SELF-EFFICACY BELIEFS AND BARRIERS AMONG UNRELATED DONORS TO BONE MARROW DONATION

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By
Ching-Min Chiu

Thesis Committee:

Dr. Elizabeth Kunimoto, Chairperson  
Dr. Gary Fontaine  
Dr. Thomas Kelleher
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ABSTRACT

The level of self-efficacy and self-esteem of registered potential bone marrow donors and non-donors was examined. Results indicated that a high percentage of registered potential donors had scored higher than non-donors in task-specific self-efficacy scales. Registered potential donors had higher sense of task-specific self-efficacy than non-donors did. Nevertheless, the results of the general self-efficacy and self-esteem scale, however, revealed that differences between registered donors and non-donors were statistically insignificant. Furthermore, this study was set to identify the major barriers to bone marrow donation. Limited knowledge of bone marrow donation and lack of opportunity were the two major causes that stopped people from becoming registered potential donors.

The results of this study provide a starting point for campaign planners who are considering what approach to use when conducting donor-recruiting promotion. Due to the subjective nature of this study, however, additional research is suggested to determine what methods and messages are effective for recruiting more potential donors.
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CHAPTER 1
INTRODUCTION

There are many contradictions between traditions and modern science; often times, the contradictory can be fatal, especially when medical parameters are involved. Bone Marrow Donation in Taiwan exemplifies this controversy. Bone marrow donation is a procedure whereby bone marrow is removed from one individual (donor) and transplanted into another (recipient). Due to the traditional Chinese customs, bone marrow donation was nearly implausible for most people in Taiwan. Even in the world, there was just a small pool to draw from ethnic Chinese donors; and until 1990, there had not been a single Chinese bone marrow donor on the International Red Cross Registry. The reason for the small numbers of Chinese donors is that it is taboo, according to Chinese tradition, to give away any parts of the body, such as blood, organs, or even hair. The consequences, people believe, affect their longevity. Specifically, the bone marrow symbolizes a person’s “Chi” spiritually and physically and giving away the bone marrow is considered harmful to the individual. However, after the establishment of the Tzu Chi Bone Marrow Donor Registry, the situation has been changed. Tzu Chi launched a series of health communication campaigns to encourage the donation and collect more
voluntary donors. Since then, more and more people have joined the registry. The most important message from the series of Tzu Chi's campaign is "Respect lives" and "You can save a life without hurting yourself, just by donating your bone marrow." By providing comprehensive information and social support to individuals, the campaign is considered very successful. Now, Tzu Chi Bone Marrow Center in Taiwan is by far the largest of its kind in Asia and the third largest in the world.

According to Paisley (2001), Public Communication Campaigns (PCCs) can be defined from different aspects as follows: 1) they are strategies of social control, insofar as one group intends to affect the beliefs or behaviors of another group; 2) they are a genre of mass communication that might be called noncommercial advertising or public services announcements (PSAs); 3) they are strategies of mass communication and interpersonal communication designed to set public agendas and affect the beliefs and behaviors of individuals and social groups. Numerous frameworks have been developed to describe the campaign process, and many theories have been constituted that inform campaign evaluation (Valente & Saba, 1998; Rice & Atkin, 1989). This is particularly salient in the field of health communication, in which great amount of dollars are spent annually intending to change health-related behaviors (Atkin & Arkin, 1990). Health
communication campaigns are typically directed at a large number of individuals, conducted in a predetermined time frame, and consist of organized and planned communication activities (Rogers, 1996; Rogers & Story, 1987). In order to achieve the objectives of campaigns, campaign designers usually employ theories to guide the development of campaigns. Among various theories, two major approaches can be identified in terms of micro-level and macro-level (Lapinski & Witte, 1998). They emphasize differently on individual and social factors that contribute to the attitude and behavior change of target segments. Many theories have been developed in micro-level, for example, the health belief model (Janz & Becker, 1984; Rosenstock, 1974), theory of reasoned action (Fishbein & Ajzen, 1975, 1981), and social cognitive theory (Bandura, 1977), stage of change model (Prochaska, DiClemente & Norcross, 1992).

Among those theoretical approaches, the primary focus of this study is the "self-efficacy" concept of Bandura's social cognitive theory (SCT), which describes human behavior as being reciprocally determined by internal personal factors and environmental influences (Bandura, 1986). Bandura asserts that people and their behaviors are shaped by their environments. On the other hand, people also shape their environments through their behavior and expectations. The social cognitive theory
perceives that individual behavior change can be facilitated by modifying people’s personal factors and by altering the environmental factors. In general, research based on Bandura’s theory has found self-efficacy to be a significant factor in various health-related behaviors (Neufeld & Thomas, 1977; Bandura et al, 1980, 1982; Seeman & Anderson, 1983; Taylor, 1985; DiClemente, 1985; Schneider & Agras, 1985; Newcomb & Harlow, 1986; Schwalbe & Gecas, 1988). In addition, SCT has been applied to various health communication campaigns in order to encourage healthful behavior. For instance, the Stanford 5-cities projects that aimed to prevent heart disease employed SCT (Flora, Maccoby, & Farquhar, 1989). It also has been used in several AIDS-prevention projects (Bandura, 1989).

1.1 Statement of the Problem

Each year, more than 30,000 people in Asia and Pacific Islands are diagnosed with life-threatening diseases for which a marrow or blood stem cell transplant may offer the only chance for a cure. A successful transplantation requires carefully matching the donor's and patient's tissue types. The best source is usually a patient's brother or sister, with a twenty-five percent chance of a match. Otherwise, an unrelated donor is needed. People need to search for an unrelated donor in a bone marrow registry programs such as
the National Marrow Donor Program's Registry in the U.S., which is the world's largest data bank. By July 2003, it maintained more than 5 million volunteer blood stem cell donors and more than 28,000 umbilical cord units (National Marrow Donor Program [NMDP], 2003). Donor blood samples are tissue typed and the donor is assigned an index number to protect confidentiality. The information is entered into a searchable database where it can be compared to a patient's tissue type. Unfortunately, the chances of matching the tissue type of the patients to that of the non-relative donors are extremely low (approximately: 1/100,000). However, a data bank with around 100,000 registrants has a match rate of fifty percent; a bank with one million registrants can increase the match rate to seventy percent (Buddhist Compassion Relief Tzu Chi Foundation, 2002).

