

## **CHAPTER 3**

### **METHODOLOGY**

This chapter discusses the methodology used in this research.

#### **Sample**

The following sections give a description of how the sample was selected as well as some biographical data on the sample

#### **Selection of Sample**

The sample was taken from an "enhanced Basic Military Training" cohort who had just begun training. The enhanced Basic Military Training course are for National Service recruits who have been deemed sufficiently fit enough to be assigned to future combat vocations. This group was identified, as they had not undergone any previous training and was entering their term of national service for the first time. It was important to pick only recruits who were enlisted for the first time, as baseline measures were needed, without the confounding of previous exposure to training. The subjects comprised of persons who had no or only minor medical conditions and had obtained silver or gold awards on the pre-enlistment fitness-screening test. They were thus more homogeneous as a group

in terms of their health and fitness level. The enhanced group was also selected on the basis of capability to tolerate high stress, due to the fact that they were being trained for future combat-fit vocations. Cohorts who had failed the pre-enlistment fitness-screening test were excluded because they had to undergo a preparatory training phase involving physical toughening. A third group, the "modified Basic Military Training" group was also excluded. This group tended to be less homogenous in terms of health and fitness level as members in this group have been graded medically unfit for combat vocations due to a range of medical and psychological problems that they possessed.

### **Description of Sample**

A company of recruits ( $N = 200$ ) from the "Enhanced Basic Military Training" batch was selected. The recruits' age ranged from 18 to 24 years old, with a mean age of 20 years ( $SD = .81$ ). All subjects were males and serving National Service for the first time. Other biographical data are presented in Table 1. The majority of the recruits in this sample were Chinese. Most also had diploma education. As such, it is important to interpret any differences in mean scores between groups with caution. On the other hand, the socio-economic distribution of recruits, as measured by their family incomes and the type of housing they lived in, follows a normal distribution curve and is representative of Singapore's demographic profile. This is also the case with languages, where most have skills in two or more languages, as would be expected in Singapore's multi-racial society.

**Table 1. Biographical Data of Recruits (N = 200)**

<b>Biographical Data</b>	<b><u>n</u></b>	<b>Percent</b>
<b>Racial Composition</b>		
Chinese	183	91.5 %
Malay	8	4.0 %
Indian	6	3.0 %
Eurasian	3	1.5 %
<b>Number of Spoken Languages</b>		
Bilingual	61	30.5 %
Multilingual	139	69.5 %
<b>Family Income</b>		
Less than \$1 000	10	5.0 %
\$1 001 to \$2 000	58	29.0 %
\$2 001 to \$3 000	54	27.0 %
\$3 001 to \$4 000	35	17.5 %
More than \$4 000	43	21.5 %
<b>Type of Housing</b>		
One to Two Bedroom Flat	2	1.0 %
Three to Four Bedroom Flat	112	56.0 %
Five Room or Executive Flat	53	26.5 %
Private Condominium	15	7.5 %
Private House	18	9.0 %
<b>Educational Level</b>		
Secondary Education	5	2.5 %
Pre-University Education	5	2.5 %
Diploma	186	93.0 %
Bachelor Degree	4	2.0 %

### **Ethical Considerations**

This research followed the ethical guideline of the Singapore Armed Forces

Medical Corp. Approval was sought from the Joint Medical Committee before

the study was undertaken. (See Appendix A.) Based on this guideline, the research was classified as non-consensual. However, although subjects were not allowed to choose whether to participate, they were made aware that they were involved in a study on coping. The general goals were also explained. Subjects were not denied treatment during their study.

### **Instruments**

This section describes the instruments used in this study.

#### **Description of Instruments**

The following paragraphs give further elaboration on the instruments.

##### **Basic Military Training Stress Scale**

This is a rating scale used to define the level of difficulty of training in terms of the effort needed. (See Appendix B.) This scale was used to define low and high periods of stress. It was specifically designed by the author to measure stress that is pertinent to the local context. The scale was administered to 14 instructors including the platoon commander and section leaders. Items were based on the components of training of recruits in the Singapore Armed Forces. The scale

consists of 30 items, which make up four types of training components. The four types of training components included the following:

1. Living arrangement and social change (four items including living with new people, living away from home, regimentation and march drills);
2. Physical training (8 items; including route march, endurance training, interval training, running 4 km uphill, circuit training, swimming, training in the standard obstacle course, and training in individual physical proficiency);
3. Military proficiency training (10 items including aspects of weapons handling and face-to-face combat as well as first aid training); and
4. Proficiency Tests (8 items including tests on weapons handling, first aid, and other physical fitness tests).

