lacking, but necessary for the continued improvement of the discipline. Some of the authors’ suggestions in terms of enhancing academic interest and proclivity in this domain included using researchers’ and practitioners’ colloquial experiences to inform the empirical process; that is, to diversify the development of techniques in line with the ideas and creative notions of professionals within the discipline. The authors pointed out that research relevant to the development of such techniques could potentially contribute to the field, and aid those individuals for whom standard behavioral techniques are ineffective. The potential also exists for these techniques to be developed into preventative interventions, should initial research prove fruitful. In keeping with this assertion, the following study sought to provide a pilot evaluation of a non-behavioral program for youth, and to monitor its effects broadly on measures of childhood psychopathological symptoms and self-esteem.

Background Research

The program examined in this study was that of the martial arts. The experimenter in this study has a lifelong history of practice in several martial arts, and his informal experience suggested that practice in a specific form (Shotokan Karate) had the potential to provide a positive influence on new trainees. A small host of research additionally bolstered the selection of this form of activity as one worthy of examination

in terms of psychological effects. (A brief presentation of the major points of these studies follows.)

For the purposes of this study martial arts were defined as the practice of physical motions related to self-defense (punching, kicking, evading, blocking, etc.) coupled with meditative and philosophical exercises designed to foster responsible use of these techniques. The latter aspects of this definition become important in the conceptualization of distinctions of two general classes of martial arts, those being “traditional” and “Americanized” martial arts. Traditional martial arts are those derived from many Eastern traditional beliefs of honor, respect, and following the guidance of one’s master, and tend to have a pervasive effect on practitioners’ lifestyles. Americanized martial arts are those developed primarily as sporting activities in individualized cultures such as America, and typically do not exhibit the same pervasive effect on practitioners’ lifestyles outside the sport environment. The form selected for use in this study was the traditional Japanese martial art of Shotokan Karate.

Several articles have been published regarding the impact of traditional martial arts (in their various forms) on practitioners. Weiser, Kutz, Kutz, and Weiser (1995) gathered data from a variety of literature sources as to the possible effects of traditional martial arts in combination with verbal psychotherapy. The components of traditional Karate were outlined, which are “Kihon,” or basic techniques of blocking, punching, kicking, and movement, “Kata,” which is a patterned movement involving numerous Kihon techniques, analogous to a dance or fight with invisible opponents, and “Kumite,” which is actual sparring with a live partner. In addition to the basic physical techniques,

the philosophical components of most traditional martial arts were also indicated to be present in Karate, the cornerstone of which is the imperative of instructors (or “sensei”) to hand questions back to students, so that they might seek answers from within, rather than receive pre-formulated knowledge from without. This generally occurs with guidance and information on how and where to seek answers being imparted upon students by instructors. The authors pointed out the similarity of this technique to those seen in many forms of psychotherapy, and opined that Karate could be utilized as a source of behavioral change or outright therapy. In addition to traditional philosophical orientation, the authors point out some of Karate’s unique meditative techniques. The practices of deep breathing and contemplative techniques common in the religious philosophy of Zen Buddhism are also seen in Karate, as are several moving meditations that are embodied in the form of Kata (Weiser et al., 1995).

Weiser et al. (1995) also described a case study of a 20-year-old man (termed “M” by the authors) that involved Karate training implemented as an adjunct to a lengthy psychotherapy. “M” reported feelings of increased self-esteem through the practice of the martial arts, as well as decreased levels of depression and anxiety. The authors also indicated that “M” was able to develop clearer ideation of his thoughts and feelings through Karate training, as well as his interactions with other practitioners. This, the authors postulated, enabled “M” to return to therapy with a clearer agenda of the difficulties he faced, and allowed for therapy to progress more efficiently and smoothly. Such findings await controlled demonstration of the effects of martial arts on symptoms of psychopathology, however, in conjunction with or separate from psychotherapy.

Further limitations existed in that the therapy administered was not described, and took place over a long period of time (at least two years, although the exact time in therapy was not reported). Likewise, the nature of Karate training was not described, except that the authors indicated “M’s” participation in Kata and Kumite exercises at some point during his Karate practice. The authors also made a variety of attributions and interpretations about “M’s” behavior without noting the justification of why they did so. Additionally, no outcome measures other than subjective clinical impressions were reported in this study, thus limiting the utility, conclusiveness, and generalizability of the authors’ reported findings.

Richman and Rehberg (1986) examined the correlation between martial arts participation and self-esteem. Sixty competitors in a large national Karate competition were selected at random the day before the competition to fill out a survey including questions about their demographics, belt level, perceived Karate ability relative to others, and the Rosenberg Self-Esteem (RSE) Scale. Subjects ranged in age from 5-34 (mean=23.4) years old, and were subdivided into those who subsequently won trophies as a result of their competition ($n = 9$), and those who did not ($n = 51$). Analyses were performed that demonstrated a statistically significant relationship between length of time training and self-esteem. Further analyses indicated that RSE scores significantly correlated (positively) with individuals’ perceived ability in comparison to other Karate practitioners. A final analysis demonstrated that the RSE scores of those individuals who would subsequently win a trophy for their competition were significantly higher than those who would not. Though these results are interesting, the sample utilized was drawn

solely from Karate practitioners attending a large, competitive tournament, and were thus a non-representative sample of all Karate practitioners. Additionally, the results were purely correlational in nature, leading to many plausible explanations for the exhibited relationships between Karate training and self-esteem. It is possible that Karate training over time led to a heightened sense of self-esteem for individuals, but it is equally possible that individuals who began their Karate training with initially high levels of self-esteem maintained their participation for a longer period of time than those with initially lower levels.

Nosanchuk (1981) examined the effect of traditional martial arts training on aggression. The author administered a questionnaire concerning aggression to students of three schools of martial arts (two Karate schools and one Tae Kwon Do school; demographics of sample were not reported). The first part of the questionnaire consisted of six story-type situations in which an individual would hypothetically face threat or ridicule. Following the story, the individual was asked to determine whether or not he or she would use physical force against an assailant/tormentor in the hypothetical situation described. The second part of the questionnaire consisted of Rosenzweig frustration tasks (Rosenzweig, 1947, as cited in Nosanchuk, 1981), which are similar to the story situations outlined above, but are administered in pictorial form. A final component of the questionnaire was an item regarding the respondent's belt level and years of experience in practicing the martial arts. Using the data gained from 41 respondents on this questionnaire, a negative correlation was observed ($r = -0.58$) between experience level and aggressive response.

Subsequent to data collection, the author interviewed any interested practitioners of Karate, and questioned them regarding their perceptions of why advanced training in the martial arts would correlate negatively with aggression. On the basis of those discussions, four common themes emerged concerning practitioners' attributions of the reasons for this relationship: self-control of emotions (re-labeling anger as empathy), self-assertiveness (retaining composure in the face of anger), self-esteem, and self-confidence (the feeling that the individual "doesn't have to prove anything"). These survey data were coded for expressions of these constructs, and none were found to be significantly related to lower levels of aggression. A regression equation, however, using belt-level and constructiveness (a subscale of self-assertiveness) as predictors yielded an R^2 of 0.47, providing support for the hypothesis that this facet of self-assertiveness as measured contributed some additional variance above that afforded by belt-level alone.

