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**Factors Related to the Adherence of Non-Asian
Canadian Adults Enrolled in Tai Chi Programs**

by

Xinhong Jin

A thesis submitted to
the Faculty of Graduate Studies and Research
in partial fulfilment of
the requirements for the degree of
Master of Arts

Department of Psychology

Carleton University

Ottawa, Ontario

May 29, 1997

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Studies and Research acceptance of the thesis

"Factors Related to the Adherence of Non-Asian
Canadian Adults Enrolled in Tai Chi Programs"

submitted by Xinhong Jin, B.A.

in partial fulfilment of the requirements for
the degree of Master of Arts

Thesis Supervisor

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May 29, 1997

ABSTRACT

Factors in the adherence to Tai Chi participation of adult, English-speaking, non-Asian, male and female Canadians were identified through pilot interviews, and through a survey of four hundred and seventy five participants representing several Tai Chi centres. A forty eight item Tai Chi Survey questionnaire was developed with acceptable construct and criterion validity. It included seven content areas to examine participant's commitment to Tai Chi, personal background, program state and experienced effects, as well as characteristics of the program, the situation, and the instructor. The first prediction stage of the survey obtained perfect classification of thirty adherers and thirty drop-outs from discriminant analysis of participants' reports on the strength of their intention to adhere, using an index comprised of intention to re-register, and to adopt Tai Chi as part of one's regular life. The second survey stage provided understanding of the intention to adhere in terms of participant's anticipation of being successful at Tai Chi. This anticipation of efficacy was related to quality of instruction, current progress, and positive experiences and effects. Finally, there was convergence between quantitative and qualitative findings. Results were discussed relative to conceptualizations of adherence to physical activity, and to a recent theory of action, as well as toward practical recommendations to improve Tai Chi programs.

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INTRODUCTION

Regular physical activity benefits our physical health (Bouchard, Shephard, Stephens, Sutton, and McPherson, 1990), as well as our psychological health (Brown, 1990). Unfortunately, only about twenty percent of North Americans exercise adequately enough to ensure significant gains in wellness (Stephens, Jacobs, and White, 1985); moreover, usually fifty per cent drop-out from supervised physical activity programs (Dishman, 1988).

A growing number of North Americans have been turning to non-Western practices such as Yoga, the Martial Arts, and Tai Chi as alternatives to our traditional sport and physical activity programs for satisfying their recreational, and wellness needs. In the Ottawa area alone there are currently over fifteen Tai Chi Centers serving around 1,000 participants. Unfortunately, the drop-out problem observed for general physical activity programs is also evident for Tai Chi. The writer recently surveyed ten local Tai Chi instructors about the level of adherence among their participants and found drop-out rates ranging from thirty to seventy percent.

This study is about why non-Asian Canadians either adhere or drop-out from participating in Tai Chi programs. As a citizen of China since birth, the writer is aware that to raise such a question would be unlikely for Chinese researchers because of the central role played by Tai Chi in Chinese society.

In China the art of healthy living has evolved through thousands of years into a national tradition. An important part

of that tradition is to "play" Tai Chi, which is a series of dance-like harmonious body movements linked together into a continuous, smooth-flowing sequence. Tai Chi is a system of activating the body with the goal of developing physical, emotional, and mental well-being, accompanied by a feeling of satisfaction and a sense of harmony with oneself, with others, and with the universe (Qiu, 1992). This is in contrast to the Western physical exercise tradition of individuals pushing their muscular and aerobic limits.

Tai Chi was developed three hundreds years ago out of a particular boxing style in the martial arts, and was integrated into the classic Chinese philosophy of *Ying* and *Yang* (Cheng and Smith, 1962). Until one hundred years ago, it was mainly practiced in the countryside of Henan Province, but then a more relaxed, flowing form of Tai Chi was introduced to the millions of urbanites in Beijing. This softer form of Tai Chi movement made it popular with women, children, and the aged (CSEB, 1988).

Like most students in China, the writer was introduced to Tai Chi at the age of eighteen through a compulsory physical education course on the traditional sport of *Wu-Shu*, of which Tai Chi is a part. Whether or not you liked it, you had to pass the Tai Chi test in universities, especially in medical schools. In China there is no reason given for playing Tai Chi, such as to have fun, or win prizes. The emphasis is not on what you will get out of it, but simply to make your best effort to do it. It is Chinese tradition to accept that Tai Chi is part of a healthy way

of life. Some students continue doing Tai Chi for the rest of their lives, while others may discontinue; but most people usually return to the practice of Tai Chi sometime later, for example, when recovering from illness or injury, childbirth, or when physical signs of aging appear.

Sweeping claims have been made in the Chinese medical literature for positive physical and mental effects of Tai Chi. For example, Koh (1981) believed that Tai Chi could cure illnesses such as hypertension, asthma, and insomnia; prevent arteriosclerosis and spinal deformity; and shorten the recovery phase from long-term illness. Lie (1988) claimed positive effects on the nervous system, respiratory system, blood circulation, digestion, metabolism and muscular system.

The claim in traditional Chinese medicine is that participation in Tai Chi modifies biological functions, and thus health, through the influence that stereotyped hand and foot movements have on important visceral channels (Qu, 1988). Unfortunately, when it is possible to examine critically the research designs of many studies in support of Tai Chi claims, the evidence is often questionable in light of under-reporting of procedures for assignment of participants to treatment and control groups (e.g., Qu, 1988; Tse and Bailey, 1992).

To understand the widespread acceptance and practice of Tai Chi in China, and the sweeping claims made for its role in physical and mental health, it is necessary to examine the philosophy of Tai Chi, especially in relation to the central

Ying-Yang principles which are of paradigmatic influence in the awareness of self and the world for most Chinese people, and how these principles are integrated into the practice of Tai Chi movements.

Philosophical Foundation of Tai Chi

According to ancient philosophers (Lau, 1963), the universe began as a void out of which came a formless substance called Tao, Tai Chi, or the Primordial Source, from which all other things originated. When it separated it became Ying and Yang, the two opposing principles in nature; the former feminine, the latter masculine. But when these united they again formed a perfect whole, from which a myriad of things came into being.

The movements of Tai Chi embody the dynamic relationship between Ying and Yang. They are based upon shifting the body's weight to create a continuous intermingling of Ying states and Yang states. In most movements, either one leg or the other bears the body's weight. The leg bearing the weight is the Yang or "solid" leg, while the other, non-weight-bearing leg is "hollow" or Ying. Inhalation (Ying) and exhalation (Yang) also illustrate these principles. That is why Tai Chi emphasizes smooth, continuous, even breathing. The posture of Tai Chi, too, encompasses Ying and Yang. The relaxation of the body, the relaxed abdomen, and relaxed shoulders, is Ying; the obvious firmness of the supporting leg is Yang. There is no stopping, but a continuous flow from one movement to the next. The motions

continue like spirals of endless circles representing fluctuations in the rhythms of nature. The energy of the body imitates, or really is a part of, the energy that flows through all of nature. When finally each movement form, or exercise concludes, the feet come together again and the practitioner has "returned to the source." Here, in true Chinese spirit, the journey (the series of exercises) has been an inward one (mental concentration), and the participant finds the goal to be in the same place where the journey had begun.

One's mental orientation also reflects a balance of Ying and Yang: Intention, the inner concentration on the movements, is Ying; attention, the monitoring of their accurate physical execution, is Yang. The key to thinking while moving lies within the practitioner himself, in the kinaesthetic sense. His thinking or intention has to do with this internal image; for example, with shifting his weight from one leg to the other, or with turning his body or bringing up his arms. His thought models the movement he intends to make. Especially, his thought models the changes of weight that make his legs "hollow" or "solid", the changes that create Ying-Yang balance.

Thus, through a dynamic and continuous series of changes in mental intentions and motor movements, one's psychological and physical center remains stable, like the hub of a moving wheel, even as you pass from Ying to Yang and Yang to Ying. This shifting balance is considered by Chinese philosophers to be essential to health. They believe that it is the changes in the

relationship between Ying and Yang that keeps the body's energy, or Qi, flowing freely. In fact, they believe that the health and wholeness of everything in the universe depends upon the "oneness" of the relationship between these Ying and Yang elements. The more natural the relationship is, the more these elements form one whole, and the better the health and wholeness of animals, plants, and people.

To this point, we have learned that the practice of Tai Chi in China has a long history, is very wide-spread, is rooted in philosophy and tradition, is claimed by their medical practitioners to have far-reaching positive effects, and is considered to be part of their health care and general system of wellness. But does the practice of Tai Chi really generate health benefits?

Demonstrated Effects of Tai Chi

Two investigations, with acceptable research procedures, provide affirmative evidence that Tai Chi really works. Jin (1989) employed a three-way factorial design, with occasion (before, during, and after Tai Chi), experience (beginners, N=33; practitioners, N=33), and time (morning, afternoon, and evening) as the independent variables. The dependent variables were heart rate, urinary excretion of catecholamine and serotonin, cortisol concentration in saliva, and mood states. Jin found immediate effects comparable to those reported for moderate exercise; following Tai Chi sessions, both levels of participants reported

less tension, depression, anger, fatigue, confusion, and state anxiety, and they also reported feeling more vigorous.