Respondents used a four-point scale to rate the level of difficulty of each of the training tasks, in terms of amount of effort needed for each of the tasks. Scores range from zero for 'Not applicable', one for 'Easy', to four for 'Very difficult'.

The minimum score was zero and the maximum score was 120 for each week of training. The mean rating score of all respondents for each of the nine weeks of training was used to determine the stress level for each week. (See Appendix C.)

An alpha cronbach internal consistency reliability estimate was .96. Thus the Basic Military Training Stress Scale of 30 items was found to be reliable between raters for measuring level of difficulty. Based on the findings of the Basic Military Training Stress Scale, the first three weeks of training were defined as the

high stress period and the last three weeks of training were defined as the low stress period.

### Ways of Coping Questionnaire

The Ways of Coping Questionnaire (Folkman and Lazarus, 1988) was used to measure coping strategies. This scale is based on the transactional theory. In transactional theory, coping is seen as a dynamic process, changing with time, depending on the objective demands and subjective appraisals of the situation. There is hence a reciprocal relationship between stress and coping, that is, coping actions taken to solve a problem also affect appraisal of the problem and subsequent coping. The Ways of Coping Questionnaire is a self-report questionnaire. Subjects are first asked to think of a recent stressful event, appraise it, and to reflect their thoughts and actions that they used to cope with that stressful event.

Folkman and Lazarus (1988) did a multiple factor analysis of the 66 items. Fifty items were found to provide a consistent estimate of each item's factor loading. The analysis resulted in eight derived scales. The eight scales that were used are as follows, with sample items shown:

1. **Confrontative Coping** (Items 6, 7, 17, 28, 34 and 46). This strategy describes aggressive efforts to alter the situation. A sample item is "Stood my ground and fought for what I wanted."

2. **Distancing** (Items 12, 13, 15, 21, 41 and 44). This describes cognitive efforts to detach oneself and to minimize the significance of the situation. A sample item is "Went on as if nothing had happened."
3. **Self-Controlling** (Items 10, 14, 35, 43, 54, 62 and 63). This describes efforts to regulate one's feelings and actions. A sample item is "I tried to keep my feelings to myself."
4. **Seeking Social Support** (Items 8, 18, 22, 31, 42 and 45). This describes efforts to seek informational and emotional support. A sample item is "Talked to someone to find out more about the situation."
5. **Accepting Responsibility** (Items 9, 25, 29 and 51). This involves acknowledging one's own role in the problem and efforts in trying to put things right. A sample item is "Criticized or lectured myself."
6. **Escape-Avoidance** (Items 11, 16, 33, 40, 47, 50, 58 and 59). This describes wishful thinking and efforts to escape or avoid a problem. A sample item is "Hoped a miracle would happen."
7. **Planful Problem Solving** (Items 1, 26, 39, 48, 49 and 52). This describes deliberate problem-focused efforts to alter the situation. A sample item is "I made a plan of action and followed it."
8. **Positive Reappraisal** (Items 20, 23, 30, 36, 38, 56 and 60). This describes efforts to formulate a positive meaning by focusing on personal growth. A sample item is "Changed or grew as a person in a good way."

A four-point Likert rating scale was used, ranging from "Did not use at all", scored as zero to "Used almost always", scored as three. Language of the response format was changed to suit local understanding. The range was from a minimum score of zero to a maximum score of 150 for the total scale. A sum total score for each of the coping strategies was derived. Reliability check using the cronbach alpha yielded an alpha of .77.

In this study, the questionnaire was administered at three points of time. On the first day of enlistment, subjects were asked about the coping strategies they used to handle a recent stressful event before enlistment, and excluding the events of the day. (See Appendix D.) In the second and third administration, they were asked about how they coped with training over the last three weeks prior to administration. (See Appendix F and G.)