Trulson (1986) researched the effects of traditional Tae Kwon Do training on indicators of juvenile delinquency. The author utilized a sample of 34 male high school students (age 13-17; no mean reported) who were referred by their parents because of problems with delinquent-type behavior. All subjects were administered the MMPI, and were classified as juvenile delinquents on the basis of their profiles. This classification was seemingly made on the basis of clinical elevations in Psychopathic Deviation in comparison to non-delinquent controls, but the author did not outline the exact method of using the MMPI as a diagnostic tool in this regard.

The subjects were additionally administered tests of aggression similar to those used in Nosanchuk's (1981) research cited above and the Jackson Personality Inventory

(JPI). Subjects were matched on the basis of personality type, SES, and age, and were assigned to one of three groups: traditional Tae Kwon Do training, Americanized (or “modern”) Tae Kwon Do training, or a sports control group. Assignment consisted of the development of nine matched triads, which were assigned to groups at random, and the random assignment of the remaining seven subjects to either Tae Kwon Do condition. All three groups received training from the same male instructor three times per week for six months. Students were encouraged to sustain participation in the study by the experimenter’s indication that they would be turned over to juvenile authorities if they decided to drop out, which would likely lead to their incarceration. At the end of the six month period, all students were again administered the measures outlined above, and pre-post scores were compared. Students in the sports control group exhibited little change on any measure. Students in the traditional Tae Kwon Do training group displayed normal MMPI profiles in comparison to the original group of non-delinquent controls (including a mean reduction on Psychopathic Deviation of 12 points, placing this group in the non-clinical range), had aggression profiles that were well below average norms (and significantly decreased from their pre-test levels), and exhibited significant increases in self-esteem as indicated by the JPI. Students in the “modern” Tae Kwon Do training group exhibited significant increases in aggressiveness and delinquent tendencies (including an increase of 7 points in Psychopathic Deviation), and none of the demonstrated positive effects that were notable in the traditional Tae Kwon Do training group. The differential success of the traditional group was touted by the author as

indicative of support for Tae Kwon Do as a novel “cure” for juvenile delinquency, especially given the relatively short time frame of the intervention.

A one-year follow-up was conducted with four students from the traditional training group, four students from the “modern” training group, and two students from the control group. Three of four from the traditional training group were still engaging in Tae Kwon Do at the time of follow-up, and all were classified as non-delinquent. None of the students from the “modern” training group were still engaged in Tae Kwon Do practice at follow-up, and all four were still classified as delinquent, as were both of the students from the control group. The author gave little information about why so few of the participants of the original study were selected for follow-up, however, and it is possible that the follow-up results were attributable to sampling artifact.

Although the literature reviewed represents initial efforts of inquiry into the psychological effects of martial arts training, limitations exist that affect the impact of these studies. Of particular note is the limited use of targeted, objective measures of psychopathological symptoms. Additionally, none of the authors defined the specific content of the martial arts training programs utilized in their studies, making an examination of the methodology of these studies impossible and greatly limiting the opportunity for replication. The current study sought to remedy these shortcomings through implementation of more standardized and well-researched measures of psychopathology, as well as a detailed description of a martial arts training program that could be utilized in subsequent research on the topic.

Current Study

The current study focused mainly on the question of whether or not training in traditional martial arts contributed to reduction in children's symptoms of psychopathology, as measured by the Child Behavior Checklist (CBCL; Achenbach and Rescorla, 2001) Internalizing and Externalizing Scales, and the Revised Child Anxiety and Depression Scale (RCADS; Chorpita, Yim, Moffitt, Umemoto, and Francis, 2000) Total Anxiety and Depression Subscales. This study also examined the effects of martial arts training on children's self-esteem, as measured by the Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965). The elements of martial arts described by previous articles as potential sources of effect are the physical aspects of training, methods of meditation, and the philosophy of traditional martial arts. As such, each of these was included in this pilot study in an effort to determine whether or not any effect arose from their combined implementation. (For a detailed description of the timing and nature of instruction, please see Appendix A.)

The martial art that was employed in this study was Shotokan Karate. This form was selected for two reasons: (1) the experimenter's familiarity with this form of martial arts, which was likely to ensure integrity of the delivery of the program, and (2) the specific, more or less manualized nature of the art, which had the potential to facilitate subsequent replication. At the time of its development in the early part of the 20th century, the specific techniques of Shotokan Karate were documented by its chief proponent, who also formalized the art, Gichin Funakoshi (Funakoshi, 1973). These books are widely available today, such that the practice of this art has little variation,

regardless of location. It might be surprising to know that this is extremely anomalous in the teaching and practice of the martial arts, as very few have written or pictorial histories that document techniques. This has generally lead to an overall drift in teaching method that results in very different forms of the same martial art depending upon location. For the purposes of subsequent replication of techniques used in this study, Shotokan Karate was thus a logical choice.

CHAPTER 2: METHOD

Overview

Thirty children between the ages of eight and 11 years old enrolled in a five-week Karate training program provided at their schools (School A and School B). Children completed pre- and post-experimental questionnaires measuring levels of psychopathology and self-esteem. Paired *t*-tests were used to compare pre- and post-experimental scores in several domains: CBCL Internalizing, CBCL Externalizing, RCADS Total Anxiety, RCADS Depression, and RSE. Additionally, a hierarchical regression was performed, analyzing whether or not a subjective, instructor-responder measure accounted for any unique variance in the prediction of post-experimental scores for each of the above domains.

Participants

Recruitment. Participants were intended to be solicited from Oahu elementary schools by offering free Karate classes to all children in the 3rd, 4th, and 5th grades. Thirty-three schools were contacted to discuss recruitment of their students for inclusion in this study, and the first 31 declined to be involved. Because of the initial limited success of the solicitation process, those schools that did agree to be involved in the study were granted some leeway in terms of allowing their input regarding student recruitment procedures. As a consequence, changes were made to the initially intended (and preferred) method of including as many students as possible. School A elected to extend invitations only to members of an A+ after-school program that returned recruitment statements because they were already in attendance after school on the prescribed days.

School B extended invitations to all students, but was only able to recruit on one occasion, rather than the predetermined process of two waves of solicitation separated by two weeks that had been shown to be effective in a colleague's thesis research (Nakamura, 2003). A copy of the recruitment statement sent to children and their parents appears in Appendix B. This statement included a plain-language disclosure concerning the potential risks, benefits, and participant responsibilities related to enrollment in this study, and its signed return served as informed consent (or assent in the case of children) for voluntary inclusion in this study.

Recruitment of children from different age groups was intended to ensure heterogeneity of social interactions (consistent with the manner in which Karate classes are traditionally taught) and facilitated the application of any findings of this study to a somewhat broad array of age groups. An additional justification for the selection of these heterogeneous groups was that, in general, older students are often willing and able to aid younger students in the acquisition of various physical techniques, which allows for richer peer interactions in the form of these intra-student instructions.