In addition, a recent ongoing investigation examined the effects of Tai Chi and other intervention techniques on markers of frailty in the elderly, such as falls, functional status, muscle strength, balance, and activities of daily living. The study examined results from eight independent health care centers (FICSIT, 1995). To date, investigators have concluded that some of the treatment interventions, including Tai Chi, reduce the risk of falls for elderly adults.

Recapitulation

To summarize to this point, we have learned that traditional North American physical activity programs benefit physical and psychological health, but many people either do not engage in these activities, or drop out soon after starting. We have also learned that when North Americans turn to Eastern approaches to wellness, through activities such as Tai Chi, they are also likely to drop-out, even though evidence supports it's utility.

Unfortunately, the Tai Chi literature, though rich in providing rationale for change, and optimistic in claims of efficacy, does not address the issue of adherence. This is understandable considering the central role guaranteed to the practice of Tai Chi in China, by the way in which the movement forms are integrated with their culture, in terms of the paradigmatic principles of *Ying* and *Yang*.

A logical next step for designing an exploratory study on adherence of non-Asian Canadians to Tai Chi is to review North American literature on adherence to traditional physical activity programs.

Review of North American Literature on Exercise Adherence

Research has shown that over two hundred factors are related to adherence to exercise programs (Dishman, 1994). These factors can be classified into three broad categories as follows: personal factors; program and leadership factors; and situational and social factors. Theoretical perspectives are also being developed.

Personal Factors. This category includes participants' life style, personal dispositions, and expectations. Smoking (Conrad, 1987), and low or non-existent past program participation (Suter and Marti, 1992) are life-style factors related to non-adherence. In fact, past level of participation in supervised exercise programs, where activity can be observed, is the most reliable predictor of current participation (Dishman, 1987). Personal dispositions favouring adherence include high self motivation (Dishman, 1981) and extroversion (Blumenthal, Williams, Needles, & Wallace, 1982), while the Type A disposition of being aggressive, high achievement oriented, ambitious, and time-pressured is linked to dropping out of exercise programs (Weinberg and Gould, 1995). Finally, a key personal expectation

related to adherence is self-efficacy; that is, the subjective likelihood of being able to successfully achieve exercise goals (Bandura, 1986). The positive role of self-efficacy in exercise adherence has been found for both clinical populations (Kaplan, Atkins, and Reinsch, 1984), and non-clinical samples (Deshainais, Bouillon, and Godin, 1986).

Program and Leadership Factors. Several program characteristics such as high frequency, high intensity, and long duration of exercise are associated with increased attrition (Pollock, Wilmore, & Fox, 1984), while group exercise leads to better adherence than exercising alone (Massie and Shephard, 1971). However, when participants are asked to discuss programs which they like best, they identify the program leader, in terms of being likeable and knowledgeable, as the most important factor (Weinberg and Gould, 1995).

Situational and Social Factors. Godin (1994) has found that the most common barriers to exercise among the general population include: lack of access to sporting facilities, difficulty in finding time to exercise, financial cost of exercising, and difficulty in getting an exercise partner. Lack of time is reported to be the principal and most prevalent self-reported reason for dropping out of supervised or unsupervised exercise programs.

Social support is an additional factor in the participant's

situation which has been linked with adherence. For example, the level of social support obtained by participants, particularly from family members, has been shown to be most highly correlated with exercise adherence in supervised programs among cardiac patients (Oldridge, 1982, 1988), sedentary but healthy adults (Martin & Dubbart, 1987), aerobic dance participants (Kravitz and Furst, 1991), and corporate employees (Wankel, 1985). Similarly, social support from peer influences have been found to be associated with the maintenance of physical activity in male and female athletes (Greendorfer, 1983), and social support from program staff and exercise partners has been found to be related to exercise adherence among adult males (Dishman, 1994). Carron and associates found that group and task cohesion was significantly positively related to attendance of exercise classes, and having an exercise partner was associated with increased exercise participation (Spink & Carron, 1992). Wilhelmsen and associates (1975) found significantly poorer long-term adherence in those who exercised alone. Likewise, Massie and Shephard (1984) found that while only 47 percent of participants in individual aerobic exercise programs were adherent, 82 percent participating in group exercise were adherent. Heinzelmann and Bagley (1970) reported that 90 percent of a sample of 195 cardiac rehabilitation patients stated that they either did prefer, or would have preferred exercising with others.

Theoretical Perspectives. Since the early 1980's, a number of researchers have applied different theoretical frameworks to the study of exercise behaviour among different segments of the population. One integrated framework of exercise adoption and adherence is that by Maddux (1993), who believes that any exercise behaviour is the result of three influences: *intentions*, *self-efficacy for exercise*, and *cues to action*. According to Maddux, intentions are the most immediate and powerful determinant of behaviour. Self-efficacy influences exercise behaviour either directly or indirectly through its influence on intentions. Finally, situational cues will influence exercise behaviour directly when the physical activity has been performed repeatedly in the presence of the same cues and is prompted automatically by those cues. When situational cues automatically prompt exercise behaviour, these cues are referred to as cues-to-action, and the behaviour is referred to as a habit (Maddux, 1993).

Prolegomena for an alternative explanation of exercise participation and adherence have been discussed by Wankle (1993). Although his conceptualization is less well-integrated than that of Maddux above, the concepts which he brings together are rich. His thesis is that enjoyment of exercise is a key variable for enhancing exercise adherence, so that the anticipated physical and psychological benefits might be realized. He first cited Iso-Ahola (1980) and Neulinger (1984) to support his opinion that enjoyment, or more broadly, intrinsic motivation, is central to

any leisure engagement. He then observed that intrinsic interest in an activity is likely to be present when one is testing one's skills or competencies against realistic task challenges. He included Deci's position that intrinsic motivation is based on the need to be self-determining and competent (Deci and Ryan, 1985). He also included Csikszentmihalyi's (1975, 1978) concept of "flow", which is a very positive and enjoyable state, the central requirement for which is that one engage in an activity that presents a realistic challenge (personal skills and task challenges are in balance), provides clear demands and feedback, and requires focusing of attention and total absorption in the activity.

Common to each of the above conceptualizations of adherence is the central role proposed for competence and self-efficacy.

Statement of Purpose

Canadians are seeking non-traditional approaches to wellness. Among their alternatives is Tai Chi, with demonstrated health benefits. A growing number of non-Asian Canadians are enrolling in Tai Chi programs, yet a large proportion drop-out soon after. If health benefits associated with Tai Chi exercise are to be realized, it is necessary to identify controllable factors that determine adherence. The purpose of this exploratory investigation was to accomplish that task. A pilot interview study was conducted on Tai Chi adherers and drop-outs. Findings supplemented insights about adherence gained from the review of

physical activity literature. This knowledge base made it possible to construct a questionnaire for a second study, which surveyed adherence factors in a large sample of Tai Chi participants.

STUDY 1

Purpose

The purpose of this pilot study was to become well informed about the experiences of non-Asian Canadians who had attended Tai Chi classes. This was to ensure an adequate knowledge base from which to draw when constructing the survey questionnaire to be used in the large scale survey phase of this investigation.

Method

Subjects. Interviews were conducted with ten non-Asian Canadians who were or had been participating in a Tai Chi program. Five subjects were "adherers", i.e., still participating after six weeks, and five were "dropouts". These subgroups were balanced for gender. Their ages ranged between 28 and 55 years.

Interview Guide. The interview included the following open-ended questions:

1. What were you expecting from your first Tai Chi program experience? That is, what were you hoping to achieve?
2. What did you like best about the Tai Chi class?
3. What didn't you like about the Tai Chi experience?
4. What were the three most important reasons for you

- continuing to do Tai Chi?

- dropping out of Tai Chi ?

5. How could the Tai Chi experience be improved for someone like you?

Procedure. The investigator contacted several Tai Chi instructors in the area to explain the purpose of the study, and to ask each instructor to nominate participants in their recent or current classes who fit the criteria of "adherer" and "drop out". Telephone numbers of these individuals were obtained from class records. These individuals were then contacted after Tai Chi classes or by telephone to explain the purpose of the study, to seek their comments, and to arrange a convenience time for the interview. When the participant was present in the actual interview, an informed consent agreement text was read (see Appendix A.). Once consent was given, the open-ended interview questions were asked. Following this the debriefing text was read (see Appendix B.). Taped interviews were transcribed.

Analysis. Interview transcripts were content analyzed to provide a rank ordering of common factors mentioned for the following: expectations, liked and disliked program factors, reasons for adherence or drop-out, and suggestions for program improvement. This involved organizing the text and then identifying for each question, themes which were either common to, or differentiated adherers and dropouts. Direct quotations were used to identify and illustrate the results of the content analysis. Summary findings for each of the interview questions

are given below.

Results

Expectations. The first question asked, "What were you expecting from your first Tai Chi program experience? That is, what were you hoping to achieve?". Adherers and dropouts expected many of the same outcomes; i.e., fitness gains such as, "renewal energy", as well as rehabilitation such as, "fix or heel my body", and "pain in my back... doctor recommended gentle movement and balance". However, adherers expressed clearer expectations about the process of Tai Chi. They expected it to be gentle, achievable, convenient, and involve coactive physical activity. In contrast, only one dropout mentioned an expectation about the process, namely that it should be fun.