Therefore, a well-established data bank is a very important resource for all nations, citizens, and mankind. In addition, because the tissue types are inherited, patients are more likely to find a matched donor from their own racial or ethnic group. By adding volunteers who are from minority racial and ethnic groups, these patients may have a second chance at life. Although more Asian patients are finding donors for their transplants, they are still less likely than Caucasians to identify a matched donor. Asian patients will continue to benefit from the addition of more Asians joining the Registry.
More Asian donors are still needed, so others can have a chance of finding a matched donor.

1.2 Purpose and Significance

Previous studies have conducted findings of blood and various organ donations that indicated the motivations of donors, their self-image, and psychological well-being (Mauss, 1967; Piliavin 1990; Piliavin & Libby, 1985-1986; Fellner & Marshall, 1970; Simmons, Marine, & Simmons, 1987). They have indicated helping behaviors resulting from the positive moods and favorable self-evaluations of individuals (Baumann, Cialidini, & Kenrick, 1981; Batson, O’Quin, Fultz, Vanderplas, & Isan, 1983; Simmons, 1991; Simmons, Schimmel, & Butterworth, 1993). However, studies focusing more specifically on bone marrow donors are still in the minority. This study intends to differentiate the registered donors and others in terms of the level of self-efficacy and self-esteem. Furthermore, this study also aims to identify barriers to bone marrow donation. Bone marrow drive campaign designers can utilize this information of donors in order to recruit more donors for future applications. Eventually, a larger and diverse bone marrow registry program can be established, which will be a great benefit to
countless patients in the world.

1.3 Objectives

By analyzing the differences among registered potential bone marrow donors and people who have not registered as volunteer donors, this study hopes to provide more information to Bone Marrow Drive campaign designers for future applications. By examining the significance of “self-efficacy” and “self-esteem” of participants, this study aims to uncover the characteristics of potential bone marrow donors in order to present practicable approaches to alter behavior change for this particular segment of health communication campaigns. Thus, a larger data bank can be established and innumerable patients may benefit in the future.

The specific objectives of this proposed study are:

*Research Objective 1:* To differentiate between registered potential bone marrow donors and non-donors in terms of the degree of “self-efficacy” and “self-esteem”.

*Research Objective 2:* To identify the major barriers of bone marrow donation.
1.4 Literature Review

There are several sections in this portion of research. The theoretical and systematic reviews of existing literatures are represented in terms of: 1) Bone Marrow Transplantation and Donation; 2) Nature and Function of Efficacy Beliefs; 3) Self-Efficacy and Outcome Expectation; 4) Self-Efficacy and Health Promotion; 5) Self-Efficacy and Behavior; 6) Self-Efficacy and Self-Esteem; 7) Self-Efficacy and Locus of Control; 8) Conclusion; 9) Research Questions. The objective of this literature review is to set a theoretical base for this research through delineating the relations among the concept of self-efficacy and other variables.

1.4.1 Bone Marrow Transplantation and Donation

Bone marrow transplantation has been accepted as potentially curative for people who have a wide variety of hematologic neoplasms, bone marrow failure syndromes, or certain congenital disease (Thomas, Storb, & Clift et al., 1975; Hansen, Gooley, & Martin et al., 1998; Anasetti, Howe, Peteersdorf et al., 1994; Kernan, Bartsh, & Ash et al., 1993). For seventy percent of these individuals, sibling donors – who have a one in four chance of having marrow matching that of the patient – are not available.
and an unrelated donor is the only hope. However, in order to comprehend the nature of bone marrow transplantation and donation thoroughly, the medical terminology will be clarified in the following section to facilitate the discussion in this study.

1.4.1.1 Terminology

_Bone Marrow_

Bone marrow serves as one of the body's largest organs and is responsible for four to five percent of the body's mass. The bone marrow, a spongy blood-like substance found in cavities of bones, plays a major role in the development of blood cells (The Leukemia & Lymphoma Society [TLLS], 2003). After puberty, the marrow in the spine, ribs, breastbone, hip, shoulders, and skull is most active in blood cell formation.

_Stem Cells_

The stem cells are primitive cells that are essential in making blood cells. There are three types of blood cells: red blood cells, which carry oxygen to and remove waste products from organs and tissues; white blood cells, which fight infection; and platelets, which enable the blood to clot. About five hundred billion blood cells are made each day through stem cells (TLLS, 2003). Because most blood cells live for very
short period and must be constantly replaced, the activity of blood cell production is extremely critical for survival. Therefore, when the process fails, it causes the severe deficiency in people. Generally, they are largely found in the marrow, but some leave the marrow to circulate in blood, which called peripheral blood stem cells (PBSCs) (National Cancer Institute [NCT], 2003). Through special treatments, the PBSCs in blood can be collected, preserved, and used for therapy. In addition, the stem cells also circulate in large numbers in fetal blood and can be recovered from the placental and umbilical cord blood after childbirth. The techniques of harvesting, freezing, and storing of “cord blood” has provided another source of stem cells for transplantation.

**Bone Marrow Transplantation**

This technique was developed to restore the marrow of patients who had lethal injury to the site due to primary marrow failure, destruction of marrow by disease, or intensive chemical or radiation exposure. As first designed, the source of the transplant was the marrow of a healthy donor who had the same tissue type (HLA type) as the patient. Usually, the donor was a sibling of the patient’s. Later, donor program have been established to identify unrelated donors who have a matching tissue type. This approach requires screening tens of thousands of unrelated individuals of similar ethnicity.
The actual “product” of transplant is a very small fraction of the marrow cells called “stem cells”, which has been discussed above. Since blood as well as marrow is a good source of stem cells for transplantation, the term “stem cell transplantation” has also applied as the general term for these procedures (NCT, 2003).

According to the source of tissue, there are three types of transplants (TLLS, 2003; NCT, 2003):

1. **Autologous Transplant**: In this procedure, patients receive stem cells that are collected from their own blood or marrow. Technically, this procedure is not a transplantation, which implies transferring tissue from one individual (donor) to another person (recipient). According to TLLS (2003), this technique would better be referred to as autologous marrow infusion.