Sample characteristics. Eighteen students from School A and 12 from School B were successfully recruited. Attrition from each group led to 14 students that completed the class at School A and seven at School B (with students with no more than two-hours' absence designated as completers). All students who provided both pre- and post-experimental data, and who were subsequently included in the statistical analyses, had perfect attendance to the class. Students excluded from the final analysis generally missed all or the majority of classes, often provided no pre-experimental data, and

universally did not complete post-experimental measures, thus making an intent-to-treat analysis of the entire recruited sample unviable. Specific conditions that led to attrition were as follows: one student at School A formally quit the program part-way through the first class, one never showed up for classes, and two others did not attend the last several classes. Three students at School B removed themselves from participation in favor of another after-school activity shortly after beginning the first class (without filling out measures), one student never showed up for classes, and a fifth student did not attend the last several classes. Three other students at School B had the potential to be classified as completers, but missed the last day of instruction and could not be contacted subsequent to the study's completion; hence, neither the children nor their parents completed post-experimental measures. At completion of the study, 14 students and 10 parents from School A completed post-experimental measures. Additionally, four students and parents from School B completed post-experimental measures.

The arrangement of data collection was not ideal, being positioned close to the cessation of school for the summer, but was necessary if the experimenter was to obtain data after the culmination of Karate classes. The data collection procedure had been originally slated to occur through the A+ program, with students filling out their measurements on the last day of school and parents being asked to fill out their measures a day prior, bringing the forms back to the school when completed. Due to an administrative error, however, only four child participants filled out the appropriate measures prior to leaving school for the summer, and no parents received forms or instructions regarding the post-experimental data collection.

The experimenter contacted the school to attempt to resolve this issue by calling parents directly, but summer personnel shortages led to a delay of approximately two weeks before calls and requests for meetings were returned. After obtaining parental contact information, relevant questionnaires were administered to parents and children over the phone ($n = 9$, parent and child) or through the mail ($n = 1$ parent and child). Of the children that filled out the measures at the original, predetermined time, none of the parents could be reached for telephone interview concerning CBCL data, hence the disparity in numbers between parent and child measures ($n = 14$ and $n = 18$, respectively). The delay in contacting participants and their parents to procure data was 15 days for all telephone interviews and 17 days for the mail respondent.

No statistical differences existed between the participants from School A and B in terms of age, gender, or ethnicity (neither in terms of those initially recruited nor those that completed follow-up measures). As such, the samples were combined for the purposes of data analysis. The mean age of the combined sample that completed pre- and post- measures was 9.00 years old ($SD = 0.77$). Forty-four percent of the children were female, and the relative composition of group individuals' ethnicity was as follows: 27.78% were Caucasian ($n = 5$), 27.78% were Hispanic ($n = 5$), 22.22% were African American ($n = 4$), 16.67% were Multi-ethnic ($n = 4$), and 5.56% were Pacific Islander ($n = 1$).

Measures

Child Behavior Checklist (CBCL). The CBCL is an empirically designed test that surveys children's competencies, adaptive functioning, and problems by way of parent or

primary caretaker report in order to provide a standardized description of overall functioning. The current version of this scale has been normed for children ages 6-18, and has been used in at least 4,000 other studies that involved measures of childhood psychopathology, in either its current form or one of several earlier incarnations. One-week test-retest reliability coefficients for this measure yielded ICC values averaging .95 for the problem scale items (those that take inventory of psychopathological symptoms). Measures of internal consistency on these items were also high, with alpha values ranging from .63-.94, and measures of criterion-related validity indicated that the instrument was able to significantly differentiate clinically referred from non-clinically referred populations approximately 85% of the time. Measures of construct validity, established by correlating subscale scores to scores on DSM-IV Checklists for a given sample, yielded correlation values ranging from .43-.80 (Achenbach and Rescorla, 2001).

Revised Child Anxiety and Depression Scale (RCADS). The RCADS is a child self-report scale designed as a brief, specific, self-report measure for the purpose of identifying anxious and depressive symptoms in children, in accord with DSM-IV (American Psychiatric Association, 1994) criteria. It was developed as an adaptation of an earlier measure, the Spence Children's Anxiety Scale (SCAS; Spence, 1998). The authors of the RCADS augmented the question pool drawn from the SCAS, so as to strengthen measures of generalized anxiety, and eliminated or condensed two of the original subscales on the basis of factor analysis. The authors also developed items to enable the addition of a measure of depressive symptomatology in this scale that was lacking in previous measures of childhood psychopathological symptoms. This measure

represents a succinct, specific measurement of a diverse array of childhood psychopathology that is useful in the screening of children for symptoms of various disorders. Reliability coefficients for the various subscales of the RCADS ranged from 0.73-0.82, and one-week test-retest reliability for these same subscales ranged from 0.63-0.85. External validity, determined by correlation of the RCADS subscales (separated by age and gender of respondent) with two established measures, was similarly well-supported overall, with most correlations being in the approximate 0.50-0.70 range (Chorpita et al., 2000).

Rosenberg Self-Esteem questionnaire (RSE). The RSE is a brief self-report scale designed to assess levels of self-esteem. This scale, developed by Rosenberg in 1965, may be considered the “gold-standard” of self-esteem assessment, and has received wide support through research for many years. In a literature review that encompassed 33 scales of self-esteem, Lorr and Wunderlich (1986) stated that the RSE was the only one that represented a true global measure of self-esteem, and was not confounded by testing complexities and individual variation. In a study comparing various forms of administration of this measure, Vispoel, Boo, and Bleiler (2001) noted that the generally established and accepted measures of reliability for the paper form ranged from .72-.88 across studies, and that one-week test-retest reliability had been established as having a reliability coefficient of .82.

Subjective measures. A subjective measurement, generated by the experimenter, was also utilized during this study. Following each class session, the instructor of the

course filled out a form for each student concerning their understanding of and engagement in various aspects of the class (see Appendix C).

Procedure

Participants from each school were enrolled in Karate classes with other members of their school, held on school grounds. This procedure was a necessary constraint due to liability issues of bringing children from outside a particular school onto that school's grounds. Due to spatial availability and additional scheduling constraints, classes at School A were held twice per week for one hour each class, and classes at School B were held once per week for two hours per class.

At the outset of the program, students began attending Karate classes at School A or School B. Initial training consisted of basic instruction and practice in several striking techniques and stances, which made up the majority of the first two weeks (or four hours) of classes. These techniques were incorporated into the learning of a Kata during the third week of study. The fourth week of study marked the beginning of teaching of some of the rudimentary philosophy underlying the tradition of Shotokan Karate, and students continued practicing techniques learned during the previous three weeks of study. The fifth and final week of study continued to rehearse and build on all previous efforts, and additionally included a period of guided meditation in each class period. For a detailed presentation of what occurred during each time period of instruction, please see Appendix A.

The CBCL, RCADS, and RSE were administered (as appropriate) once at the beginning of the study and once at the end to everyone who agreed to enroll. From the

CBCL, Total Externalizing and Internalizing scores from each measure were tabulated. From the RCADS, Total Anxiety and Depression were tabulated. Each of these four separate constructs served as the basis for a pre-post comparison of participants in terms of demonstrated symptoms characteristic of psychopathology. From the RSE self-esteem scores were tabulated. These scores served as the basis for a pre-post comparison of children's self-reported levels of self-esteem.

Procedures were in place to ensure that any child exhibiting a *T*-score of greater than 70 on any subscale on the CBCL or RCADS (indicating clinical impairment) would be able to obtain a clinical referral if desired by the parent(s). Because no child fell into this category, no one was excluded. Information concerning the children's age, gender, and ethnicity that was reported on the CBCL was recorded and served as the representative demographic data for individual participants.