Positive Factors. The second question asked, "What did you like best about the Tai Chi class?". Adherers and dropouts mentioned similar reasons for liking Tai Chi; these included doing the movements, e.g., "feels good doing it", "slow and gentle", "graceful and nice-flowing", "fun to do", "non-competitive", "no stress involved", and, "good work-out without hurting the body". Individuals in both groups also listed the social aspects of Tai Chi, e.g., "learning in a group setting", "doing it together", "enjoy meeting people", and "having an approachable instructor". While dropouts particularly emphasized the social aspects, adherers gave more outcome reasons for liking

Tai Chi, e.g., "it relaxes me", "I feel stress released and you can accomplish anything", "had fun", "I feel very happy", "the class increased my commitment", and, "I found a mental type of discipline (concentration) that I was not expecting".

Negative Factors. The third question asked, "What didn't you like about the Tai Chi experience?". The major factor expressed by both adherers and dropouts was difficulty learning and performing the movements, e.g., "I felt frustrated because I couldn't get my steps and hands properly", "I didn't like the fact that I didn't have any balance", "the instructor wanted everyone to go further...I just enjoyed doing the basic movements", "as a slow learner, my body didn't listen to me", "all of a sudden you were learning hand and step movements --- maybe I was a little slow", and "I wasn't doing well because I wasn't concentrating as I should have been". Probably related to this learning difficulty, one adherer said, "one class a week is not enough", and a drop-out complained, "I found the class to be very slow, we were always repeating things for somebody who hadn't caught on". Finally, one drop-out who was disappointed by the class instructor said, "the instructor couldn't say why we were doing something".

Adherence Factors. Adherers were asked, "What were the three most important reasons for you continuing to do Tai Chi?". Typical answers included positive outcomes, convenience, and

challenge. Their primary reasons included positive physical and psycho-social benefits, e.g., "I'm under a lot of pressure...it's good for me emotionally and physically", "very helpful for stretching my back", "it helps my balance and relaxation", "improving balance and concentration", and, "after having a baby I need something to get out of the house". Convenience was another typical reason given, e.g., "I can (now) have some kind of exercises and I can do, like in the morning, or something that doesn't take too much room, because in the winter I can't go out". Finally, challenge in the service of competence needs was evident in some of the reasons, e.g., "I want to be better. The better I get, the better I feel I get, feeling like I accomplish something", and, "I want to learn further and know more about it".

Drop-out Factors. Drop-outs were asked, "What were the three most important reasons for you dropping out of Tai Chi?" Concerns about the level of challenge, and timing or convenience were represented in the reasons given for dropping out. One drop-out blamed inconvenience , e.g., "it was not convenient for me especially in winter time. The class started too late. I have to be out of town regularly to do business, so I couldn't attend (and got behind the class) sometimes". Another participant dropped out simply because it was a bad time of year, e.g., "It had nothing to do with the exercise. It was just a bad time of year for me (too busy). I wasn't doing well because I wasn't

concentrating as I should have been. I wasn't doing my best performance". Finally, two drop-outs felt under-challenged, and one felt over challenged by their Tai Chi programs, e.g., "I lost motivation because the class was going very slowly, I wasn't being challenged, and I didn't think it was beneficial because the instructor couldn't tell me 'fix this' to make (the movement) perfect", "Tai Chi is a little too slow for me, and the people in the class were all elderly and learned very slowly, so the class was boring", and, "I don't want more than I need. I just want to do basic Tai Chi. I have been quitting and starting. I quit at a certain level when it's too much for me. I just want to stay at a certain level that is comfortable".

Suggested Improvements. The last question asked, "How could the Tai Chi experience be improved for someone like you?". Both adherers and drop-outs suggested program improvements towards making it easier to learn and become successful at doing Tai Chi by changing the frequency and duration of classes, the pace of instruction, and the provision of visual aids such as diagrams and video tapes to facilitate learning. Two drop-outs suggested that the level of instruction could be improved, e.g., "Have an instructor who can explain why you do certain things", and, "It would be nice if there were some introduction to Tai Chi's philosophy and its benefits so I would have a better understanding and have more motivation to learn". One final improvement factor, common to both groups, had to do with the

participant's life situation, e.g., "When the kids go to school I'll have more free time", and, "If I had more free time I would like to do it more, being able to do the next level, to progress".

Conclusions

The above material demonstrated that participants in Tai Chi were able to identify concrete reasons for adhering or for dropping out from their programs. Moreover, many of their reasons parallel those given in the literature based on reports by physical activity adherers and drop-outs. However, some new insights were also gained from this pilot survey; for example, detailed reactions to Tai Chi instruction to facilitate learning.

STUDY 2

Method

Participants. Participants were four hundred and seventy five volunteer, adult, Non-Asian, English-speaking Canadians; one hundred and sixty eight were male and three hundred and seven were female. They ranged in age from seventeen to ninety three years ($M=53.5$; $SD=15.1$). Participants were current or former Tai Chi program participants drawn from fifteen Tai Chi schools, clubs, local community centres and health rehabilitation centres in Ottawa, Hull, Carleton Place and Montreal.

Materials. A package of materials was developed which

included a Consent Form, a Debriefing Form, and a Tai Chi Survey questionnaire (see Appendix C, D, E.).

Tai Chi Survey. The forty nine items in this questionnaire targeted seven content areas: Commitment; Program Characteristics; Program Situation; Instructor Characteristics; Program Effects; Program State; and Personal Background. Items reflected factors known to be associated with adherence to physical activity programs as reported in the literature, as well as the experience and concerns reported by adherer and drop-out Tai Chi participants in Study 1, and by four thesis committee members, three of whom had discontinued their participating in Tai Chi.

In addition, items in the Program State section represent variables on each of five theoretical factors. These factors have emerged from extensive research on personal adjustment and general life satisfaction. They are based on analyses of ratings on a number of given dimensions of the "Personal Projects" which comprise people's daily lives (Little, 1989). The first two items in the Program State section of the Tai Chi Survey represent "Self-Prototypicality" and "Value Congruency" dimensions on the "Meaning" factor. The third item represents the "Others View" dimension on the "Community" factor. The fourth, fifth and eighth items represent "Control", "Time Adequacy", and "Negative Impact" dimensions on the "Structure" factor. The sixth and seventh items represent "Stress" and "Difficulty" dimensions on the "Stress" factor. Finally, the ninth and tenth items represent "Progress"

and "Outcome" dimensions on the "Efficacy" factor.

Fourty five of the fourty nine items were Likert scale format, while gender, age and ethnic origin were open-ended, and finally typical level of prior physical activity involved an open ended format for description of type, frequency, duration and intensity. In addition to the qualitative items, the survey questionnaire also included opportunities for program evaluation in the form of alternatives to be decided by respondents, as well as open-ended comment sections for respondents to express their ideas for improving Tai Chi programs.

Procedure. Study participants were sought through local Tai Chi programs. The investigator visited each site and discussed the study purposes with each class instructor, and reviewed the Tai Chi Survey Questionnaire. The investigator then arranged with each instructor for the most convenient system for distributing and retrieving the questionnaires. Testing generally happened after the seventh or eighth class in the series of ten classes.

The required number of questionnaire packages were provided to each instructor. The package was contained in a large self-addressed envelope. The package comprised the Consent Form, the Tai Chi Survey Questionnaire, and the Debriefing Form. When questionnaire packages were given out by the class instructor, students were advised to return their questionnaires to their class instructors in this sealed envelope or to mail it directly to the address provided. Students were instructed not to sign

their name on the questionnaires, nor the envelope. Finally, participants were assured that specific results, even though given anonymously, would not be discussed with individual instructors. This procedure assured student confidentiality.

The study involved two stages. The first focussed exclusively on samples of thirty known Tai Chi adherers and thirty drop-outs to ensure preliminary understanding of adherence factors against a valid behavioral criterion. Adherers were defined as participants who completed at least one term (10 weeks) of Tai Chi classes, and registered in a second term; and drop-outs were participants who failed to complete even one term of Tai Chi class, and didn't register for a second term. This behavioural classification of adherence/drop-out status was done independently, or "blind", to how participants had answered the Tai Chi Survey. The classification system also respected confidentiality. The principal investigator attended the seventh or eighth class of each Tai Chi Centre to distribute the questionnaires. At this time, she copied the class list and assigned a member code to each class participant. These codes were then recorded on the participants' questionnaire packages. Then at the end of the class term the investigator obtained the attendance record of each participant, and determined whether participants had registered for a second term. Sometimes it was necessary to confirm a participant's status by follow-up telephone contact.

The second stage involved a large scale survey. A sixty nine

percent return rate yielded a sample of four hundred and fifteen Tai Chi participants. This large survey was undertaken because it was difficult to access drop-outs since they were usually irritated and disappointed from their Tai Chi program experience, yet it was necessary to obtain a broad data base to ensure an adequate subject-to-variable ratio, in view of the large number of independent variables required in this exploratory research.

Analysis of Data. The Tai Chi Survey yielded quantitative data on forty eight variables. One of these variables, typical prior level of physical activity, required that participants be categorized based on their open-ended reports on type, frequency, duration, intensity of their exercise. Participants were categorized independently by the author and a second judge as "low (1)" or "moderate (2)" exercisers according to the decision criteria given in Table 1 (See Table 1, Appendix F.). The few instances of disagreement in categorization were resolved through collaborative discussion relative to the given decision criteria.

Five steps were involved in the quantitative analyses. First, an exploratory principle axis factor analysis was undertaken to determine the utility of items and topics in the survey questionnaire in terms of evidence of common variance.