2. **Syngeneic Transplant**: if the patient receives tissue from his/her identical twin, the transplant is called “syngeneic transplant”. The medical term “syngeneic” stands for genetically identical.

3. **Allogeneic Transplant**: when patients receive stem cells from someone other than themselves or an identical twin, the procedure is referred as “allogeneic transplant”. The patient’s parent and a non-identical sibling, or a person not related to the patient (an
unrelated donor) may serve as the donor. The term “matched unrelated” is applied to
the donor recruited from marrow donor programs who is very similar in tissue type to the
patient.

**HLA**

The major criteria for marrow donor matching is a set of genetically determined
molecules known as the human leukocyte antigens (HLA) which determine whether
donated marrow is accepted or rejected by the immune system. There are four major
groups of HLA antigens in terms of HLA-A, HLA-B, HLA-C, and HLA-D. These HLA
antigens are on the surface of most tissue cells and give every individual his/her unique
tissue type. It is nearly impossible for two individuals to display the same HLA
molecules on their cells unless they are identical twins. Because of this, when foreign
cells are introduced into an individual, the body does not recognize the antigens presented
by the cells and will attack them. Therefore, the success of allogeneic transplantation
depends largely on how well the HLA antigens of the donor’s marrow match those of the
recipient’s marrow. The higher the number of matching HLA antigens, the greater is the
chance that the recipient’s body will accept the donor’s bone marrow.
Bone Marrow Donation

Many bone marrow donor programs are created to facilitate transplantations for patients who do not have a donor in their family. These organizations encourage donation, sign up potential donors, record information on HLAs for tissue-type and blood-type matching, and match donors to patients. The Bone Marrow Donors Worldwide (BMDW), which started in 1988, is a voluntary collaborative effort of bone marrow donor registries and cord blood banks worldwide. The participants of BMDW are fifty-three stem cell donor registries from thirty-nine countries, and thirty-five cord blood registries from twenty-one countries. By November 25, 2003, the total number of registered donors and cord blood units obtained in BMDW is 8,805,123 (Bone Marrow Donors Worldwide, 2003). In 1994, in order to address and overcome the obstacles faced in donations when transplantations involved donors and recipients in different countries, the World Marrow Donor Association (WMDA) was formed to establish guidelines for international bone marrow and blood stem cell transplantations.

The ability to donate bone marrow or peripheral stem cells depends on whether:

1. the donor's blood type and tissue antigens are compatible with the recipient; 2. the donor is healthy enough to withstand the donation process. Generally, in order to assess
potential donor's ability to donate, the donor registry will undertake several tests and procedures on people who are willing to join the registry and become a donor. The exact criteria, form, and timing of the tests will be determined by the donor registry.

Take the NMDP as an example (NMDP, 2003); a person, regardless of race, ethnicity or gender, who is between 18 to 60 (up until 61st birthday) years old and meets donation health guidelines is eligible to become a volunteer potential marrow or blood stem cell donor. First, the individual has to complete a brief health questionnaire, and sign a form consenting to have his/her tissue type listed on the NMDP Registry and provide a small blood sample to determine his/her tissue type. Once listed on the NMDP Registry, his/her tissue type will be compared to the tissue types of thousands of patients around the world who need transplants. Next, if the person is identified as a potential match for a patient, NMDP Donor Center representatives will ask another blood sample to see whether his/her match well enough to be an actual donor for the patient. If he/she is indeed a match, he/she will receive further education about marrow and PBSC donation processes and which is the preferred process for this patient. Moreover, in order to prepare for either donation procedure, the donor will attend an information session about the donation process and potential side effects of the procedure. The donor will have a
physical exam to determine his/her health status and to discover if there are any special
risks to him/her with either donation procedure. The health requirements are the same
for marrow and PBSC donation. Finally, after being fully informed about the donor
experience, the individual will make the final decision whether or not to donate the
marrow or PBSC. In addition, according to the National Institute of Health (NIH)
(2003), the risks associated with bone marrow or peripheral blood stem cell donations are
very small. Bone marrow donation involves a surgical procedure. Because only a
small amount of bone marrow is removed, donating usually does not pose any significant
problems for the donor. The most serious risk associated with donating bone marrow
involves the use of anesthesia during the procedure. Within a few weeks, the donor’s
body will have replaced the donated marrow. The area where the bone marrow was
taken out may feel sore for a few days, and the donor may feel tired. The time required
for a donor to recover varies. Some people are back to their usual routine within 2 or 3
days, while others may take up to 3 to 4 weeks to recover their strength. Unlike bone
marrow donation, PBSC donation does not require anesthesia. The medication that is
given to stimulate the release of stem cells from the marrow into the bloodstream may
cause bone and muscle aches, headaches, and/or difficulty sleeping. Peripheral blood
stem cell (PBSC) donors may experience bone pain, muscle pain, nausea, insomnia, and fatigue while receiving injections of medication. Bone pain and headaches have been the two most frequently reported symptoms. These side effects disappear promptly within 2 to 3 days of the last dose of the medication.

1.4.1.2 Tzu Chi Marrow Donor Registry

Every year, thousands of people with leukemia, genetic disorders such as Fanconi anemia, and other potential fatal blood diseases need a marrow transplant. The first bone marrow transplant in Taiwan was carried out in 1983 (Chen, & Huang et al., 1994). Since then, increasing numbers of patients have undergone allogeneic marrow transplantation. However, more than two-thirds of patients were still unable to find a matched sibling donor.

Unrelated Bone marrow transplant was initiated thirty years ago. In 1993, Taiwan government reinterpreted the Body Organ Donation Law because originally, bone marrow transplants were allowed only between close relatives, and Taiwan did not have any bone marrow donor registry. Though there are millions of donors registered with the bone marrow registries worldwide, Asian patients rarely find a match with all these
donors. In order to increase the probability of providing matched unrelated donors for
patients, Tzu Chi Taiwan Marrow Donor Registry (TCTMDR) was established by the
Buddhist Tzu Chi Foundation in October 1993. Following the establishment of
TCTMDR in 1993, people increasingly registered as volunteer donors. The
achievement of Tzu Chi is extremely profound. It has become the largest Asian marrow
donor registry in the world. With the introduction of high technology to test the HLA of
the donors and recipients, the success rate of bone marrow transplant is greatly improved
among Asian countries. The establishment of cord blood banks in Taiwan will
complement fifty percent of blood disease Asian patients who cannot find a bone marrow
matched donor.