### **General Health Questionnaire**

The General Health Questionnaire (28 questions format) or GHQ-28 (Goldberg, 1978) was used to measure the extent of psychological symptoms. The General Health Questionnaire aims to detect psychiatric disorders of persons in a non-psychiatric setting. The scales are based on the diagnostic guidelines as specified by the Clinical Descriptions and Diagnostic Guidelines of Mental, Behavioural and Developmental Disorders in the 10<sup>th</sup> edition of the International Classification of Diseases (World Health Organization, 1992). They are also based on the



guidelines specified in the third revision of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 1987)

The General Health Questionnaire is a self-report questionnaire with 28 items, and contains four scales

- 1 **Somatic Symptoms**, which has seven items (See Questions A1 to A7 in Appendix D).
- 2 **Anxiety**, which has 7 items (See Questions B1 to B7).
- 3 **Social Dysfunction**, which has seven items (See Questions C1 to C7).
- 4 **Depression**, which has seven items (See Questions D1 to D7), and
- 5 **General Symptom Scores**, which is the sum of the above four scales

Subjects were asked to report their general health at three points or time. On the first day of enlistment, they were asked to rate their psychological health over the past few weeks before enlistment (see Appendix D ). On the third week, they were asked to rate how they felt over the first three weeks of Basic Military Training. On the 10<sup>th</sup> week, they were again asked to rate how they felt over the last three weeks of training. (See Appendix F and G.) A four-point Likert rating scale was used, ranging from "Not at all" which was scored as zero to "Much more than usual", which was scored as three. The higher the scores on the General Health Questionnaire, the more symptoms were reported. The minimum score was zero and the maximum score for the 28 items was 84. A reliability check using the cronbach alpha yielded an alpha of .85.

### Eysenck Personality Scales

The Eysenck Personality Scales was used to measure personality (Eysenck and Eysenck, 1991). Personality is defined as a predisposition to think and act in a consistent manner and is in part dependent on genetic predisposition. The five personality scales that were used were (see Appendix E).

1. **Neuroticism** which measured emotionality. People with high scores tended to be more anxious, worrying, moody and frequently depressed (24 items);
2. **Extraversion** which measured the tendency for individuals to prefer social contact or be less sociable (23 items),
3. **Psychoticism** which measures tough mindedness or a tendency to be less empathic (32 items);
4. **Social Desirability** which measures a tendency to conform (21 items), and
5. **Impulsiveness** which measures the extent to which one acts without weighing the consequences of his actions (19 items)

The total number of questions is 106. One hundred of these items are used to measure neuroticism, extraversion, psychoticism, social desirability and impulsiveness. Six items were appended to the questionnaire, which are used for the addiction or criminality scale and are not scored in this study. A scoring key is used for each of the scales. Items which are ticked in the same direction as presented on each of the scales are scored as one. This may either be ticked as

"yes" or "no". The neuroticism scale has a minimum score of zero and a maximum score of 24. The extraversion scale has a minimum score of zero and a maximum score of 23. The psychoticism scale has a minimum score of zero and a maximum score of 32. The social desirability scale has a minimum score of zero and a maximum score of 21. The impulsiveness scale has a minimum score of zero and a maximum score of 19.

Numerical scores as well as mean scores were used for analysis. The subjects were divided into low, median and high groups by using one standard deviation from the mean to split the groups. The means of the current sample are compared with mean scores given by Eysenck's sample (See Table 27 in Appendix H). Recruits in this sample were similar to Eysenck's sample for neuroticism and extraversion. Recruits in this sample however were found to be less empathic, more conforming and more impulsive than Eysenck's sample. This may be due in part to the skew in the current recruit sample toward the younger age group (with a mean age of 20 years,  $SD = .81$ ) as compared to the Eysenck sample (with a mean age of 27 years,  $SD = .12$ ).

### **Personal Problems Checklist**

The Personal Problems Checklist is a self-report checklist designed by the author to measure the extent of personal problems that recruits have in their personal lives. (See Appendix E.) The 30 items measure two types of problems, including

family problems (15 items) and problems within the self (15 items). Family problems include interpersonal problems with family of origin (Items 4, 5, 6, 7, 8 and 14), interpersonal problems with family members arising from legal issues (Items 9, 10, 11, 12, 13) and other problems related to hardship amongst family (Items 1, 2, 3 and 15). Self-problems include interpersonal problems with friends (Items 16, 17, 18 and 20), social problems (Items 21, 22, 23, 28), and psychological problems (Items 19, 24, 25, 26, 27, 29 and 30). These items were chosen as soldiers visiting the mental health clinics within the Singapore Armed Forces commonly reported them. A four-point Likert scale was used, ranging from "Not at all", scored as zero to "A big problem", scored as three. A composite personal problem score was obtained by summing all items. The minimum score was zero and the maximum score for the 30 items was 90. Using the alpha cronbach reliability check, the Personal Problems Checklist yielded an alpha of .70, thus indicating that it was internally consistent.