Additionally, the subjective measurement of students' grasp of and engagement in various aspects of Karate classes was filled out by the instructor for each student at the conclusion of each class (see Appendix C). Results from this measure were tracked to potentially mitigate any eventual results. These results were also useful in determining what aspects of the class were accessible and/or challenging for the group members as a whole, which may aid in the alteration of this program for subsequent research. For a synopsis of all measurements and informants please see Table 1.

Hypotheses

It was a hypothesis of this study that children would exhibit decreases in Externalizing and Internalizing scores on the CBCL over time. It was additionally

hypothesized that children would exhibit decreases in Total Anxiety and Depression scores on the RCADS. Finally, it was hypothesized that children's scores on the RSE would increase over time.

CHAPTER 3: RESULTS

Statistical analyses conducted were paired *t*-tests that compared measurements of each of the dependent variables (externalizing problems, internalizing problems, total anxiety, depression, and self-esteem; please see Appendix D, Table 1) between aggregated participants at pre- and post-experimental time periods. As there were five such tests, a Bonferroni correction was issued, setting the adjusted statistical significance level of each individual paired *t*-test at 0.01, rather than the traditionally accepted 0.05 level. For a description of mean pre- and post-experimental data, please see Appendix D, Table 2.

A paired *t*-test comparing pre- and post-experimental RSE scores was non-significant ($t(17) = -1.209; p = .243$), indicating that self-esteem scores did not change over time. Similar pre- and post-experimental comparisons made on the CBCL also yielded non-significant change scores for the Internalizing ($t(13) = 2.079; p = .058$), and Externalizing ($t(13) = .529; p = .606$) Scales, suggesting that parent-reported symptoms of child psychopathology did not change over time. Similar comparisons on RCADS Total Anxiety scores also indicated a non-significant difference between pre- and post-experimental measurement ($t(17) = .991; p = .335$), suggesting that child self-reported symptoms of anxious psychopathology did not change over time. Paired *t*-test comparisons on RCADS Depression scores ($t(17) = 3.517; p = .003$) indicated a significant difference in pre- and post-test measurements, suggesting that child self-reported symptoms of depressive psychopathology diminished over time.

Subjective, instructor-completed measurements of participant comprehension and engagement (Appendix C) were analyzed by hierarchical regression to determine if comprehension contributed any unique variance to the prediction of post-test scores above the effects of pre-test scores. Subjective scores on the first six items of the comprehension scale, with “1” being the lowest (below average) and “3” being the highest (above average), were utilized (when appropriate) in generating a total comprehension score each time the scale is filled out.

Scores on those items that were applicable at the time of measurement were converted to a percentage of total possible points. This was done in an attempt to create a standard score, as not all items were applicable to every class. These percentages were averaged over the length of the class for each participant to generate a cumulative comprehension score, which were then averaged for the group and served as the data for the above regression analysis. An aggregated score of 66% would correspond to a subjective rating of “2” on the scale, indicating average performance of the group. Analysis of the data yielded by this subjective measure indicated that children were performing at a level below average in comparison to typical Karate students (59.33%; 66% equivalent to standard score of “average”).

A hierarchical regression examining the unique contribution of variance accounted for by the subjective measure displayed in Appendix C was performed for each variable of interest. The score on each variable of interest at pre-experimental administration was entered as the first variable for the regression, and the standardized score on the subjective measurement was entered as the second (and last) variable. In all

examinations, the measure outlined in Appendix C did not account for significant variance above and beyond the predictive ability of the pre-experimental measurement. Please see Appendix D, Tables 3-7 for a synopsis of regression results.

CHAPTER 4: DISCUSSION

The results of the statistical measures partially supported the stated hypotheses of the study, in that RCADS Depression scores decreased significantly comparing pre- to post-experimental data. It could be expected that engaging in the class served as a pleasurable activity for many of its members, and that this contributed to a decrease in children's depression scores. This finding, despite potential confounds to its validity (see below), offers some preliminary support for Shotokan Karate as having a positive effect on children's levels of psychopathology, such that it could bear potential as the focal point of further investigations.

Additionally, subjective measures of children's understanding of and participation in the class were not reflective of a significant contribution to the prediction of post-experimental scores on any measure. To offer support for an overall effect of the independent variable in this study, it would be expected that regressions for every variable of interest would have found a significant contribution of variance from the measure in Appendix C. The absence of this expected finding is potentially reflective of an overall lack of relationship between the Karate training program and an effect on the other stated variables of interest.

The lack of significant change on other measures of psychopathology and self-esteem could be attributable to a variety of factors. It is possible that the term of engagement in the Karate program was not sufficiently long enough to foster an effect in students in terms of the measurements administered. Time limitations could also be responsible for the lack of significant effects in terms of externalizing behavior and self-

esteem. Examination of the data, however, indicated that mean score changes on each measure were in the expected direction at follow-up, belying a non-significant trend toward improvement across domains. The lack of significant results could reasonably be attributable to low power, which is often problematic in studies with small sample sizes.

Limitations

There were several limitations in the performance of this study. Generally, the ability to gain access to schools was limited by a lack of prior relationship with many of the principal “gatekeepers” for these organizations. Given a limited amount of time and resources that administrators of schools may promise to be allocated to research, it follows logically that they would engage in research that is controlled by individuals with whom they have a prior, favorable relationship. Some research suggests that the nature of this relationship need not be related to specific issues surrounding research or administration, and that more colloquial and frequent interactions of a pleasant nature between researchers and administrators, the better (Rogers, 2003). Future research that necessitates a working relationship with schools could be enhanced by careful cultivation of the relationships with school personnel, particularly informal relationships of the sort likely to enhance the schools’ opinion of the researcher (and concomitant motivation to engage in research).

The converse of the above problem was also sometimes true in approaching schools, in that several had working relationships with researchers previously that did not fare well over the long term. Some administrators indicated their distrust of research projects based in University settings due to the fact that previous researchers had never

shared the results of their studies with the schools after completion. This condition was particularly difficult to overcome, as individuals with control over access to the school populations had been swayed by experience to change their initially positive and receptive attitude toward research being carried out in their schools to a negative one that precluded researcher involvement. This sentiment on the part of administrators was also likely easily avoidable if prior researchers had engaged the school in collaborative exploration of the results of their studies. Research on the diffusion of innovations predicts that efforts dedicated toward debriefing in this fashion would strengthen the attitudes and knowledge of school personnel in regard to research in general, and would likely enhance their subsequent involvement with other research projects (Rogers, 2003). In summation of this point, it would do well for investigators to remember that research is not performed in a vacuum, and that much of the eventual success or failure of their work is dependent upon non-academic relationships with people who may be only tangentially related to the central aims of research efforts.

In addition to the overarching difficulties faced by research in school-based populations at large, there were several specific limitations to this study as well. First, spatial and scheduling constraints made it impossible to include a control group. The inclusion of such a control group would have strengthened the methodology of the study, and made more powerful statistical tests possible, which could have allowed for more robust and potentially meaningful comparisons. The necessary format of pre- and post-experimental comparisons allowed for some inferences to be generated, but the results were generally weak and inconclusive in comparison to what would have been possible

with other more powerful and controlled tests. In such controlled tests, any demonstrated effects seen in the experimental group but not in the control group could have been reasonably attributed to manipulation of the independent variable. Without a control group, such a statement cannot be made conclusively, thus limiting these findings considerably.