Nevertheless, many Taiwanese at that time still had the superstition that women
who donated would become sterile and that other donors would become handicapped.
In order to eliminate people’s incorrect concepts regarding bone marrow donation, Tzu
Chi members went throughout Taiwan with the appeal, “You can save a life without
hurting yourself, just by donating your bone marrow.” Tzu Chi Foundation hopes
Taiwan will become the "Land of Great Love" by having more people join the donor
program through community networks and the Internet. Tzu Chi bone marrow
volunteers work hard to educate and encourage participation of the general public.

According to the donors' testimony reported in Tzu Chi Magazine, the biggest incentive of donating their bone marrow is that donors perceive by donating their bone marrow they actually can save other people's lives. The incentive is successfully stimulated by the campaign and eventually leads to behavior changes. As a result, more and more people came out to actively support the campaign. Every blood test drive attracted thousands of eager participants.

By November 2002, the Tzu Chi Marrow Donor Registry had collected 238,647 potential donors, the Tzu Chi Marrow Donor Registry currently facilitates total 497 transplants (167 domestic, 330 international), and at any time, it offers hope to more than 10,000 patients searching its Registry. The Tzu Chi Marrow Donor Registry now has cooperative agreements with counterparts in Hong Kong, Singapore, the United States, and Australia. This has increased the international resources for leukemia patients. Now, blood disease patients need only apply to any one of the data banks, and computer can do the search for a match internationally. This simplifies the procedure, saves a lot of time in traveling, and greatly increases the probability of finding a compatible donor. Currently, Tzu Chi bone marrow registry ranks third in the world only next to those in the
US and Europe. The registry is continuing its efforts to recruit more potential donors under a primary slogan: "It doesn’t hurt to save a life".

1.4.2 Nature and Function of Efficacy Beliefs

Bandura first introduced the concept of self-efficacy in 1977 in his *Social Learning Theory*. In order to explain that his theory went beyond how humans learn to an explanation of motivation, affect, and action, Bandura changed the name in 1986 to Social Cognitive Theory to reflect this broader scope.

Bandura (1986) stated that people are “neither driven by inner forces nor automatically shaped and controlled by external stimuli” (p.18). In describing what he calls human agency, Bandura (1986) proposed a model in which the human agent operates within an interdependent causal structure involving three major determinants that he labeled as (a) internal personal factors, which include cognitive, affective, and biologic events, (b) behavior, and (c) environmental events (see Figure 1). The figure below portrays a conceptual representation of this reciprocal nature of determination among behavior, person, and environment (Bandura, 1986; Maibath & Cotton, 1995; Pajares, 2000). The interaction among these three determinants is bi-directional.
However, these determinants are not of equal strength, and the relative influence of each will vary for each individual for different circumstances and activities.

![Figure 1: Relationships Among Three Determinates in Social Cognitive Theory](image)

Bandura (1991) affirmed that "among the different mechanisms of personal agency, none is more central or pervasive than people's beliefs in their capability to exercise control over their own motivation and behavior, and over environmental demands" (p.229). The cognitive mechanism that Bandura called self-efficacy is considered particularly important.

Social Cognitive Theory (SCT) has demonstrated the importance of self-
efficacy in behavior change. In the “Self-Efficacy in Changing Societies”, Bandura (1995) indicated the importance of efficacy beliefs.

“People’s level of motivation, affective states, and actions are based more on what they believe than on what is objectively the case. Hence, it is people’s beliefs in their causative capabilities that is the major focus of inquiry. Much of the research generated by the various theories is tied to an omnibus measure of perceived control and devoted to the search for its psychosocial correlates. To fully understand personal causation requires a comprehensive theory that explains, within a unified conceptual framework, the origins of beliefs of personal efficacy, their structure and function, the processes through which they operate, and their diverse effects. Self-efficacy theory addresses all of these sub-processes both at the individual and collective level. (p.2)"

1.4.2.1 The Role of Self-Efficacy

The concept of self-efficacy has been recognized as one of Bandura’s most important to psychology and the field of health behavior change in general (Bandura, 1977b). Self-efficacy refers to the individuals’ confidence in his/her own ability to successfully carry out particular behaviors. The importance of self-efficacy for behavior change has been widely recognized across multiple behaviors related to health risk reduction (Strecher, V. J., DeVellis, B. M., Becker, M. H., & Rosenstock, I. M., 1986).

Self-efficacy is defined by Bandura (1986) as “people’s judgments of their capabilities to organize and execute courses of action required to attain designated types of performance” (p.391). Wood and Bandura (1989) expanded the definition by adding
that self-efficacy “refers to beliefs in one’s capabilities to mobilize the motivation, cognitive resources, and courses of action needed to meet situational demands” (p.408). Furthermore, Mitchell, Hopper, Daniels, George-Falvy & James (1994) concluded that self-efficacy “clearly refers to what a person believes he or she can do on a particular task” (p.506). The judgments of self-efficacy include both motivational and integrative perceptions (Gist & Mitchell, 1992). According to Mitchell et al. (1994), “capability, although based heavily on ability, also reflects a forward-looking prediction of how hard one will work and an integration of both of these factors” (p.506). The self-efficacy beliefs affect behavior in several ways. They influence the choices individuals make and the courses of actions they pursue. Efficacy beliefs also help people to determine how much effort they will expend on an activity, and how long they will persevere when confronting obstacles.