### **Perceived Social Support Questionnaire**

This is a measure of perceived support. This questionnaire was adapted from the Multidimensional Scale of Perceived Support (Zimmet, Dahlem, Zimmet and Farley, 1988). The 15 items were divided into three types of support, including support from a significant other (Items 1, 4, 7, 10 and 13), support from family (Items 2, 5, 8, 11 and 15) and support from friends (Items 3, 6, 9, 12 and 14). (See Appendix E.) Subjects rated their support by checking on a four-point Likert

scale, with "Strongly disagree" scored as one to "Strongly agree" scored as four. Summing all the 15 items would derive a composite social support score, with a minimum score of zero and a maximum total score of 60. A reliability check using the cronbach alpha yielded an alpha of .71, thus indicating internal consistency.

### **Individual Physical Proficiency Test**

This is an objective set of tests used in the Singapore Armed Forces and includes a battery of tests on sit-ups, standing broad jump, chin-ups, shuttle run and a two-and-a-quarter kilometer run. Points are awarded to each test in the battery based on a criteria set by the Singapore Armed Forces. Point score results for each recruit were obtained from the Commanding Officer of the Company of recruits. Of the 200 recruits studied, 170 recruits took the Individual Physical Proficiency Test, with a mean point-score of 20.66 ( $SD = 3.0$ ).

### **Passing Basic Military Training**

This measures whether recruits completed Basic Military Training or were taken out of course as a result of incomplete training. Recruits who passed were scored as one and those who did not complete training who were taken out of course were scored as two. Pass rates were obtained from the Commanding Officer of

the Company of recruits. Of the 200 recruits studied, 92.5% ( $n = 185$ ) passed Basic Military Training and 7.5% ( $n = 15$ ) were taken out of course.

### **Personal Information**

The following are other background variables that are under study to examine their effects on coping. Questions on these background variables can be found on the section on personal information in Questionnaire booklets two to four (see, Appendix E to G.)

### **Mental and Physical Preparedness**

Mental and Physical preparedness are indirect measures of motivation. In Questionnaire Booklet 2 (see Appendix E), recruits are asked to rate how mentally and physically prepared they feel in doing Basic Military Training. A four-point Likert scale was used, ranging from "Not prepared" (scored as one) to "Confident" (scored as four). For mental preparedness, 6% ( $n = 12$ ) in this sample felt confident, 44% ( $n = 88$ ) felt prepared, 39% ( $n = 78$ ) felt only somewhat prepared and 10.5% ( $n = 21$ ) felt unprepared. For physical preparedness, 6% ( $n = 12$ ) felt confident, 28.5% ( $n = 57$ ) felt prepared, 51% ( $n = 102$ ) felt only somewhat prepared and 14% ( $n = 28$ ) felt unprepared.

### **Physical Fitness Level**

Physical fitness level is a nominal variable that measures the recruits' level of fitness before enlistment by their results on the pre-enlistment screening test on physical fitness. (See Appendix E.) The test is taken as a pre-enlistment screening procedure to grade registrants in terms of their fitness level. Physical fitness level was graded into 'Passed with silver award' scored as one, and 'Passed with gold award' scored as two. In this sample, 14.5% ( $n = 29$ ) had obtained gold awards on the pre-enlistment physical fitness test and 85% ( $n = 170$ ) had silver awards.

### **Medical Status**

This is a nominal variable and measures the pre-enlistment health level of the recruits. (See Appendix E.) Recruits were graded as having no existing medical problems before enlistment, scored as one, or having minor medical problems, scored as two. Of the 200 recruits, 51 % ( $n = 102$ ) did not have any medical problems, 49.5 % ( $n = 97$ ) had minor medical problems and 1.5 % ( $n = 1$ ) was awaiting classification of their medical status.