Second, the significant results obtained in terms of changes in RCADS Depression scores could be potentially confounded, as the temporal positioning of the class was such that it corresponded with the cessation of the school semester. It could reasonably be expected that the termination of school for the academic year would be a positive event for many students, and that they would exhibit lower levels of depression accordingly. Without subsequent research to control for this potential confound, it is difficult to discern whether this phenomenon or the administration of the independent variable contributed to the exhibited reduction in depressive symptoms.

Third, the intended experimental protocol for this study was originally slated to be 12 weeks long, with a specific, structured application of particular methods during each class. Due to space and time constraints, however, classes were limited to a five-week period immediately prior to the end of the school semester. The protocol had to be changed to adapt for this substantially abbreviated time period, and material was presented in a much denser fashion than was originally intended. This allowed for a much smaller degree of specificity and rigor in terms of the application of the experimental method, and could have negatively impacted results. The time period was

also relatively short, and perhaps not of sufficient length to allow for changes in children's emotional and behavioral states to become evident.

Finally, several of the exercises as outlined posed significant challenges to many of the children. A small percentage of students participated in philosophical exercises in either class, and fewer still participated in meditation exercises. In fact, during initial periods of philosophically oriented exercises, the few children that were attempting to engage in reflection and put forth effort in the exercises were verbally ridiculed by their classmates. This situation led to those children abandoning their attempts to engage in the philosophical exercises, and likely contributed to their hesitancy to subsequently engage in similar exercises. A single student attempted to engage in meditation, and this student's attempt was short-lived, as he was teased for his efforts. Given this interference and lack of engagement, the children's proficiency regarding either of these tasks was difficult to ascertain.

As reflected by these negative interactions between students and overall lack of engagement in philosophical and meditative exercises, something was clearly amiss in terms of the intended focus of these exercises. One potential explanation for the lack of effectiveness of these exercises is that much of the development of the methodology that went into this pilot effort was based on the instructor's subjective experience with traditional martial arts. This experience may have been phenomenologically different than what could be expected for an average child of the age enrolled in this study. As such, the inclusion of some of the exercises perceived to be useful a priori (i.e. philosophical and meditation exercises) was potentially inappropriate and interfering,

given the average child's attention span and lack of inclination to engage in these activities. Regardless, the net effect on study data due to the children's lack of participation in these aspects of the class was to negatively influence the subjective measure outlined in Appendix C, which could have contributed to the lack of significant predictive validity of this measure.

Future Research

In order to examine the hypotheses put forth in this study in a controlled or larger evaluation, several changes will be necessary in future research. First, the timing of the experiment could be more ideally placed early in the fall semester, where school cessation will not be a confounding factor in influencing exhibited levels of depression. Second, future researchers should take care to maintain as much control over the recruitment, implementation, and data collection procedures as possible. This can be difficult in dealing with populations accessed through the educational system, but numerous confounds and difficulties with data collection could be avoided in subsequent research by simply centralizing these responsibilities with the primary investigator. Future researchers would do well to ensure this centralization by adhering to strict guidelines of methodology, and only directing their efforts to those settings where schools will agree to these guidelines explicitly.

Additionally, it may be possible to foster children's involvement in various aspects of the class by adapting traditional teaching technique to facilitate their engagement. Potential methods of adaptation could perhaps be making instruction competitive and recognizing the winners of such competitions, associating modern simile

that children will understand for explaining exercises (i.e., cartoons and movies), exhibiting a looser class structure and Socratically eliciting children's input regarding lesson plans for a given class, using videos to attain children's attention whenever possible, and limiting the amount of introspection and philosophical effort necessary for initial learning. These assertions are far from being empirically based, but could prove helpful in beginning further research into this area by tailoring the originally outlined program to account for the modern practitioners' particular inclinations and optimal learning style. By engaging children in a way that is potentially familiar and enjoyable to them, it may become possible to impart some of the underlying features of the martial arts, and thus more accurately study the exact effects of Karate practice on exhibited levels of psychopathology and self-esteem.

APPENDIX A

*Terms included in bold may be unfamiliar to the reader, and are included following the descriptions of class sessions in a glossary format.

Week one:

- 1) Student introduction
- 2) Orientation to the **dojo**
- 3) Instruction in **lining up**
- 4) Instruction in **bowing in/out**
- 5) Instruction in basic stretching (steps 3-5 to occur at the beginning and end of every class period)
- 6) Introduction to **Kihon** techniques (hands): fighting stance, proper making of a fist, jab, punch, hook punches (**lead** and **rear**), uppercuts (lead and rear), ridge hand (lead and rear), shuto, inverted shuto
- 7) Practice of striking techniques on **hand mitts** and **body shields** (for purposes of experiencing contact in a controlled, protected manner – these shields will always be held by the instructor, rather than the students)

Week two:

- 1) Review of previous **Kihon** techniques
- 2) Instruction in new **Kihon** techniques (feet and defense): front kick (lead and rear), side kick (lead and rear), flip kick, round kick; stances - front stance, side stance, horse-riding stance, taught by using **line drills**; defensive movement - upward, middle, downward blocks, taught in a stationary position using a **blocker**
- 3) Practice of striking techniques on **hand mitts** and **body shields**

Week three:

- 1) Review of previous **Kihon** techniques
- 2) Instruction in **Kata – Pivot Form**. The **Kihon** techniques learned earlier will be utilized together in this short form, and emphasis will be placed on precision, accuracy and fluidity of movement.

Week four:

- 1) Begin discussion of philosophy of Shotokan Karate during stretching (see below)
- 2) Review of previous **Kihon/Kata** techniques
- 3) Instruction in new **Kihon** techniques at the discretion of the instructor
- 4) Facilitation of intra-student instruction by instructor

Regarding the philosophy of the Shotokan Karate, it is important to iterate that the utilization of the physical combative skills acquired through martial arts practice are a *last resort*, not a first line defense to all of life's problems. This philosophical instruction will be largely colloquial and Socratic, in the form passed down from instructor to instructor for generations, but will also utilize some specific stories and/or examples, adapted from *Zen in the Martial Arts* (Hyams, 1982), *Karate-Do, My Way of Life* (Funakoshi, 1981), and/or several other classical Eastern texts (Lao-Tzu, circa 400 B.C.E./translated edition 1997; Sun-Tzu, circa 500 B.C.E./translated edition 1986; Musashi, 1645/translated edition 1992; Yamamoto, 1716/translated edition 1992; Lee, 1975).