Next, six discriminant analyses were conducted, one for each set of independent variables, to determine which sets of variables, and which individual item variables would best predict adherence/drop-out status of the sixty participants in the first

stage of the study.

For the large survey sample, used in the second stage of the study, six step-wise multiple regression analyses, using the same sets of independent variables, were conducted, using as the dependent variable a composite index of Adherence Intention. This index was based on combining scores from two "intention" items from the Commitment section. These items had been empirically established in the first stage of the study by follow-up discriminant analyses to be nearly perfect predictors of adherence/drop-out status. Items with highest beta coefficients in the significant equations yielded from the above analyses were then used as independent variables in a summary regression analysis in search of a parsimonious adherence model.

Since an "efficacy" item reliably appeared as a very strong link in the chain of obtained relationships, both from the discriminant as well as the regression analyses, scores on this item were used as the dependent variable in a series of six step-wise multiple regression analyses, one for each set of independent variables, in search of a parsimonious explanation for reported feelings of self-efficacy in relation to the practice of Tai Chi.

Finally, qualitative data were also obtained. Participants were asked to write comments in response to the following questions: "What would you like to change -- in the Tai Chi program; the program situation; and the type of instruction?" The aim of the analysis of these written verbal reports was to

provide a parsimonious and descriptive summary representation of the participants' concerns and recommendations. The written responses to each of the three program evaluation questions were content analyzed separately following procedures given by Patton (1990). First, all responses for each question were read and screened for meaningful content. Responses that simply repeated elements found in direct questions, and responses that were unclear were eliminated from subsequent consideration. Trial categories were then established by the author inductively by repeatedly skim reading a set of forty to fifty meaningful responses. These trial categories were labelled, and each was represented by two or three typical responses given verbatim. The remaining responses were coded first independently by the author and a second judge, and then coding differences were resolved by collaboratively discussion. This was done to refine the categories so as to ensure that the final set of categories were meaningful, representative, and authentic. Finally, the proportion of responses in each category was computed.

RESULTS

Two sets of results were obtained. The major section of results focused on the issue of adherence, and utilized findings from item ratings in the Tai Chi survey. A second set of results are given which provide an evaluation of current Tai Chi programs.

Adherence to Tai Chi

The exploratory nature of the study, designed to understand adherence to Tai Chi, required five stages of analysis. The rationale and results for each stage follows.

Representativeness of the Tai Chi Survey Questionnaire

A principal axis factor analysis was conducted first to determine whether responses to the forty seven items [1] in the Tai Chi Survey would covary as implied by the several components, or sections in that questionnaire. The analysis identified five factors based on the Scree criterion. Following varimax rotation, examination of the item loadings given in Table 2 supported the utility and representativeness of the Tai Chi Survey questionnaire (See Table 2, Appendix G.). This was based on the following observations: First, forty five of the forty seven items included in the analysis had substantial loadings on at least one of the factors comprising this pool of common variance; second, most of the items in each section of the questionnaire loaded together on a common factor: For example, all items from the Program Characteristics, Program Situation, and Instructor Characteristics sections loaded on Factor 1; all nine of the positively worded items in the Program Effects section loaded on Factor 2, while the three negatively worded items comprised Factor 4; all four items from the Commitment section loaded on Factor 3; and the only two Personal Background items that loaded

substantially in this common factor space served to identify the small fifth factor. Finally, items in the Program State section loaded on several factors, as expected, since they were selected to represent five theoretical factors in life (project) satisfaction.

Discrimination Between Adherer and Drop-Out Samples

The responses of the sample of adherers and drop-outs to all items in the Tai Chi Survey are summarized and represented by means and standard deviations given in Table 3 (See Table 3, Appendix G.). The purpose of this series of analyses was to determine whether any set of variables could be identified from the Tai Chi Survey which would provide a statistically significant and practically meaningful discrimination between Tai Chi adherers and drop-outs. Results given in Table 4 show significant discriminations in terms of item ratings in the Commitment, Program State, and Program Effects sections of the questionnaire (See Table 4, Appendix G.).

Examination of the function coefficients in Table 4 enables the following inferential reconstruction: The very best information for predicting whether participants will adhere or drop-out comes from ratings of their certainty about registering in another Tai Chi program, and beginning to make Tai Chi part of their daily life by doing the forms at home or anywhere. The next best information for the prediction of adherence/drop-out status came from ratings of feeling in control, and having adequate

available time for Tai Chi ("structure" factors), and from ratings of the likelihood of being successful in achieving Tai Chi goals ("efficacy" factor). The final set of information for predicting whether Tai Chi participants will adhere or drop-out came from ratings of physical effects such as becoming more fit and recovering from a physical problem, as well as effects on mood, e.g., feeling energized and happy after class.

Identification of a Valid Index of Tai Chi Adherence

In order to validate these findings with a much larger survey sample, it was necessary to identify a valid index of adherence/drop-out status. This was because the records of many Tai Chi instructors precluded accurate behavioral identification of their participant's adherence and/or drop-out status.

The strong discrimination between the adherer and drop-out samples provided by scores on the set of four commitment items in the Tai Chi Survey suggested the potential of these variables for such a purpose. Review of the commitment item loadings on the third factor shown in Table 2, as well as the standardized discriminant function coefficients in Table 4 suggested that two items, one on the likelihood of re-registering, and the other on adopting Tai Chi into one's life, might provide the best index of actual adherence/drop-out behaviours.

The expectation was confirmed by discriminant analysis. A highly significant canonical coefficient was obtained ($R=.94$, Chi square=120.34, sig=.0000). Moreover, the function coefficients of

.91 and .89 respectively for these two items provided a 100% correct classification of both adherers and drop-outs. These findings, plus demonstrated internal consistency of the two items ($\alpha=.45$, $F=60.2$, $\text{sig}=.000$) supported the decision to combine participants' scores on them in order to provide a valid index to represent Adherence Intention for the next series of analyses. A composite score can be calculated in this way without standardizing raw scores because the two items are measured on the same scale, and are therefore qualitatively similar and quantitatively comparable (Tabachnick and Fidell, 1989).

Correlates of Tai Chi Adherence Intention

Survey data from four hundred and fifteen Tai Chi participants were analyzed next by means of a series of step-wise multiple regressions. Each analysis used the composite Adherence Intention item index as the dependent variable, and scores from one of the sets of items in the Tai Chi Survey as independent variables.

Results summarized in Table 5 show significant relationships between the Adherence Intention score, and item variables from four sections of the Tai Chi Survey; i.e., Program State (will be successful; close people approve; adequate available time; typical of me), Program Effects (feel energized and happy after class; recovering from physical problem), Program Characteristics (nice classmates; philosophy interesting to learn; right duration of class), and Instructor Characteristics (motivates us to

practice at home by providing visual aids) (see Table 5, Appendix G.).

The above ten best prediction variables were then used as a battery of independent variables in an attempt to determine a parsimonious representation of factors related to adherence intention. Table 6 summarizes the findings and identifies the following six items as providing a simple yet significant representation of factors in Tai Chi adherence intention: (a) will be successful in achieving Tai Chi performance goals; (b) feel energized and happy after class; (c) philosophy of Tai Chi interesting to learn; (d) duration of class about the right length; (e) close people approve of me doing Tai Chi; and (f) adequate available time for doing Tai Chi (see Table 6, Appendix G.).

Correlates of Tai Chi Efficacy

The efficacy factor item in the Program State section of the Tai Chi Survey, "How likely is it that you will be successful in achieving your Tai Chi performance goals?" was the independent variable with the highest function coefficient in the series of discriminant analyses which separated thirty adherers from thirty drop-outs (i.e., excluding the commitment items later used as dependent variables); this variable also had the highest standardized beta coefficient in the multiple regression analyses of four hundred and fifteen participants in the prediction of scores on the Adherence Intention index.

Since the efficacy "success" item appeared to be a reliable psychological linchpin in both the discriminant and regression predictions of adherence and adherence intention, a final series of step-wise multiple regression analyses was conducted to determine correlates of feeling efficacious about achieving Tai Chi performance goals. Scores on the "success" item served as the dependent variable, and each analysis used items from a separate section of the Tai Chi Survey. Table 7 shows significant relationships between the efficacy dependent variable and items in all but the Personal Background section of the Tai Chi Survey (see Table 7, Appendix G.).

Examination of the standardized beta coefficients of the twelve best prediction variables in Table 7 enables the following inferential reconstruction: Tai Chi participants who expected to be successful in achieving their Tai Chi goals reported that they had already achieved some progress learning Tai Chi movements, and gained some positive effects; they also reported that the program fits their life and their values; and rated their instructor as supportive, emphasizing teaching Tai Chi movements (rather than belief conversion) in a well-paced class that is challenging and fun.

Tai Chi Program Evaluation

Several sets of findings were obtained in the Tai Chi Survey. Besides the above findings based on participants' item ratings, program evaluation information was sought through

alternatives to be checked for each item in the Program Characteristics and Program Situation sections of the survey; in addition, written comments were invited via three open-ended comments sections which provided qualitative findings concerning program improvement.

Feedback on Program Characteristics and Situation

Table 8 shows very high levels of satisfaction (>90%) for seven of the twelve program and situation factors. Most frequent criticisms included the following: (a) not enough classes per week; (b) classmates don't talk much together; (c) too many classmates; and (d) don't like additional fees (e.g., for Master's workshops, clothing, and teaching aids) (see Table 8, Appendix G.).