### **Deterioration in Medical Status**

This is a nominal variable that looks at whether the recruits developed medical problems or whether their current medical problems became worse during the training period (See Appendix G) 'No change' was scored as one and 'New medical condition or deterioration in existing condition' was scored as two. In this sample, 11% ( $n = 22$ ) of recruits' health showed deterioration.

### **Confinement**

This is a variable in which recruits report whether they received weekend confinement for extra training or as punishment for offences during the high stress period (See Appendix F). A response 'No' was scored as one and 'Yes' was scored as two. During the high stress period, 2.5% ( $n = 5$ ) of the sample were given weekend confinement.

### **Secondary Appointment**

This is a nominal variable that is defined by whether the recruits were given a secondary leadership role such as being in charge of a group to ensure cleanliness in the bunk (See Appendix F). This added responsibility and accountability expected of the individual might affect coping as the leader has to ensure that his group completes their duties. 'No' responses were scored as one and 'Yes'



responses were scored as two. During the high stress period, 2.5 % ( $n = 5$ ) were given secondary appointments.

### **Number of Spoken Languages**

This is a nominal variable defined by whether the recruits were bilingual or multilingual. (See Appendix E.) It indirectly measures the ability to communicate and socialize with different groups of people who come from diverse social backgrounds. Being bilingual was scored as one and multilingual was scored as two.

### **Type of Medical Leave**

This is a nominal variable which looks at the type of rest recruits were given by their medical officer after falling sick. (See Appendix F.) It indirectly measures the level of recuperation after illness. A three-point Likert scale was used. 'No medical leave or not applicable' was scored as one, 'Attend B' or being given light duties was scored as two, and 'Attend C' or being allowed to rest in the bunk or at home was scored as three. During the high stress period, 60.5% ( $n = 121$ ) of the sample did not have any medical leave or were not given any, 32% ( $n = 4$ ) were given light duties and 4.5% ( $n = 9$ ) were allowed to rest in their bunks or at home.

### **Family-Income**

This is a nominal variable that looks at the impact of socio-economic status on coping (See Appendix E ) A five-point Likert scale was used with 'Less than \$1000' scored as one and 'More than \$4000' scored as five

### **Type of Housing**

This is a nominal variable and indirectly measures socio-economic status (See Appendix E ) A five-point Likert scale was used, a minimum score of one was assigned to those who lived in 'One- to Two- Room Flats' and a maximum score of five for 'Private House'

### **Birth Position in Family**

This is also a nominal variable and describes the birth position of the recruits in relation to their siblings (See Appendix E ) 44% were the youngest son in their families ( $n = 88$ ), 14% were the middle son ( $n = 28$ ), 36% were the oldest son ( $n = 72$ ) and 6% were the only child ( $n = 12$ )

## **Race**

This is a nominal variable. (See Appendix E.) Chinese were coded as one, Malays as two, Indians as three, and Eurasians and other racial groups as four. The groups were also re-coded into 'Chinese', scored as one, and 'non-Chinese', scored as two.

## **Educational Level**

This describes the type of education the recruits had obtained. (See Appendix E.)

### **Procedure for Data Collection and Analysis**

This section describes the procedures for collecting data as well as the statistical procedures used in analyzing the data.

## **Order of Administration**

The measures and instruments are presented in the following order.

1. Basic Military Training Stress Scale.
2. Questionnaire Booklet One. This comprises the General Health Questionnaire and the Ways of Coping Questionnaire and measures

baseline levels of psychological symptoms and the ways recruits coped with civilian stressors.

3. Questionnaire Booklet Two. This comprises the Eysenck Personality Scales which measures stable personality traits of the recruits; the Personal Problems Checklist, which measures the personal concerns of the recruits outside of National Service; and the Perceived Social Support Questionnaire, which measures their sense of personal support outside the Singapore Armed Forces. There are also questions on their personal details as well as their level of preparedness to do National Service.
4. Questionnaire Booklet Three. This comprises the Ways of Coping Questionnaire for dealing with training stress during the high stress period. It also contains the General Health Questionnaire which measures psychological symptoms during high stress period, and information regarding whether the recruits were given secondary role appointments or weekend confinements, their help-seeking behaviours, and types of medical leave taken.
5. Questionnaire Booklet 4. This comprises the Ways of Coping Questionnaire for dealing with training stress during the low stress periods, and the General Health Questionnaire, which measures psychological symptoms during the low stress period. It also contains sections on whether their personal problems increased during enlistment, whether their social support network deteriorated, and whether they developed new or worsened medical conditions during the training period. It also asks about

their help-seeking behaviours and types of medical leave taken in the last three weeks of training.