Discussions may continue during and after class, with reinforcement in the form of verbal praise being issued to students who display an understanding of the ideals

attempting to be conveyed. Examples of the possible stories or adages to be used are too numerous to list here, but the following are several notable excerpts that will certainly be utilized. The contents of some of these quotations may be altered slightly, so as to be more readily accessible by children, and also to remove gender oriented pronouns that have a reference to only one sex, being that groups will likely consist of mixed genders:

“To win 100 victories in 100 battles is not the highest skill. To subdue the enemy without fighting is the highest skill.” – Sun-Tzu, circa 500 B.C.E./translated 1986

“The only reason men fight is because they are insecure; one man needs to prove that he is better or stronger than another. The man who is secure within himself has no need to prove anything with force, so he can walk away from a fight with dignity and pride. He is the true martial artist—a man so strong inside that he has no need to demonstrate his power. The point of achieving proficiency in any martial art is to be able to walk away from a fight rather than to win it. But you will walk away with shoulders erect, pride in your bearing, knowing inside what the outcome of the battle would have been had you wished to precipitate it. And this attitude of confidence will be communicated to your antagonist, who will realize that he narrowly escaped defeat.” – Ed Parker, as quoted in Hyams, 1982

“Knowing others is wisdom; knowing yourself is enlightenment.” – Lao-Tzu, circa 400 B.C.E./translated 1997.

“A famous samurai comes to visit a humble master, widely known as the best Zen teacher of his time, to inquire about Zen. It becomes obvious to the master from the beginning of the conversation that the samurai is not so much interested in learning about

Zen as he is in impressing the master with his own opinions and knowledge about the subject. The master listens patiently and finally suggested that they have tea. The master pours his visitor's cup full, and then keeps on pouring. The samurai watches the cup overflowing until he could no longer restrain himself. 'The cup is overfull; no more will go in!' 'Like this cup,' the master said 'you are full of your own opinions and speculations. How can I show you Zen unless you first empty your cup?'" – Ancient Japanese adage, as quoted in Hyams, 1982

"Instead of trying to do everything well, do those things perfectly of which you are capable. Although most expert martial artists have spent years mastering hundreds of techniques and movements, in a bout, or Kumite, a champion may actually use only four or five techniques over and over again. These are the techniques which he has perfected and which he knows he can depend on." - Lee, 1975

"You may train for a long, long time, but if you merely move your hands and feet and jump up and down like a puppet, learning Karate is not very different from learning to dance. You will never have reached the heart of the matter; you will have failed to grasp the quintessence of Karate-do." – Funakoshi, 1981

"In life, one cannot take back what has been done. Zen teaches that life must be seized at the moment, not before or after." – Musashi, 1645/translated 1992

"A young boy traveled across Japan to the school of a famous martial artist. When he arrived at the dojo he was given an audition with the sensei. 'What do you wish to learn from me?' the master asked. 'I wish to be your student and become the finest Karateka (practitioner of Karate) in the land' the boy replied. 'How long must I study?'

‘Ten years at least,’ the master answered. ‘Ten years is a long time,’ said the boy. ‘What if I studied twice as hard as all your other students?’ ‘Twenty years,’ replied the master. ‘Twenty years! What if I practice day and night with all my effort?’ ‘Thirty years,’ was the master’s reply. ‘How is it that each time I say I will work harder, you tell me that it will take longer?’ the boy asked. ‘The answer is clear. When one eye is fixed upon your destination, there is only one eye left with which to find the Way.’ – Ancient Japanese adage, as quoted in Hyams, 1982.

Again, while the listing above is non-exhaustive, it is representative of the stories or examples that will be used as the impetus for discussion among the members of the class.

Week five:

- 1) **Zazen** meditation
- 2) Group discussion of thoughts apparent in meditation – informal restructuring of maladaptive thoughts
- 3) Review of old **Kihon/Kata**
- 4) Instruction of new **Kihon** at instructor’s discretion, again with emphasis on promoting intra-student instruction
- 5) Informal discussion of philosophical ideals outlined in week four as time permits
- 6) Answer students’ questions about continuing study of the martial arts; attempt to provide information relevant to training opportunities available at Schofield Barracks

Glossary for use with the above listings:

Dojo – area of practice for Karate exercises

Kihon - basic methods of striking (kicking, punching, kneeing, etc.), defending (blocking, evading, countering, etc.) and moving or standing necessary as a cornerstone to all further martial arts study.

Kata - patterned form of specific movements and stances that incorporates numerous punching and kicking techniques. (The Kata is designed to demonstrate proficiency and fluidity of the basic Kihon that have been acquired, and was originally developed as a simulation of fighting form against multiple invisible opponents.)

Lining up – refers to the methodical placement of students in a line such that everyone has sufficient space to practice their movements, and is oriented toward the instructor, who stands at the front of the room. (This typically occurs in order of belt rank, but as each of these students will be white belts, the lowest possible rank, this will not be a relevant consideration.) The majority of instruction occurs with students in this position, including the basic learning of Kihon and Kata.

Bowing in/out – formal bowing procedure utilized at the beginning and end of each class; emphasizes respect and consideration not only for the instructor, but also for the process of learning and engaging in the martial arts

Lead/rear appendages – when organized in a traditional proper fighting stance, the body has one side placed forward in relation to the other. The forward leg or arm is referred to as the “lead” leg or arm, and the leg or arm that is behind is referred to as the “rear” leg or arm.

Hand mitts – small foam hand coverings that act as targets when practicing striking techniques. These mitts will be held by the instructor and allow students to experience contact with an object while striking in a protected manner.

Body shield – serves the same purpose as hand mitts, but is larger, and tends to be used more for the practice of kicking techniques

Line drills – exercise involving forward and backward motions across the length of the dojo floor; typically utilized to learn appropriate stances

Blocker – soft foam pad on the end of a plastic stick used to swing at Karate practitioners for the purpose of blocking exercises, again in a safe and protected manner.

Pivot Form – introductory Kata that utilizes several Kihon in fluid combination. Specific Kihon integrated into this Kata are outward blocks, jabs, punches, rear leg front kicks, and front stances in several orientations.

Zazen - Zen meditation practice with the goal of ancillary suppression of furtive emotion through deep-breathing, calming meditation. Students will be instructed not to try to suppress or control their thoughts while breathing and relaxing, but instead just notice them, and think about them in the context of any anxiety they might be feeling. This understanding of the mind's "chatter" is often the first step of learning for beginning students of Zen.

APPENDIX B

Parental consent form (School A)

Hello, my name is John Young, and I am a graduate student in Psychology at the University of Hawai'i at Manoa. I am contacting you today to offer your child placement into a research study that looks at the effects of Shotokan Karate training on children's feelings and behaviors. Participation in this study is completely voluntary, and will be offered to everyone in the 3rd, 4th, and 5th grade that attends the A+ program at your child's school. If you agree to sign up for participation in this study, you may withdraw at any time without penalty. The details of the study are listed briefly below.

What you'll get:

- Free Shotokan Karate classes, twice per week, 60 minutes per class, for a five-week period. Class size will be approximately 15-20 students. Classes will be taught by me at School A on Mondays and Thursdays from 3:00-4:00. They will include instruction in basic stretching, punching, kicking, blocking, and stances. I am a black belt in Shotokan Karate, and I have over 20 years of martial arts experience. In addition, some background on the philosophy of the martial arts will be given, and beginning meditation will be taught. During these presentations, group discussion involving the children in the class will be encouraged, but not required.

What you'll have to do:

- Agree to twice fill out a measure (once at the beginning of the study, and once at the end) concerning various behaviors of your child's, and share the results with me. This form will take approximately one hour to complete each time it is administered.
- Agree to allow your child to twice fill out two questionnaires regarding their thoughts, feelings, and self-esteem, and share the results with me. These forms should take approximately 15 minutes to fill out each time they are administered.