1.4.2.2 Source of Self-Efficacy

Bandura (1977, 1986, 1995) suggested that an individual’s self-efficacy is developed and influenced, and verified through four principle sources of information: (1) mastery experiences, (2) vicarious experiences, (3) social persuasion, and (4) physiologic
and emotional states. *Mastery experiences* refer to personal experiences and the interpreted results of one's previous performances, which are considered the most influential source of efficacy expectations because success strengthens self-beliefs of ability (Biran & Wilson, 1981; Feltz, Landers, & Raeder, 1979; Gist, 1989). Typically, outcomes interpreted as successful raise the self-efficacy, and those interpreted as failures lower the self-efficacy. For instance, successful performance of a behavior such as roller-skating, serves as an indicator to the individual that he or she is capable of performing other behaviors such as skating. Yet, if people experience only early success, they come to expect quick results and are easily discouraged by failure. Some difficulties and setbacks serve a useful purpose in demonstrating that success usually requires perseverant effort. After people become convinced and assured of their capabilities through repeated successes, they can mange setbacks and failures without being adversely affected (Wood & Bandura, 1989). By sustaining perseverance through tough times, people emerge stronger from adversity. The second source of efficacy information is *vicarious experiences* that refer to how the individual seeks appropriate role models performing the activity. Modeling helps people to build efficacy through observation and social comparison. Through observation, people learn effective
strategies for managing difficult situations. Through social comparison, people see similar others succeed because of sustained effort and may experience an increase in their beliefs about their own capabilities (i.e., "If she/he can do it, I can too"). When the individual observes others performing an activity successfully; the one becomes persuaded of his or her ability to perform the activity. When people are uncertain about their own abilities or when they have limited prior experiences, they tend to be more sensitive this source of information. Social persuasion is a third way of strengthening self-efficacy, which refers to people's exposure to the verbal judgments that others provide. People who receive realistic encouragements are more likely to exert greater effort and become successful. Positive persuasion can encourage and empower self-efficacy. By contrast, negative persuasion can work to defeat and weaken self-efficacy. Finally, people also rely partly on their physiologic and emotional state such as anxiety, stress, arousal, and mood states in judging their capabilities. People evaluate their abilities and degree of confidence by the emotional states they experience associated with a given activity. For example, individuals in a depressed mood may lower their efficacy regarding a given task. When facing a task, people interpret their emotional arousal and physical tension as predictors of poor performances.
Modifications may be made by improving physical well-being, reducing stress level, and/or altering negative self messages with positive affirmations (Wood & Bandura, 1989).

Self-efficacy is the judgment of one's ability to perform specific behaviors in particular situations (Bandura, 1986). The source of self-efficacy information comes from individuals' interpretations of the results of the events, and these interpretations provide the information on which judgments are based. However, information that is relevant for judging individuals' efficacy, whether conveyed enactively, vicariously, persuasively, or affectively is not inherently instructive. Rather it gains its significance through cognitive processes. Therefore, the information conveyed by the different modes of influence should be distinguished from the cognitive processing by which that information is selected, weighed, and integrated into self-efficacy judgments.

1.4.2.3 Types of Self-Efficacy

Bandura (1977a) first introduced task-specific self-efficacy (TSSE) in his social learning theory. He defined TSSE as “the conviction that one can successfully execute the behavior required to produce the required outcome” (Bandura, 1977b, p.193).
According to social cognitive theory, TSSE judgments can be categorized into three different dimensions: (a) level or magnitude, which means that TSSE may be limited to simple tasks or extended to more difficult ones; (b) strength, which refers to whether the individual will persist despite obstacles; and (c) generality, in which people judge themselves competent across a wide range of domains or situations. Self-efficacy, as presented in Bandura’s social learning theory (1977a, 1977b) and social cognition theory (1989), tends to be narrow in scope. Bandura’s restrictive words “given situational demands” have given self-efficacy a narrow focus, and many researchers have emphasized their researches on the magnitude and strength dimensions, conceptualizing and studying self-efficacy as a task-specific construct (Gist & Mitchell, 1992; Lee & Bobko, 1994).

Despite Bandura’s emphasis on domain specific characteristics of self-efficacy, more recently, many researchers have become more interested in the more trait-like self-efficacy, which has been termed general self-efficacy (GSE) (Eden, 1988; Gardner & Pierce, 1998; Judge, Erez, & Bono, 1998; Judge, Locke, & Durham, 1997). First of all, the concept of GSE is based on Bandura’s dimension of generality. Sherer et al. (1982) defined GSE as a general set of expectations that a person possesses, based on past
experiences, which affect his/her expectations of success in new situations. In other words, GSE is task-specific self-efficacy, which is generalized to other situations. Individuals with histories of numerous successes in various situations are theorized to have positive GSE expectations in a greater variety of situations than individuals with less successful experiences (Sherer et al., 1982). Second, especially in a new and ambiguous situation, generalized expectations have an impact on behavior (Speier & Frese, 1997). Thus, GSE is good for predicting outcomes of new and ambiguous situations. Third, according to Eden (1988), TSSE and GSE both denote beliefs about individual’s ability to achieve desired outcomes, although they construct in different scope (specificity or generality). Self-efficacy beliefs gained from a specific mastery experience of one situation may generalize to other similar situations (Tipton & Worthington, 1984). As such, TSSE and GSE share the similar antecedents (mastery experiences, vicarious experiences, social persuasion, and physiologic and emotional states). Shelton (1990) proposed that GSE emerges over one’s life span as one accumulates successes and failures across different assignment domains. Discussing the generality of self-efficacy beliefs, Bandura (1997) stated:

"Powerful mastery experiences that provide striking testimony to one’s capacity to effect personal changes can also produce a transformational restructuring of efficacy beliefs that is manifested
across diverse realms of functioning. Such personal triumphs serve as transforming experiences. What generalizes is the belief that one can mobilize whatever effort it takes to succeed in different undertakings.” (p.53).

GSE is theorized to be significantly related to TSSE because GSE is derived from it. The empirical evidence also indicates a significant relationship between them (Woodruff & Cashman, 1993; Pond & Hay, 1989; Eden & Kinnar, 1991; Smith, 1989). Further, because the relationship between TSSE and performance outcomes have been empirically linked and well documented (Bandura, 1986; Locke, Frederick, Lee & Bobko, 1984; Wood & Bandura, 1989), many scholars argue that GSE should significantly predict performance as well (Pond & Hay, 1989; Shelton, 1990; Sherer et al., 1982). Nevertheless, the relationship between GSE and performance predication remains controversial. Although many researchers reported that GSE is a construct that can be used to predict behavior, other researchers believe that GSE does not significantly predict performance outcomes (Mueller, 1992; Bandura, 1997).