Qualitative Findings Concerning Program Improvement

Tai Chi Program. Three open-ended questions were included in the Tai Chi Survey. For the first question, "What would you like to change in the Tai Chi program?", one hundred ninety-seven comments were given, of which one hundred fifty satisfied the criteria for inclusion. Meaningful comments were distributed into the following categories: (a) Class Frequency --- want classes at least twice per week (47.3%), e.g., "It would be better to have class twice per week". (b) Class Composition --- don't mix levels (19.67%), e.g., "The class is comprised of several different levels. This is quite confusing, and not enough class time is

devoted to my class level"; (c) More Information --- history, philosophy, culture. (17.10%), e.g., "It would be nice if we could be given a small pamphlet giving us a history, or more information about Tai Chi in general"; (d) Session Frequency --- at least three sessions per year (15.33%), e.g., "The program should run continuously, continue for more than 8 weeks, 3 sessions per year".

Program Situation. For the second question, "What would you like to change about the program situation?", one hundred and two responses were recorded, of which ninety-two satisfied the criteria for inclusion. Meaningful comments were distributed into the following categories: (a) a larger Tai Chi room (43.48%), e.g., "I feel rooms ought to be spacious enough for movement"; (b) better environment (35.61%), e.g., "mirrors in the room would be helpful for us to learn movements", "better ventilation"; (c) less cost (20.33%), e.g., "I would like Tai Chi program in general to be available more frequently 2-3 times per week but keep the fees the same", "I find \$200 for a four hour workshop with the Tai Chi master is too expensive".

Instructor Improvement. The third question was, "What would you like your current instructor to improve?". This item yielded a total of two hundreds ninety-six comments, of which ninety-seven satisfied the criteria for representation. Meaningful comments were distributed into the following categories: (a) more

movement theory (40.05%), "explaining origin and meaning of movement"; (b) providing visual aids (39.96%), e.g., "I would like to buy or rent a video tape, it would help me to practice at home"; "I think a video would enhance my feeling of the movements and would encourage me to continue"; (c) individual instruction (19.43%), e.g., "Give more individual instructions for beginner", "give more individual correction during the class".

Discussion

This study found that adherence to Tai Chi can be predicted from a participant's intention to register in the next session of classes, and to adopt Tai Chi as a regular part of life by doing the forms at home or anywhere. Findings also showed that such intentions to continue participating in Tai Chi were strongly linked to anticipated efficacy; i.e., to a participant's rating of the likelihood of being successful in achieving their Tai Chi goals. Finally, this positive expectation state was related to a number of factors in the participant's current experience in a Tai Chi program.

Several arguments favour the adoption of these findings as valid. First, their generalizability is supported by the large and unselected sample of participants who were enrolled in classes offered at fifteen different Tai Chi centres. Second, the Tai Chi Survey questionnaire appeared to have acceptable content validity, given that none of the participants' written comments

to the open-ended program evaluation questions included issues beyond those framed within the structured questions; content or construct validity was also evidenced in the results of the factor analysis. These results showed that the organization of questionnaire items into sections, e.g., Commitment, was reflected by the empirically based item loadings on common factors. Third, reliability or internal consistency in participant's responding was evident from a comparison between the quantitative and qualitative findings. Specifically, the linch-pin concern for efficacy, noted in the quantitative findings, was also evident in participants' written suggestions for how Tai Chi programs could be improved; e.g., more frequent classes and sessions, more explanations about movements and more individualized instruction, provision of audio-visual aids, and mirrors to help in learning the movements. Finally, criterion validity of the Tai Chi Survey was demonstrated by the significant discriminant classifications obtained by each of three different sets of items in relation to the behavioural criterion of known adherence and drop-out status of sixty Tai Chi participants.

Two findings which are particularly noteworthy in reference to previous reports in the literature were revealed by the discriminant analyses used to determine predictors of adherence to Tai Chi. One of these was a negative finding; specifically, that the Personal Background item about previous adherence to the participant's reported physical activity did not discriminate

between known adherers and drop-outs. This is in contrast with findings that past level of participation is the most reliable predictor of current level (Dishman, 1987). Examination of the specific types of prior physical activity reported in the Tai Chi Survey revealed a preponderance of traditional Western forms of exercise, such as walking, swimming, jogging, and cycling. Only nine participants included Tai Chi as part of their prior physical activities. This may explain the disparity. Studies on prior activity as a predictor probably involved participants reporting on similar types of prior and current activity; i.e., current adherence to aerobics being predicted by prior adherence to aerobics participation. However, in the present study current adherence to Tai Chi, an Eastern form of physical activity involving physical and mental demands, was being predicted by reports of prior level of adherence to Western forms of physical activity, such as walking and cycling, which do not involve a great deal of concentration at the recreational level. Hence, it is understandable that prior physical activity was not a significant predictor in this study.

The second noteworthy finding was the dramatic power of the composite Adherence Intention index to correctly classify one hundred percent of known Tai Chi adherers and drop-outs. This finding about the importance of participants' intentions is consistent with the representation of the processes involved in adherence to physical activity given in a model by Maddux (1993). Moreover, the finding is also consistent with a more general

psychological model of action proposed by Gollwitzer (1996).

Research guided by Gollwitzer's model on a wide array of tasks has demonstrated the role of intention in overcoming typical volitional problems, including getting started on a task despite distractions, persisting in a task despite difficulties, and successfully resuming a task after a disruption. Gollwitzer's key concept of "implementation intention" is of the form, "I really intend to do X, when I encounter situation Y". The procedural operation employed by Gollwitzer to develop an intentional mind-set, involved asking experimental participants to think of the five most important implementation steps toward achieving the intended action goal, and then asking the participant to commit to plans specifying when, where, and how those steps will be executed. Gollwitzer's rationale for the intentional mind-set is that it may involve imagery in which people may actually picture themselves in a goal striving situation, and it is this imagery, or mental rehearsal, which programs them to react in a certain way when they encounter cues to action in a particular situation. Gollwitzer's findings show that participants with implementation mind-sets are very certain about the feasibility of their goals, believe in their capabilities, and feel in control over their action outcomes.

Returning to the present study, what is there about the Adherence Intention index which resembles Gollwitzer's implementation intention? Examine the wording of the two items which form this composite index:

"How likely is it that you will register in another Tai Chi program? (Adherer answer -- "Totally sure about registering" [again]).

"How likely is it that you will begin to make Tai Chi a part of your daily life by doing the forms at home or anywhere?" (Adherer answer -- "Totally sure").

Clearly, each of these two items conform to an implementation intention, since each stresses the strength of the intention (e.g., "totally sure"), and each articulates a specific action situation (e.g., "doing the forms at home").

Gollwitzer used experimental instructions to provide an intentional mind-set in his participants. Let us now re-visit results of the present study to understand what may have brought some Tai Chi participants to the point of their having a strong intention to adhere; i.e., what provided their intentional mind-set?

Results from the analysis of correlates of the Adherence Intention index showed that the anticipation of efficacy was the strongest predictor; i.e., participants who rated themselves as highly likely to succeed in achieving their Tai Chi goals were those who also rated themselves as highly likely to register in another Tai Chi program and try to make Tai Chi a part of their daily life by doing the forms at home or anywhere. Anticipated efficacy was, in turn, related to progress in learning Tai Chi movements, and the experience of positive physical and mental effects; as well as the recognition that the program fits their

life and values; and finally, the participant's experience of receiving instruction from an approachable, supportive leader, who gave greater emphasis to teaching Tai Chi movements than dwelling on movement philosophy, and whose classes were considered to be well-paced, challenging and fun. It would seem that optimal teaching and learning factors, the enjoyment and benefits of making progress, and anticipating further success may have provided an intentional mind-set to adhere for participants in this study.

The central role played by efficacy in Tai Chi adherence was also evident in the qualitative program evaluation segment of the results. The greatest proportion of participants' comments were directed toward the goal of feeling efficacious, that is, knowing how to do Tai Chi movements and forms. Thus, some of the key program suggestions included having more classes per week, more sessions per year, and to avoid mixing different levels of Tai Chi proficiency in the same class; key situation suggestions included having a room large enough to do the forms, and having mirrors to aid participants in learning the movements; and finally, instructor suggestions included calling for more explanation about movements, more individualized instruction, and the provision of audio-visual aids to guide practice at home. Certainly, there were other suggestions, such as providing pamphlets to take home to learn more about Tai Chi philosophy, and avoiding increasing fees, and add-on costs, but these were far less numerous than suggestions in the service of improving

opportunities to learn and become competent at Tai Chi.

These findings mirror Wankel's conceptualization about adherence to physical activity, as involving self-efficacy, competence, and above all, the enjoyment which comes from engaging in a realistically challenging activity providing clear demands and feedback, and requiring total concentration and absorption (Wankel, 1993). Becoming competent in Tai Chi may fine-tune the balance between the movement demands, and the participant's motor and concentration skills or resources, such that the participant may become totally absorbed in the activity. Such magic moments of being in a "flow" state, experienced as effortless control and self-transcendence, are considered to be central to enjoyment and life satisfaction (Deci and Ryan, 1985; Czikzentmihalyi, 1975, 1978).

For both youthful and adult Canadians, competence is a key factor in satisfaction across a wide spectrum of sport involvement (Wankel and Kreisel, 1985; Butt, 1987). It should, therefore, come as no surprise that the desire to be competent and to feel efficacious is important to non-Asian Canadian Tai Chi participants.