### **Data Collection**

On the 28th September, 1999, that was one day before the recruits arrived in camp, trainers, including platoon commanders and section leaders, were asked to rate the difficulty level of training for each of the weeks of training using the , Basic Military Training Stress Scale. Based on this rating, the first three weeks were identified as high stress period (  $\bar{M}$  = 67.93,  $\underline{SD}$  = 24.86) and the last three weeks as low stress periods ( $\bar{M}$  = 36.93,  $\underline{SD}$  = 16.55). (See Appendix B.)

On the 29th September 1999 which was the first day of enlistment, baseline measures were taken. This involved a two-part administration procedure. Two administration times were needed to cater to the tight programme schedule of the first day of enlistment. Two sets of questionnaire booklets were given out to all recruits just after lunch and after dinner. The times were picked based on logistical convenience. Effort was made to minimize the confounding effect of training exposure for the Ways of Coping Questionnaire and the General Health Questionnaire by administering these scales before lunch when recruits were minimally inducted into training. The author and two assistants administered the Questionnaire booklet one just after lunch. All subjects were assembled into a lecture room in the School of Basic Military Training Centre, and instructions

were given by the author verbally (see Appendix I for verbatim) as well as in written form in the booklet. Subjects were allowed 30 minutes to complete the set of questions. The first booklet comprised of the Ways of Coping Questionnaire and the General Health Questionnaire. The second booklet was given in the same manner as the first after dinner and subjects were allowed 60 minutes to complete this booklet. Included in the booklet were the Eysenck Personality Questionnaire, the Personal Problems Checklist, Perceived Support Questionnaire and a questionnaire on personal biographical data as well as the motivation questions. Subjects were given 60 minutes to complete the booklet.

The second administration occurred on the third week of training, on the 15th of October 1999. In the second measurement (high stress period), a third booklet containing the questionnaires was administered. The booklets were administered in the morning, when recruits were fresh. In the same fashion as the earlier administration, the subjects were gathered into the same lecture hall at the School of Basic Military Training Centre. Verbal as well as written instructions were given by the author. The subjects were given 15 minutes to complete the questionnaire. The booklet contained the Ways of Coping Questionnaire and the General Health Questionnaire. The instructions were modified to ask the subjects to report their responses to the events that had occurred in the last three weeks of training. Information was also obtained regarding whether they had any mental or medical health professional consultation, the type of medical leave they were

given, and whether they had been given secondary appointments and / or confinements.

On the last week of training, on the 1st December 1999, the third administration was carried out. This was considered to be a low stress period. By this time, the subjects had completed all training and were preparing for their graduation ceremony. A forth booklet was administered, comprising the Ways of Coping Questionnaire , the General Health Questionnaire and information about whether the recruits had a deterioration in terms of their of their personal problems, social support or medical status. Information was also obtained about whether they had any mental or medical professional consultation for problems and the type of medical leave they were given in the last three weeks of training. Individual Physical Proficiency Test results and pass rates were also obtained from the trainers.

### **Statistical Analysis**

Statistical analysis was done using the Statistical Package for Social Sciences (SPSS), version 7.5. Pearson product-moment correlation was used to analyze the relationship between general symptoms and factors including age, personal problems, social support, personality and coping strategies T-test analysis was used to find mean score differences between two independent groups. These included comparing mean differences in general symptoms scores, scores on the

Individual Physical Proficiency Test and pass rate for Basic Military Training. Analysis using one-way analysis of variance was used to compare mean differences when there were more than two groups. Post hoc analysis using the Scheffe test was also used to examine mean differences between groups. Multiple linear regression was used to study the factors affecting psychological well being and physical performance. Logistic regression was also used to find out the predictors of completion of training. The general linear model for repeated measures was used to explore the main and interaction effects of situation and . personality on the types of coping strategies used by recruits.

In sum, this chapter described the methodology of this research design. This included a description of the sample of recruits that were studied, ethical considerations, the instruments and measures used, as well as the procedures of data collection and the statistical analysis employed for this study.