Things to keep in mind:

- These classes are not long-term enough or appropriate to engage in fighting exercises. That is to say, ***no one will ever put your child in a situation where he or she could be struck by another individual in the class.*** Some contact will occur during blocking exercises, which require a foam pad to be swung lightly at children. I will always be the one swinging this foam pad, and any contact to your child that occurs will always be minimal and well-protected. Other exercises require the kicking and punching of body shields or hand mitts. These will only be held by me, and never by another student in the class.
- You, as a parent, will always be welcome to stay and watch as much of each class as you might wish to. There will also be adequate adult supervision at all times, so if you don't wish to stay for classes, you don't have to.
- Participation in this research project may benefit your child in terms of physical health and the development of interest in a new activity. Eventually, this research may also lead to methods of intervention for children with difficulties (such as anxiety or depression), so your participation now may benefit others later. Since Karate is an athletic pursuit, however, the potential exists for injury on a level approximate with other sports, such as

baseball or basketball. Further, it is possible that children's interactions with one another during class may cause some students stress or discomfort, though every attempt will be made to ensure that each child benefits from and enjoys participation in this class.

- All personal information gained about your child through the course of this research will be kept confidential from any outside parties, with code numbers being used to protect identities.
- If your child is injured in the course of this research, you alone may be responsible for the costs of treating your child's injuries.

Please return this form within the next two weeks to your child's teacher, indicating your intentions concerning your child's enrollment below by checking the box next to the appropriate choice.

_____ Yes, I would like to enroll my child in this study, and I understand and accept all the information above.

_____ No, I would not like to enroll my child in this study.

Parent Name (printed): _____ Signature: _____

Child's (or Children's) Name(s): _____

Please list a phone number and/or email address if you would like to be in the study, so that I may contact you regarding the date of the first class.

If you have any questions or concerns about this form or any aspect of this study, either before signing up or after your enrollment, please do not hesitate to contact me via email or telephone:

John Young

jnyoung@hawaii.rr.com

956-9559

If you cannot obtain satisfactory answers to your questions or have comments or complaints about your treatment in this study, contact:

Committee on Human Studies

2540 Maile Way, 253

University of Hawaii

Honolulu, HI 96822

808-956-5007

Child's assent form (School A)

Hello, my name is John Young, and I am sending this home with you to see if you can be in a research study. The study will look at how training in Shotokan Karate affects children's thoughts, feelings, and behaviors. If you and your parents agree to sign up, you will attend free Karate classes twice a week for five weeks with about 15 or 20 other kids. You and your parents will answer some questions, once before you start Karate and once after you finish.

If you come to the class, you'll learn some basic stances, punches, kicks, and blocks, along with some ideas behind Karate and meditation exercises. I will ask students in the class for their thoughts or feelings about certain things, but you don't ever have to talk if you don't want to. You also won't practice Karate long enough to start fighting, so no one will ever hit you in this class.

The decision about whether or not to sign up is completely up to you and your parents, and nothing bad will happen to you if you decide not to. Also, if you sign up and decide that it isn't for you, then you can quit at any time you want.

Coming to this class may help you by exercising, and you may decide that you enjoy it enough to continue taking Karate lessons. It may also help other children that are really nervous or sad a lot of the time by helping us to find ways to make them feel better.

Since Karate is a sport, you could be hurt when doing the exercises. It's about as risky as other sports like baseball or basketball. Some kids may also feel nervous when talking to or exercising with others. Since there will be other kids in the classes, this is something to think about.

Anything that I learn about you in this study will be kept private, meaning that no one other than me will see it with your name attached.

_____ Yes, I would like to enroll in this study. I understand and accept all the information above.

_____ No, I would not like to enroll in this study.

Name (printed): _____ Signature: _____

If you or your parents have any questions about this form or this study, now or after signing up, please contact me by email or phone:

John Young
jnyoung@hawaii.rr.com
956-9559

Parental consent form (School B)

Hello, my name is John Young, and I am a graduate student in Psychology at the University of Hawai'i at Manoa. I am contacting you today to offer your child placement into a research study that looks at the effects of Shotokan Karate training on children's feelings and behaviors. Participation in this study is completely voluntary, and will be offered to everyone in the 3rd, 4th, and 5th grade at your child's school. If you agree to sign up for participation in this study, you may withdraw at any time without penalty. The details of the study are listed briefly below.

What you'll get:

- Free Shotokan Karate classes, once per week, 120 minutes per class, for a five-week period. Class size will be approximately 15-20 students. Classes will be taught by me at School B on Wednesdays from 2:30-4:30. They will include instruction in basic stretching, punching, kicking, blocking, and stances. I am a black belt in Shotokan Karate, and I have over 20 years of martial arts experience. In addition, some background on the philosophy of the martial arts will be given, and beginning meditation will be taught. During these presentations, group discussion involving the children in the class will be encouraged, but not required.

What you'll have to do:

- Agree to twice fill out a measure (once at the beginning of the study, and once at the end) concerning various behaviors of your child's, and share the results with me. This form will take approximately one hour to complete each time it is administered.
- Agree to allow your child to twice fill out two questionnaires regarding their thoughts, feelings, and self-esteem, and share the results with me. These forms should take approximately 15 minutes to fill out each time they are administered.

Things to keep in mind:

- These classes are not long-term enough or appropriate to engage in fighting exercises. That is to say, ***no one will ever put your child in a situation where he or she could be struck by another individual in the class.*** Some contact will occur during blocking exercises, which require a foam pad to be swung lightly at children. I will always be the one swinging this foam pad, and any contact to your child that occurs will always be minimal and well-protected. Other exercises require the kicking and punching of body shields or hand mitts. These will only be held by me, and never by another student in the class.
- You, as a parent, will always be welcome to stay and watch as much of each class as you might wish to. There will also be adequate adult supervision at all times, so if you don't wish to stay for classes, you don't have to.
- Participation in this research project may benefit your child in terms of physical health and the development of interest in a new activity. Eventually, this research may also lead to methods of intervention for children with difficulties (such as anxiety or depression), so your participation now may benefit others later. Since Karate is an athletic pursuit, however, the potential exists for injury on a level approximate with other sports, such as baseball or basketball. Further, it is possible that children's interactions with one another during class may cause some students stress or discomfort, though every attempt will be made to ensure that each child benefits from and enjoys participation in this class.

- All personal information gained about your child through the course of this research will be kept confidential from any outside parties, with code numbers being used to protect identities.
- If your child is injured in the course of this research, you alone may be responsible for the costs of treating your child's injuries.

Please return this form within the next two weeks to your child's teacher, indicating your intentions concerning your child's enrollment below by checking the box next to the appropriate choice.

_____ Yes, I would like to enroll my child in this study, and I understand and accept all the information above.

_____ No, I would not like to enroll my child in this study.

Parent Name (printed): _____ Signature: _____

Child's (or Children's) Name(s): _____

Please list a phone number and/or email address if you would like to be in the study, so that I may contact you regarding the date of the first class.