Pedagogical Recommendations

In the service of enhancing Tai Chi participants' feelings of efficacy and competence, and thereby increasing the likelihood of program adherence especially in the early stages of learning, the following pedagogical recommendations are made, based on

input from the Tai Chi participants in this study.

Tai Chi instructors should be selected, or trained to be approachable and supportive in all their dealings with students. In class, the instructor should be able to explain and demonstrate the movements, and provide constructive feedback to participants. Moreover, the pace of instruction should fit the current level of the participants so that the learning environment is experienced as challenging yet enjoyable. On this point, the instructor should also avoid mixing competence levels in the same class. Other recommendations to improve learning include having more classes per week, and more sessions per year, as well as providing a large well-ventilated Tai Chi room with mirrors for visual feedback to participants. Since some students like to practice at home, instructors should also provide audiovisual instructional aids to illustrate the forms which are being taught currently.

Suggestions for Future Research Oriented Program Modifications

Three useful suggestions for research-oriented Tai Chi program modifications emerged from discussion of this thesis by members of the examining committee.

One proposal was to administer a battery of tests to potential Tai Chi participants which would measure perceptual-cognitive-motor skills relevant to learning and performing Tai Chi. The rationale was that individuals who drop-out from Tai Chi may not have experienced progress because that lacked necessary

skills. Knowledge about participants' strengths and motor learning impairments could lead not only to enhanced prediction of dropping-out, but more importantly, it would enable instructors to form "special" classes", and to design teaching strategies to accommodate the variety of learning styles which may characterize sub-groups within the population of these interested in doing Tai Chi.

A second suggestion was to follow Gollwitzer's empirically supported recommendations for enhancing "intentional mind-set" in order to improve adherence to Tai Chi. For some experimental classes, this would include having participants identify a personal Tai Chi achievement goal, translate this goal into several action steps, and then clearly spelling out the "when, where, and how" implementation plan for each step toward the goal. The question is whether coaching Tai Chi participants in strengthening their implementation mind set for doing Tai Chi would increase likelihood of adherence.

The third suggestion related to the finding about the importance of efficacy and the strong desire for competence found in this study. If many people are in fact not well-endowed for concentrating, and for learning complex motor skills, and are therefore unlikely ever to achieve full competence in Tai Chi, then perhaps a difference class emphasis is warranted. The suggestion was to evaluate the utility of designing Tai Chi programs which de-emphasize competence, and which underscore the joy of movements, even if movements are not perfect. Such a

change in class orientation could lead to greater satisfaction, and therefore greater adherence, especially for those participants with perceptual-motor short-comings.

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Notes:

[1] The "music" item in the Program Characteristics section was excluded since half of the Tai Chi classes do not use music.

Appendix A. Informed Consent Form

Guideline: The purpose of an informed consent is to ensure that you understand the purpose of the study and the nature of your involvement. The informed consent must provide sufficient information such that you have the opportunity to determine whether you wish to participate in the study.

Study: Factors Related to the Adherence of Non-Asian Canadian Adults Enrolled in Tai Chi Programs

Research Personnel: The following people are involved in this research project and may be contacted at any time. Sing Xinhong Jin (principal investigator, 788-2600, ext. 8738), Dr. John Partington (Faculty Advisor, 788-2600, ext. 2695). Should you have any ethical concerns about this study then please contact Dr. Lise Paquet (Chair, Department of Psychology Ethics Committee, 788-2600, ext. 2692) or Dr. Bill Jones (Chair, Department of Psychology, 788-2600, ext. 2648).

Purpose: This study will address the factors that influence the adherence of Non-Asian Canadian adults enrolled in Tai Chi programs.

Task Requirements: You are asked to participate in an interview about why you decided to enroll in Tai Chi program and your experiences in your Tai Chi classes. The interview will take no more than half an hour at your convenience, either face-to face or by telephone. It will help us a great deal if the interview can be tape recorded.

Potential Risk/discomfort: There are no potential physical and psychological risks in this study.

Anonymity/Confidentiality: The data collected in this study is confidential. Your response will be kept in the strictest of confidence. The data is made available only to the researchers associated with this project. Please do not write your name on the questionnaire. We prefer that the answers remain anonymous.

Right to withdraw: You are free to withdraw from the study at any time without any penalty.

If you are willing to participate in this study, please complete the following consent form.

===== cut here =====

I have read the above description of the study and understand the conditions of my participation. My signature indicates that I agree to participate in this study.

Participant's name (please print): _____

Participant's Signature: _____

Date: _____

Appendix B. Debriefing Procedure

At the end of each interview, the participants will be told that the information in the interview transcript will be added to information from interviews with other Tai Chi participants, and all of this will also be added to information from other studies on why people continue or drop out from physical research programs, so that a questionnaire can be developed for a large survey about Tai Chi. The final goal of this survey is to help instructors to improve their Tai Chi program so that more and more people will benefit from Tai Chi. At that point any other questions about the study, or about Tai Chi will be answered.

Appendix C. Informed Consent Form

Guideline: The purpose of an informed consent is to ensure that you understand the purpose of the study and the nature of your involvement. The informed consent must provide sufficient information such that you have the opportunity to determine whether you wish to participate in the study.

Study: Factors Related to the Adherence of Non-Asian Canadian Adults Enrolled in Tai Chi Programs

Research Personnel: The following people are involved in this research project and may be contacted at any time. Sing Xinhong Jin (principal investigator, 788-2600, ext. 8738), Dr. John Partington (Faculty Advisor, 788-2600, ext. 2695). Should you have any ethical concerns about this study then please contact Dr. Lise Paquet (Chair, Department of Psychology Ethics Committee, 788-2600, ext. 2692) or Dr. Bill Jones (Chair, Department of Psychology, 788-2600, ext. 2648).

Purpose: This study will address the factors that influence the adherence of Non-Asian Canadian adults enrolled in Tai Chi programs.

Task Requirements: You are asked to complete a survey questionnaire about your experiences in the Tai Chi program as well as your previous level of physical activity. The questionnaire should take no more than twenty minutes.

Potential Risk/discomfort: There are no potential physical and psychological risks in this study.

Anonymity/Confidentiality: The data collected in this study is confidential. Your response will be kept in the strictest of confidence. The data is made available only to the researchers associated with this project. Please do not write your name on the questionnaire. We prefer that the answers remain anonymous.

Right to withdraw: You are free to withdraw from the study at any time without any penalty.

If you are willing to participate in this study, please complete the following consent form.

===== cut here =====
I have read the above description of the study and understand the conditions of my participation. My signature indicates that I agree to participate in this study.

Participant's name (please print): _____
Participant's Signature: _____
Date: _____

Appendix D

TAI CHI SURVEY

TAI CHI SURVEY

Department of Psychology
Carleton University, Ottawa, Canada

Through the questions in this survey we want to learn more about what makes people satisfied or not satisfied with their Tai Chi program. This information is important because we know that Tai Chi has been proven to be good for people, but we also know that many people drop-out from their programs. Your answers, and those from many others will help us to improve Tai Chi programs.

COMMITMENT

Knowing what you do about the Tai Chi program so far, please answer the following questions. Select any number from "0" (no chance) to "10" (totally sure) to show your judgement.

1. How likely is it that you will continue to attend all the rest of the classes in this program?

No Chance										Totally sure
(I'll dropout)										about continuing
0	1	2	3	4	5	6	7	8	9	10

2. How likely is it that you will register in another Tai Chi program?

No Chance										Totally sure
										about registering
0	1	2	3	4	5	6	7	8	9	10

3. How likely is it that you will begin to make Tai Chi a part of your daily life by doing the forms at home or anywhere?

No Chance										Totally sure
0	1	2	3	4	5	6	7	8	9	10

4. How likely is it that you will recommend doing Tai Chi to others (family, close friends and acquaintance)?

No Chance										Totally sure
										I'll tell them
0	1	2	3	4	5	6	7	8	9	10

PROGRAM CHARACTERISTICS

Below are a number of characteristics of Tai Chi programs. Rate how satisfied you are with your Tai Chi program in terms of these characteristics. Select and write down any number from "0" (not satisfied) to "10" (extremely satisfied) to show your judgement. Also, for each item, check any of the specific reasons listed. For example, if someone was not satisfied with the frequency of classes per week, he/she would give a "0" or "1" rating, and then might check "not enough" (/).

Not Satisfied											Extremely Satisfied
0	1	2	3	4	5	6	7	8	9	10	

Program Characteristics:

Satisfaction Rating:

Frequency of classes per week: not enough( ),
too many( ), about the right number( )

_____

Duration of each class: too long( ),
too short( ), about the right length( )

_____

Pace or Intensity of each class: slow boring( ),
too demanding( ), challenging and fun( )

_____

Music sounds awful( ), peaceful and relaxing( )

_____

Philosophy of Tai Chi, for example concepts of
Ying and Yang: Philosophy interesting to learn( );
Philosophy unnecessary to know( ); Philosophy
offensive( )

_____

Class size: too many classmates( ), too few( ),
about the right number( )

_____

Type of classmates: too old( ), not friendly( ),
nice people to be with( )

_____

Class cohesion or "spirit": we enjoy-getting
along together in the group( ), or we don't
talk very much together( )

_____

Program Emphasis: the instructor emphasized teaching
Tai Chi movements( ); or the instructor was trying
to convert class members to believe in the Master
of Tai Chi almost like a religious leader( )

_____

What would you like to change in the Tai Chi program?