1.4.2.4 Efficacy-Activated Processes

Self-efficacy beliefs regulate human functioning through four major processes.
They include cognitive, motivational, affective, and selection processes. These processes usually operate in concert and in the ongoing regulation of human functioning rather than in isolation. These processes are discussed in some detail in the sections that follow.

**Cognitive Process**

Efficacy beliefs affect thought patterns that can enhance or undermine performances. These cognitive effects are displayed in various forms. The majority of purposive behavior is regulated by forethought embodying cognized goals. Personal goal setting is influenced by self-appraisal of capabilities. The stronger the efficacy beliefs, the higher the goals and challenges people set for themselves and the firmer their commitment to them (Bandura & Wood, 1989; Locke et al., 1984; Taylor, Locke, Lee, & Gist, 1984). Challenging objectives raise the level of motivation and performance attainments (Locke & Latham, 1990).

Most courses of behavior are primarily organized in thought (Bandura, 1986; 1995). People's efficacy beliefs affect the types of anticipatory scenarios they construct and rehearse. Those who have a high sense of efficacy visualize success scenarios, which provide positive guides and supports for performance. By contrast, those who
judge themselves as inefficacious are more inclined to visualize failure scenarios that undermine performances by dwelling how things will go wrong. Many studies have indicated that cognitive simulations in which individuals visualize themselves executing activities skillfully enhance subsequent performance (Bandura, 1986; Corbin, 1972; Feltz & Landers, 1983; Kazdin, 1978). Moreover, self-efficacy beliefs and cognitive simulation influence each other bi-directionally. A high sense of efficacy fosters cognitive constructions of effective actions and cognitive reiteration of efficacious courses of action strengthens self-beliefs of efficacy (Bandura & Adams, 1977; Kazdin, 1979).

A major function of thought is to enable people to predict events and to develop ways to control those that affect their lives. These activities involve cognitive processing of multidimensional information that contains many ambiguities, complexities, and uncertainties. In order to ferret out predictive and regulative rules, people must depend on their preexisting knowledge to construct options, to weigh and to integrate predictive factors. Base on these composite rules, people test and revise their judgments against the immediate result of their actions, and to remember which factors they had tested and how well they had worked. It requires a strong sense of efficacy to remain
task oriented when people face pressing situational demands under stressful circumstances. Those have a low sense of efficacy become increasingly erratic in their analytic thinking and lower their ambitions. Eventually, the quality of their performances deteriorates (Wood & Bandura, 1989). On the other hand, those who maintain a strong sense of efficacy set themselves goals that are more challenging and use good analytic thinking, which reflects on better performances.

**Motivated Processes**

Self-efficacy beliefs play an important role in the self-regulation of motivation. Most human motivation is cognitively generated. In the cognitive motivation, people motivate and guide themselves throughout their actions anticipatorily by the exercise of forethought. Individuals form beliefs about what they can do. They anticipate likely outcomes of prospective actions and they set goals for themselves and plan courses of action designed to realize evaluated futures. Moreover, people mobilize the resources at their command and the level of effort needed to succeed. There are three different kinds of cognitive motivators around which different theories have been developed. They are causal attributions, which corresponds with the attribution theory, outcome expectancies, which corresponds with the expectancy-value theory, and cognized goals, which
corresponds with the goal theory. These alternative conceptions of cognitive motivation are summarized schematically by Figure 2 (Bandura, 1992). Outcome expectancies and cognized goals clearly operate through the anticipation mechanism. Causal reasons conceived retrospectively for prior attainments also can affect future actions anticipatorily by altering self-appraisal of capability and perception of task demands.

![Figure 2: Conceptual Representation of Cognitive Motivation](image)

**Affective Processes**

The self-efficacy beliefs also play an important role in the self-regulation of affective states. In the social cognitive theory (Bandura, 1986), efficacy beliefs influence vigilance toward potential threats and how they are perceived and cognitively processed. People's efficacy beliefs affect how much stress and depression they
experience in threatening or difficult situations as well as individuals’ level of motivation. Perceived self-efficacy to exercise control over potentially threatening events plays a central role in anxiety arousal. The potential threat is not a fixed property of situational events. Nor does appraisal of the likelihood of aversive happenings rely solely on reading external signs of danger or safety. Rather, it is a relational property concerning the match between perceived coping capabilities and potentially hurtful aspects of the environment. People who believe they are able to exercise control over potential threats do not conjure up apprehensive cognitions and are not perturbed by them as well. In contrast, people who believe they cannot manage potential threats experience high levels of anxiety arousal. They view many aspects of their environment as fraught with danger, dwell on their coping deficiencies, magnify the severity of possible threats and worry about incidents that rarely happen. Through such inefficacious thinking, they not only distress themselves but also constrain and impair their level of functioning (Beck, Emery, & Greenberg, 1985; Lazarus & Folkman, 1984; Meichenbaum, 1977; Sarason, 1975).

People live continuously with a psychic environment that is largely built by them. The exercise of control over ruminative and disturbing thoughts is the other way in which efficacy beliefs regulate anxiety arousal and depression. The exercise of control over
one’s own consciousness is illustrated well in the proverb: “You cannot prevent the birds of worry and care from flying over your head. But you can stop them from building a nest in your hair.” It is not the sheer frequency of disturbing thoughts, but the perceived inability to turn them off that is the major source of distress (Kent, 1987; Salkovskis & Harrison, 1984). Therefore, the frequency of aversive thoughts is unrelated to anxiety level when the effects of perceived thought control efficacy are removed. However, perceived thought control efficacy is strongly related to anxiety level when variations in frequency of aversive thoughts are removed (Kent & Gibbons, 1987). Both perceived coping self-efficacy and thought control efficacy perform jointly to reduce anxiety and avoidant behavior (Ozer & Bandura, 1990).