If you have any questions or concerns about this form or any aspect of this study, either before signing up or after your enrollment, please do not hesitate to contact me via email or telephone:

John Young

jnyoung@hawaii.rr.com

956-9559

If you cannot obtain satisfactory answers to your questions or have comments or complaints about your treatment in this study, contact:

Committee on Human Studies

2540 Maile Way, 253

University of Hawaii

Honolulu, HI 96822

808-956-5007

Child's assent form (School B)

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If you come to the class, you'll learn some basic stances, punches, kicks, and blocks, along with some ideas behind Karate and meditation exercises. I will ask students in the class for their thoughts or feelings about certain things, but you don't ever have to talk if you don't want to. You also won't practice Karate long enough to start fighting, so no one will ever hit you in this class.

The decision about whether or not to sign up is completely up to you and your parents, and nothing bad will happen to you if you decide not to. Also, if you sign up and decide that it isn't for you, then you can quit at any time you want.

Coming to this class may help you by exercising, and you may decide that you enjoy it enough to continue taking Karate lessons. It may also help other children that are really nervous or sad a lot of the time by helping us to find ways to make them feel better.

Since Karate is a sport, you could be hurt when doing the exercises. It's about as risky as other sports like baseball or basketball. Some kids may also feel nervous when talking to or exercising with others. Since there will be other kids in the classes, this is something to think about.

Anything that I learn about you in this study will be kept private, meaning that no one other than me will see it with your name attached.

_____ Yes, I would like to enroll in this study. I understand and accept all the information above.

_____ No, I would not like to enroll in this study.

Name (printed): _____ Signature: _____

If you or your parents have any questions about this form or this study, now or after signing up, please contact me by email or phone:

John Young
jnyoung@hawaii.rr.com
956-9559

APPENDIX C

Student's Name:

Date:

Parent present at class session: Yes/No

Performance of Kihon techniques:

☐ Below average; performance needs improvement ☐ Average; performance reflects normal understanding of technique ☐ Above average; performance reflects good understanding of technique

Performance of Kata:

☐ Below average; performance needs improvement ☐ Average; performance reflects normal understanding of technique ☐ Above average; performance reflects good understanding of technique ☐ Not Applicable

Participation in group philosophical discussions:

☐ Student is not listening to discussion ☐ Student is listening, but withdrawn; is not engaged in discussion ☐ Student is active and engaged in group discussion ☐ Not Applicable

Understanding of philosophical intent of discussions, as reflected by student's speech:

☐ Below average understanding of intent of discussion ☐ Average understanding of intent of discussion ☐ Above average understanding of intent of discussion, as reflected by linking of the morals of the discussion to some other event or experience within the student's semantic hierarchy ☐ Not Applicable

Meditation Exercises:

☐ Student is unable to maintain concentration for at least half of the meditation period ☐ Student is able to maintain concentration for longer than half the meditation period, but not the entire time ☐ Student is able to maintain concentration for the entire meditation period ☐ Not Applicable

Participation in group meditation oriented discussions:

☐ Student does not offer anxious thoughts to the group, and does not engage in discussion regarding the anxious thoughts of others ☐ Student either offers anxious thoughts to group, or engages in discussion regarding the anxious thoughts of others, but

not both ____ Student both offers anxious thoughts and engages in discussion regarding the anxious thoughts of others ____ Not Applicable

Intra-student instruction of Kihon technique(s):

____ Student does not instruct or receive instruction from another student ____ Student gives instruction in Kihon technique(s) ____ Student receives instruction in Kihon technique(s), and reacts positively ____ Student receives instruction in Kihon technique(s), and reacts negatively

Notes:

APPENDIX D

Table 1

Synopsis of Measurements and Informants

| Target | Scale | Informant | Timing |
|------------------------|--|------------|-------------------------------|
| Externalizing Problems | CBCL | Parent(s) | Beginning/end of study |
| Internalizing Problems | CBCL | Parent(s) | Beginning/end |
| | RCADS (Anxiety and Depression Subscales) | Child | of study |
| Self-Esteem | RSE | Child | Beginning/end of study |
| Understanding of Class | Appendix C | Instructor | Once per class per student |

Table 2

Mean Pre- and Post-Experimental Data

| <u>Measure</u> | <u>Pre</u> | <u>Post</u> | <u>Number of respondents</u> |
|---------------------|------------|-------------|------------------------------|
| CBCL Internalizing | 48.21 | 45.36 | 14 |
| CBCL Externalizing | 43.36 | 42.93 | 14 |
| RCADS Total Anxiety | 44.50 | 43.00 | 18 |
| RCADS Depression | 47.83 | 43.78* | 18 |
| RSE | 31.28 | 32.61 | 18 |

Note. RCADS and CBCL data given in T scores, RSE given as total points on measure (10-40, with a higher score indicating higher self-esteem).

* $p < .01$

Table 3

Summary of Hierarchical Regression Analysis for Determining Predictive Ability of Subjective Measure (Appendix C) on RSE Post-Experimental Scores

| Variable | B | SE B | β |
|----------------------------------|------|------|---------|
| Step 1 | | | |
| RSE pre-experimental measurement | 0.43 | 0.22 | 0.44 |
| Step 2 | | | |
| Subjective measure | 0.00 | 0.22 | 0.00 |

Note: $R^2 = 0.20$ for Step 1; $\Delta R^2 = 0.00$ for Step 2

Table 4

Summary of Hierarchical Regression Analysis for Determining Predictive Ability of Subjective Measure (Appendix C) on CBCL Internalizing Post-Experimental Scores

| Variable | B | SE B | β |
|---|------|------|---------|
| Step 1 | | | |
| CBCL Internalizing pre-experimental measurement | 0.70 | 0.14 | 0.83 |
| Step 2 | | | |
| Subjective measure | 0.19 | 0.26 | 0.13 |

Note: $R^2 = 0.68$ for Step 1; $\Delta R^2 = 0.01$ for Step 2.

Table 5

Summary of Hierarchical Regression Analysis for Determining Predictive Ability of Subjective Measure (Appendix C) on CBCL Externalizing Post-Experimental Scores

| Variable | B | SE B | β |
|--|------|------|---------|
| Step 1 | | | |
| CBCL Externalizing pre-experimental measurement | 0.89 | 0.09 | 0.95 |
| Step 2 | | | |
| Subjective measure | 0.15 | 0.18 | 0.09 |

Note: $R^2 = 0.90$ for Step 1; $\Delta R^2 = 0.00$ for Step 2.

Table 6

Summary of Hierarchical Regression Analysis for Determining Predictive Ability of Subjective Measure (Appendix C) on RCADS Total Anxiety Post-Experimental Scores

| Variable | B | SE B | β |
|---|------|------|---------|
| Step 1 | | | |
| RCADS Total Anxiety pre-experimental measurement | 0.64 | 0.18 | 0.67 |
| Step 2 | | | |
| Subjective measure | 0.47 | 0.25 | 0.33 |

Note: $R^2 = 0.45$ for Step 1; $\Delta R^2 = 0.10$ for Step 2.

Table 7

Summary of Hierarchical Regression Analysis for Determining Predictive Ability of Subjective Measure (Appendix C) on RCADS Depression Post-Experimental Scores

| Variable | B | SE B | β |
|--|------|------|---------|
| Step 1 | | | |
| RCADS Depression pre-experimental measurement | 0.81 | 0.14 | 0.82 |
| Step 2 | | | |
| Subjective measure | 0.16 | 0.23 | 0.11 |

Note: $R^2 = 0.67$ for Step 1; $\Delta R^2 = 0.01$ for Step 2.

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