Comment: _____

_____

PROGRAM SITUATION

Below are several situational factors which contribute to how participants feel about recreational programs including Tai Chi. Rate how satisfied you are with your Tai Chi program in terms of these situational factors. Also, for each factor check any of the specific reasons listed. For example, if someone was satisfied with class location, he/she would give a "9" or "10" rating, and then might check "safe access to the building" (/).

Not Satisfied 0 1 2 3 4 5 6 7 8 9 10 Extremely Satisfied

Situational Factors:

Satisfaction Rating:

Class location: convenient public transportation,
and/or parking ( ), safe access to the building ( );
or difficult, inconvenient, or unsafe ( )

Scheduling of the program: convenient-time of day or evening ( ); convenient days per week ( ), convenient time of year ( ); or inconvenient class schedule ( ) _____

The Tai Chi room: I liked the size( ), lighting( ), ventilation( ), temperature( ), and "mood"( ); I didn't like the room( ).

```
Program cost or fee: too expensive( ); didn't like
additional fees for Master's workshops ( ); or fair
and affordable price( )
```

What would you like to change about the program situation?

Comment: _____

[illegible]

PROGRAM EFFECTS

Below are a number of experiences and outcomes which could happen to people in a Tai Chi program. Based on your experience so far in your class use the following scale to rate how much you are experiencing each effect.

No such effect yet								Experience this a lot		
0	1	2	3	4	5	6	7	8	9	10

Tai Chi Effects:

Rating:

Pleasure from just doing the gentle, graceful, flowing movements.

_____

Frustration and irritation from not being able to do the movements, or from forgetting the sequence of movements and getting lost.

_____

The positive feeling from moving in harmony with other people in my class.

_____

Confidence from knowing that I'm learning and getting better at doing the movements.

_____

Parts of my body started to hurt after attending Tai Chi class.

_____

Becoming more fit -- more flexible, better balance, more energy, etc.

_____

Recovering from a physical problem, e.g., fewer headaches, less body pain.

_____

Developing better mental discipline from concentrating on doing the movements

_____

Feeling less anxious and less stressed after class

_____

Feeling badly (embarrassed, depressed or even angry) from seeing that you are behind others in the class

_____

Feeling energized and happy after class

_____

Feeling less lonely and more connected with others through contact with classmates

_____

Are there other program effects which you feel are important for us to know about? If so, please discuss below:

_____
_____

INSTRUCTOR CHARACTERISTICS

Below are a number of ways of describing Tai Chi instructors and how they instruct. Rate your Tai Chi instructor on each of these items.

Not like my instructor

My instructor is
exactly like this

0   1   2   3   4   5   6   7   8   9   10

Instructor Characteristics:

Rating:

Has good background knowledge about Tai Chi and can explain the rationale and philosophy of Tai Chi, and why these movements are important, and why they should be done in a particular way.

_____

Has good organizational skills and starts the class on time, gives an adequate warm-up, and tells us what we are going to do, and ensures that we have enough time to cover what we plan to accomplish.

_____

Has good teaching skills and can explain and demonstrate the movements, and give useful feedback by showing how to fix your movement when it's not quite right.

_____

Has good leadership style by being approachable, supportive, and motivates us to do our best, and to feel good working together as a class.

_____

Motivates us to practice at home by providing visual aids such as pamphlets with diagrams or video tapes illustrating the movements that we have done in class.

_____

What would you like your current instructor to improve?

Comment: _____

_____

_____

_____

_____

_____

PROGRAM-STATE

Describe your experience with your Tai Chi program by rating the program in terms of each of the perspectives below.

Perspectives:

Ratings:

How typical of you is it to do something like Tai Chi? (give a "0" rating if it is not typical of you, or any number up to "10" show how typical of you it is -- "10" means very typical).

To what extent does doing Tai Chi fit with the values which guide your life? (give a "0" rating if doing Tai Chi is totally at odds with your values, or give a "10" if doing Tai Chi is entirely consistent with your values. use any other number from "1" to "9" to show your judgement).

How much do people who are close to you approve of your doing Tai Chi and see it as a valuable activity for you? (use "0" if you think your friends do not approve of your doing Tai Chi, and use any number up to "10" to show how much your friends approve of this activity).

How much do you feel you are in control of what happens in this Tai Chi program? (use "0" if you feel you are not in control, or use any number up to "10" to show how much control you feel in this program).

How adequate is the amount of time you have available for doing Tai Chi the way you want to? (use "0" if your time is totally inadequate, or use any number up to "10" to show how adequate your available time is, with "10" meaning totally adequate).

How stressful is it for you to participate in this Tai Chi program? (use "0" if there is no stress, or up to "10" to show how stressful it is for you).

How difficult is it for you to do Tai Chi? (use "0" if doing Tai Chi is easy for you, or use up to "10" to show how difficult it is).

How much do you feel that participation in the Tai Chi program hinders or interferes with other things you like or need to do in your daily life? (use "0" to show that it doesn't interfere, or rate up to "10" to show how much Tai Chi hinders your other activities).

How much progress have you achieved so far in your Tai Chi program? (use "0" to show no progress, or up to "10" to show how much progress you have made). _____

How likely is it that you will be successful in achieving your Tai Chi performance goals? (use "0" if you think you will be unsuccessful, or up to "10" to show that you expect a successful outcome). _____

PERSONAL BACKGROUND

1. Describe your typical level of physical activity in the last year or two.

(a). Type of activity (e.g., walking, jogging, cycling, swimming, recreational sport, Tai Chi, etc.)

Comment: _____

(b). Frequency of these activities per week (e.g., once, twice... etc.)

Comment: _____

(c). Duration of each exercise occasion (e.g., 20 minutes, 1/2 hour, 1 hour, etc.)

Comment: _____

(d). Intensity of your physical activity (e.g., light - regular breathing, regular heart rate & no perspiration, through to heavy - deep breathing, elevated heart rate, and sweating freely)

Comment: _____

2. Rate your typical previous level of adherence to your physical activity. Circle a number on the adherence scale below:

No physical activity	Inconsistent or irregular	sometimes regular	very consistent and regular							
0	1	2	3	4	5	6	7	8	9	10

Comment on reasons: _____

3. Year of your birth: _____

4. What is your gender? Male _____ Female _____

5. Are you a first or second generation Asian Canadian? Yes ___ No ___
If "yes", do you understand or identify with Asian culture as
found in Tai Chi? Yes _____ No _____

Appendix E. Debriefing Procedure

The reason for doing this survey is to find out why people drop-out from Tai Chi classes, and why others continue. The information from this questionnaire survey will be added to information from interviews with other Tai Chi participants, and all of this will be used to write a report containing recommendations to help Tai Chi instructors design and conduct improved programs. This should help more people to benefit from Tai Chi. Copies of an executive summary of this report will be given to all Tai Chi instructors in the Ottawa region by June/97. Hence, you will be able to know about the results and recommendations from this study by asking your instructor for a copy.

Appenix F

Table 1. Decision criteria for designating participants as "low" or "moderate" in terms of their reported typical level of physical activity.

	Low	Moderate
type of Activity	passive, e.g., walking, Tai Chi	jogging, cycling recreational sport
frequency (weekly)	twice or less	three or more
duration per occasion	< 30 min	> 30 min
intensity	light (regular breathing, no perspiration)	elevated heart rate and sweating freely

Appendix G

Table 2. Tai Chi Survey Item Loadings on Five Related Factors

<u>Items</u>	<u>Factors</u>				
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>Program Characteristics</u>					
Type of classmates	.71				
Class size	.65				
Pace and Intensity	.65				
Class cohesion or spirit	.64				
Duration	.50				
Program emphasis (teaching movements/convecting)	.44				
Frequency	.36				
Philosophy of Tai Chi (interesting/offensive)	.26				
<u>Program Situation</u>					
Scheduling	.63				
Class location	.49				
Tai Chi room	.48				
Cost	.20				
<u>Instructor Characteristics</u>					
Organizational skills	.66				
Leadership style (supportive)	.59				
Background knowledge about Tai Chi	.52				
Motivates home practice (provides aids)	.28				
Teaching skills (explain & demonstrate)	.20				
<u>Program Effects (positive)</u>					
Becoming more fit	.78				
Developing better mental discipline	.71				
Confidence (know I'm learning and getting better)	.68				
Feeling energized and happy	.67				
Feeling less anxious & less stressed	.67				
Recovering from physical problem	.59				
Pleasure from doing the movements	.58				
Feeling less lonely	.49				
Positive feeling from moving in harmony	.35				
<u>Program Effects (negative)</u>					
Feeling badly (behind others in the class)				.53	
Frustration (forgetting movements/getting lost)				.35	
Body started to hurt				.22	
<u>Commitment</u>					
Will register in another program				.42	
Will make Tai Chi part of daily life				.42	
Will recommend Tai Chi to others				.40	
Will continue to attend all classes				.33	

Table 2 continued

<u>Program State</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Doing Tai Chi fits values			.52		
People approve of you doing Tai Chi			.45		
Typical of you			.40		
Tai Chi program hinders daily life			-.26		
How much progress achieved so far		.49			
Will be successful achieving Tai Chi performance goals		.39			
Feel in control of what happens in Tai Chi program		.33			
How stressful is it to do Tai Chi				.44	
How difficult is it to do Tai Chi				.43	
Have adequate available time for Tai Chi					.34
<u>Personal Background</u>					
Year of birth					.52
Typical previous level of physical activity					-.45
Typical previous level of adherence					--
Gender					--
Factor Eigenvalues	7.9	3.3	1.5	1.1	1.0
% of Variance	16.7	7.0	3.2	2.4	2.0

[1] Criteria for listing item loadings on a factor in this table were as follows: (a) the loading exceeded the value of Person r at $p < .01$; and (b) the loading was greater on this factor than on any other factor.