The other way in which efficacy beliefs reduce or eliminate anxiety is via supporting effective modes of behavior that change threatening environments into safe ones. People who have stronger sense of efficacy tend to be bolder in taking on problematic situations that generate stress. They are more likely to have greater success as well. Major changes in aversive social situations are usually accomplished through the exercise of efficacy collectively rather than just individually. A low sense of efficacy to exercise control generates depression as well as anxiety. Several paths lead
people to depression. One route is through unfulfilled aspiration. People who impose standards of self-value on themselves and judge themselves that they cannot attain drive themselves to depression (Kanfer & Zeiss, 1983). Furthermore, a low sense of social efficacy to develop social relationships that bring satisfaction to one’s life and lessen that adverse effects of chronic stressors. However, social support is not a self-forming entity that people can get without any efforts. Rather, they need to go out and find or create supportive relationships for themselves, which require a strong sense of social efficacy. Supportive relationships can enhance personal efficacy to reduce vulnerability to depression (Cutrona & Troutman, 1986; Major, Mueller, & Hildebrandt, 1985; Major et al., 1990). In addition, much depression is cognitively generated by dejecting thought patterns. A low sense of self-efficacy to exercise control over ruminative thought gives rise to the occurrence, duration, and recurrence of depressive episodes (Kavanagh & Wilson, 1989). The lower the perceived efficacy to turn off ruminative thoughts the higher is the depression. Perceived self-efficacy and mood influence each other bi-directionally. People act in accordance with their mood altered efficacy beliefs. Low self-efficacy breeds depression. Despondent mood diminishes self-efficacy, which undermines motivation and spawns deficient performances that causes even deeper
despondency. In contrast, positive mood enhances self-efficacy beliefs, which facilitates motivation, cognitive self-guidance, and accomplishments. Dependency diminishes perceived self-efficacy and positive mood enhances it.

**Selection Processes**

People can exercise some control over their lives by creating or selecting beneficial environments. However, people are partly the product of their environments. Thus, people's efficacy beliefs can shape the courses of their lives by influencing selection of activities and environments they choose to engage in. In this process, individual's destiny is shaped by selection of environments known to cultivate certain potentialities and life-styles. People tend to avoid activities and situations that they believe exceed their coping capabilities, but they readily undertake challenging tasks and choose environments they judge themselves capable of handling. Due to different choices people make, they cultivate various competencies, interests, and social networks that determine their life courses. The social influences shape people's efficacy beliefs constantly because these environmental parameters, which operate in selected environments, continue to promote certain competencies, values, and interests long after the efficacy decisional determinant has made. Self-efficacy beliefs contribute to the
course of social development and these developmental processes, indeed, involve bi-directional causation. People’s efficacy beliefs about their personal capabilities determine choice of associates and activities, and affiliation patterns, in turn, affect the direction of self-efficacy development (Bandura, 1992).

1.4.3 Self-Efficacy and Outcome Expectation

Besides the concept of self-efficacy, Bandura (1982) proposed that outcome expectations form a second construct that relates to motivational behavior and affect. Bandura distinguished between efficacy expectations and outcome expectations because individuals may believe that a certain behavior will result in a specific outcome; however, they may not believe that they are capable of performing the behavior required for the outcome to occur. Self-efficacy focuses on an individual’s judgment of his/her capabilities to organize and execute courses of action to accomplish certain tasks. Outcome expectations refer to the consequences that a certain action will produce. Furthermore, the self-efficacy beliefs require the development of competencies and expectations of personal effectiveness (internal). By contrast, outcome expectations require people to make certain assumptions of the prevailing environment (external).
Ideally, behavior is best predicted by considering both self-efficacy and outcome expectations (Bandura, 1995, 1997).

According to Bandura, health behavior and health outcomes are a function of two beliefs – self-efficacy and outcome expectations. The role of self-efficacy beliefs and outcome expectations in health behavior change is illustrated in Figure 3 (Grembowski, Patrick, Diehr, Durham, Beresford, Kay, & Hecht, 1993).

![Figure 3: The Theoretical Framework for Self-Efficacy and Outcome Expectations in Health Behavior Changes](image)

Nevertheless, although efficacy beliefs and outcome expectations are usually positively correlated, it is possible that individuals’ efficacy and outcome expectations will be inconsistent. This occurs when either no action will result in a particular outcome, or the outcome is loosely linked to the performance. Moreover, when the outcomes are fixed, they are also partially separable from self-efficacy. For example,
when a person works seven hours a day, he/she receives a certain amount of salary. When he/ she works ten hours a day, the same salary is received. This can negatively influence the performance. In addition, it is also possible that people believe that they are capable of performing a certain behavior, but they may not believe the outcome is worthwhile. For instance, an individual may consider himself/ herself capable of registering as a bone marrow donor. Nevertheless, he/she does not perceive that the action will lead to a significant result. In this situation, outcome expectations may have a direct impact on performance. A matrix was proposed by Bandura (1982) to illustrate the expected behavioral and affective reactions for individuals who vary in self-efficacy and outcome expectation beliefs.

<table>
<thead>
<tr>
<th>High self-efficacy</th>
<th>Low outcome expectation</th>
<th>High outcome expectation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Social activism</td>
<td>Assured, opportune action</td>
</tr>
<tr>
<td></td>
<td>Protest</td>
<td>High cognitive encouragement</td>
</tr>
<tr>
<td></td>
<td>Grievance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Milieu change</td>
<td></td>
</tr>
<tr>
<td>Low self-efficacy</td>
<td>Resignation</td>
<td>Self-devaluation</td>
</tr>
<tr>
<td></td>
<td>Apathy</td>
<td>Depression</td>
</tr>
<tr>
<td></td>
<td>Withdrawal</td>
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</table>

Figure 4: Behavioral and Affective Reactions as A Function of Different Levels of Self-Efficacy and Outcome
Outcome expectations are judgments or beliefs regarding the contingency between people’s behavior and the anticipated outcome (Pintrich & Schunk, 1996). Bandura (1986) also suggested that outcome judgments are based chiefly on the individual’s self-efficacy expectations. “If you control for how well people judge they can perform, you account for much of the variance in the kinds of outcomes they expect” (Bandura, 1986, p.393). The types of outcome expectations that people anticipate generally depend on their judgments of how well they will be able to perform a certain behavior. For instance, people who consider themselves to be highly efficacious will expect favorable outcomes.