**Table 3. Summary of Adherence/Drop-out
Item Means and Standard Deviations**

Category	Item	Adherence		Drop-out	
		Mean	SD	Mean	SD
Commitment	Advocacy	9.87	.73	7.43	2.62
	Attendance	10.00	.00	6.73	3.66
	Long Term	10.00	.00	4.73	2.60
	Re-regist.	10.00	.00	3.43	3.11
Program Characteri.	Frequency	7.80	3.03	7.93	2.48
	Duration	9.17	1.60	8.80	1.38
	Pace	8.68	2.04	8.03	2.27
	Class Size	8.38	1.85	8.03	2.04
	Classmates	9.51	.75	8.10	1.97
	Cohesion	8.89	1.27	7.91	1.87
	Philosophy	8.20	1.57	7.31	2.71
	Emphasis	9.38	.71	8.71	1.73
Program Effects	Pleasure	9.40	1.16	8.40	1.65
	Frustration	3.66	2.75	3.45	2.60
	Feeling	8.23	2.45	7.35	2.25
	Confidence	8.75	1.61	7.71	2.54
	Body hurt	1.87	2.16	2.17	2.57
	More fit	8.87	1.93	6.05	2.83
	Recover	6.33	3.35	3.49	3.79
	Mental	7.78	2.05	5.18	3.52
	Relax	8.30	2.89	6.12	3.31
	Feel bad	.92	1.68	1.83	2.74
	Energize	9.33	1.18	7.24	2.48
	Less Lonely	6.63	3.40	4.93	3.54
Program Situation	Location	8.93	1.74	9.00	1.55
	Schedule	9.33	1.12	8.83	1.42
	Room	8.03	1.83	7.63	1.97
	Cost	8.70	2.28	7.97	1.97
Instructor Characteri.	Knowledge	9.07	1.11	9.03	1.88
	Organize	9.10	1.27	8.90	1.45
	Teaching	9.23	1.94	9.06	1.76
	Leader	9.33	1.94	9.20	1.42
	Motivate	6.93	3.51	5.93	3.57
Program State	Typical	6.80	3.02	5.23	3.25
	Fit Value	8.37	1.88	7.00	2.25
	People	9.03	1.63	7.20	2.63
	Control	8.37	1.38	6.03	2.59
	Time	7.97	2.04	5.60	2.47
	Stress	1.43	2.52	1.50	2.47
	Difficult	3.33	2.83	4.43	2.80
	Hinder	.90	1.95	2.33	3.31
	Progress	7.70	2.26	6.10	1.90
	Success	8.93	1.84	6.66	2.56
Personal Background	Prior Adherence	6.37	1.99	5.97	1.73
	Prior Physical-A	1.53	.51	1.47	.51
	Age	54.3	16.2	54.1	17.9
	Gender	73%F/27%M	---	57%F/43%M	---

Table 4. Discrimination Between Adherer and Drop-Out Samples

Commitment

Variable	Standardized Function Coefficients	F	Sig
Will register in another Tai Chi program	1.06	136.25	.0000
Will make Tai Chi part of daily life	.69	123.21	.0000
Will continue to attend the rest classes	.62	23.81	.0000
Will recommend doing Tai Chi to others	.18	23.98	.0000

Canonical correlation=.95, Chi-square=133.72, df=4, Sig=.0000

Program State

Variable	Standardized Function Coefficients	F	Sig
Feel in control of what happens in program	.40	18.95	.0001
Adequate time to do Tai Chi	.43	16.34	.0002
Will be successful in achieving Tai Chi goals	.59	15.49	.0002
People who're close approve of me doing Tai Chi	.26	10.53	.0020
Achieved progress so far in Tai Chi	-0.06	8.80	.0044
Tai Chi fits the values which guide my life	-0.01	6.47	.0136

Canonical correlation=.69, Chi-square=33.83, df=10, Sig=.0002

Program Effects

Variable	Standardized Function Coefficients	F	Sig
Becoming more fit	.85	20.35	.0000
Feeling energized and happy after class	.48	17.39	.0001
Developing better mental discipline from concentrating	-0.06	12.25	.0009
Recovering from a physical problem	.22	9.48	.0032
Pleasure from doing the movements	-0.16	7.40	.0086
Feeling less anxious and stressed	-0.01	7.37	.0087

Canonical correlation=.62, Chi-square=24.83, df=12, Sig=.0156

Table 5. Correlates of Tai Chi Adherence

Program State

Variables	Beta	t	Sig
Will be successful in achieving Tai Chi goals	.30	6.5	.0000
People who're close approve of me doing Tai Chi	.14	2.9	.0039
Adequate time to do Tai Chi	.11	2.4	.0164
Typical of me	.09	2.0	.0452

Multiple R=.43, F=22.43, Sig=.0000

Program Effects

Variables	Beta	t	Sig
Feeling energized and happy after class	.31	6.3	.0000
Recovering from a physical problem	.12	2.5	.0132

Multiple R=.38, F=34.25, Sig=.0000

Program Characteristics

Variables	Beta	t	Sig
Nice type of classmates	.21	4.1	.0001
Philosophy interesting to learn	.17	3.6	.0004
Right duration of class	-.13	-2.6	.0088

Multiple R=.29, F=12.62, Sig=.0000

Instructor Characteristics

Variables	Beta	t	Sig
Motivates us to practice at home by providing visual aids illustrating the movements done in class	.12	2.5	.0126

Multiple R=.12, F=6.28, Sig=.0126

**Table 6. Most Significant and Parsimonious Representation
of Factors in Tai Chi Adherence**

<u>Item Variables</u>	<u>Beta</u>	<u>t</u>	<u>Sig</u>
Will be successful in achieving Tai Chi goals	.26	5.5	.0000
Feeling energized and happy after class	.20	4.2	.0000
Philosophy interesting to learn	.14	3.2	.0015
Right duration of class	-.13	-2.9	.0035
People who're close approve of me doing Tai Chi	.12	2.6	.0084
Adequate time to do Tai Chi	.10	2.2	.0258

Multiple R=.50, F=23.06, Sig=.0000

Table 7. Correlates of Tai Chi Efficacy

Program Characteristics

Variables	Beta	t	Sig
Pace of class challenging and fun	.22	4.34	.0000
Instructor emphasizes <u>teaching TC movements</u>	.10	1.99	.0475

Multiple R=.27, F=16.51, Sig=.0000

Program Situation

Variables	Beta	t	Sig
Convenient scheduling of program	.16	3.38	.0008

Multiple R=.16, F=11.42, Sig=.0008

Program Effects

Variables	Beta	t	Sig
Confident from knowing I'm getting better	.30	5.99	.0000
Feeling less anxious and stressed after class	.18	3.55	.0004
Feeling badly from being behind others	-.15	-3.32	.0010

Multiple R=.46, F=36.84, Sig=.0000

Instructor Characteristics

Variables	Beta	t	Sig
Has good leadership style (approachable, supportive)	.22	4.49	.0000

Multiple R=.22, F=20.20, Sig=.0000

Program State

Variables	Beta	t	Sig
Progress achieved in Tai Chi	.36	8.24	.0000
Feel in control of what happens in program	.22	4.98	.0000
Stressful to participate in program	-.11	-2.68	.0076
Tai Chi fits values which guide my life	.11	2.53	.0118
Adequate available time for doing Tai Chi	.09	2.18	.0297

Multiple R=.57, F=38.37, Sig=.0000

Table 8. Feedback on Program Characteristics and Situation

Program Factors	Criticisms		Satisfaction Level
Frequency of class per week N=411	not enough 34.7%	too many 0%	right number 65.3%
Class cohesion N=407	don't talk very much together 30.1%		enjoy getting alone 69.9%
The Tai Chi room N=413	didn't like the room (size, ventilation, temperature) 18.6%		like the room 81.4%
Program cost N=415	too expensive 3.6%	didn't like additional fees for master's workshops 13.8%	fair and affordable price 82.6%
Class size N=409	too many classmates 14.5%	too few classmates 1.7%	about the right number 83.6%
Pace N=405	slow boring 6.3%	too demanding 2.9%	challenging and fun 90.8%
Philosophy N=411	Philosophy unnecessary to know 8.4%	Philosophy offensive 0%	Philosophy interesting to learn 91.57%
Scheduling N=413	inconvenient class schedule 7.9%		convenient time 91.6%
Duration of each class N=408	too long 2.1%	too short 5.8%	right length 92.1%
Type of classmates N=402	too old 1.7%	not friendly 2.7%	nice people to be with 95.7%
Location N=412	inconvenient public trans. parking or unsafe 2.5%		convenient public trans. parking, safe 97.5%
Program emphasis N=412	master->religion 1.7%		teaching 98.3%