1.4.4 Self-Efficacy and Health Promotion

The theory of self-efficacy has stimulated numerous health-related studies and health promotion activities, such as those identified in the enabling goals of the Health People 2010 Objectives: Draft for Public Comment (U.S. Department of Health and Human Services, 1998) that is influenced by improved perception of self-efficacy. The relationship between self-efficacy and health promotion behaviors, such as smoking cessation, eating behaviors, contraceptive use, exercise, alcohol and drug abuse, and
increasing pain tolerance, has been well-established in studies (Conn, 1998; Gills, 1993; DiClemente, 1981; Hofstetter, et al., 1990; Kelly, Zyzanski, & Alemagno, 1991; Marcus, Pinto, Simkin, Audrain, & Taylor, 1994; McAuley & Jacobson, 1991; Neufeld & Tomas, 1977; Newcomb & Harlow, 1986; Pender, 1996; Strecher et al., 1986; Schneider & Agras, 1985; Seeman & Anderson, 1983). Research has repeatedly reported self-efficacy as a significant predictor of one's likelihood to engage in health-related activities (Gecas, 1989). In general, studies indicated that high self-efficacy has beneficial and therapeutic consequences for individuals, and low self-efficacy has negative and maladaptive consequences.

1.4.5 Self-Efficacy and Behavior

The reciprocal determinations in social cognitive theory make it possible for particular efforts to be directed at personal, environmental, or behavioral factors in order to change behavior. For example, strategies that intend to increase well-being can be aimed at improving emotional, cognitive, or motivational processes, increasing behavioral competencies, or altering the social conditions under which people live. Among all factors, the self-efficacy beliefs are the most decisive and influential
parameter in the SCT, which provides a mechanism to explain individual behavior. First, they influence the choices people make and the courses of action they pursue. Individuals tend to select tasks and activities in which they feel confident and competent, and avoid those in which they feel unconfident and incompetent. People have little incentive to engage in those activities unless they believe that their actions will lead to the desired consequences. Moreover, self-efficacy also is an indicator of determining how much effort people will expend on a certain activity, how long they will persevere when confronting obstacles, and how resilient they will be in the face of adverse situations. In general, people with the higher sense of self-efficacy will expend greater effort and demonstrate persistence and resilience. In addition, self-efficacy beliefs influence individuals’ thought patterns and emotional reactions. High self-efficacy helps to create feelings of serenity in approaching difficult tasks and activities. By contrast, people with low self-efficacy may believe that things are tougher than they really are. They will have a belief that fosters anxiety, stress, depression, and a narrow vision of how best to solve the difficulty. This function of self-efficacy can also create the self-fulfilling prophecy in which people achieve what they believe they can achieve. As a result, high self-efficacy is likely to lead to increased performance that in turn raises
people’s sense of efficacy and spirit. Conversely, low self-efficacy associates with desisting that may bring failure, which will further lower confidence and morale.

Bandura (1995) contended that self-efficacy beliefs affect behavior both directly and indirectly, which is by influencing people’s intentions (labeled as “proximal goal”). The relationship among the variables of efficacy, intent, and outcome is depicted in Figure 5.

1.4.6 Self-Efficacy and Self-Esteem

Conventional wisdom has led us to believe that people with a strong sense of self are more highly motivated, more resourceful, higher achievers, and they are more
resilient in the face of adversity than those individuals who have a weak self-concept.

Psychologists have written extensively about the concept of self for over a hundred years.

Among these various perceptions of the self, Coopersmith (1967) and Bandura (1977, 1986) contributed by identifying self-esteem, the evaluative component of self and self-efficacy. Most definitions of self-esteem are rather similar. For instance, Coopersmith (1967) defined self-esteem as the degree to which people perceive themselves to be capable, significant, and worthy. Other self-esteem scholars generally agree that self-esteem may form around any number of dimensions of self such as physical self, social self etc. (Wells & Marwell, 1976; Marsh, 1993). By and large, the aggregate of these evaluations is termed global self-esteem, the overall evaluation of personal worth that people make and maintain with regard to themselves (Rosenberg, 1965; Coopersmith, 1967).

Self-efficacy reflects a belief about individual’s abilities to organize and execute the courses of action required to perform a specific task (TSSE) or tasks in general (GSE). Self-esteem, on the other hand, represents a self-perception about one’s competence and value (Sherer et al., 1982). Although self-esteem and self-efficacy are distinct, they are also related, both theoretically and empirically. The empirical evidence indicates a
strong relationship between these two constructs (Woodruff & Cashman, 1993; Schwarzer, 1993; Bonnett & Stickel, 1992; Saracoglu, Minden, & Wilchesky, 1989). A reasonable assumption is that individuals who have come to perceive themselves as highly capable, significant, successful, and worthy (high global self-esteem), will generally predict higher probabilities of task success (high self-efficacy) than will those who see themselves as less capable, significant, successful, and worthy (low global self-esteem). Previous studies have found that self-esteem plays an important role in the formation of psychological status such as self-efficacy (Campbell, 1990; Brown & Mankowski, 1993; Dodgson & Wood, 1998; Kernis, Brockner, & Frankel, 1989; Moreland & Sweeney, 1984). Studies have found that individuals low in self-esteem tend to respond to experiences in a balanced way; positive events lead to positive psychological states and negative events lead to negative ones. By contrast, individuals who have high self-esteem tend to embrace positive events but disregard or offset the potentially debilitating effects of negative events, and this is associated with maintaining positive psychological states (Brown & Dutton, 1995; Brown & Mankowski, 1993; Campbell, 1990; Dodgson & wood, 1998). Furthermore, self-efficacy also has effects on self-esteem. Sherer et al. (1982) found that self-efficacy correlated with self-esteem
and concluded "belief in one’s ability to perform is one factor contributing to an individual’s attitude toward oneself" (p.670). High self-efficacy is associated with high self-esteem, and low self-efficacy is associated with low self-esteem (Davis, Fedor, Parsons, & Herold, 2000; Blake & Rust, 2002; Gardner & Pierce, 1998). People who perceive themselves as highly capable, significant, successful, and worthy will generally predict for themselves higher probabilities of task success than those who see themselves as less capable, significant, successful, and worthy.

1.4.7 Self-Efficacy and Locus of Control

Rotter's (1966) locus of control theory has its roots in social learning theory. In the social learning theory, Rotter (1954) purports that reinforcement acts to strengthen the expectancy that a particular behavior or event will be followed by that same reinforcement in the future. Conversely, once a relationship is established between a behavior and reinforcement, the absence of the reinforcement will reduce or extinguish the expectancy. Expectancies are generalized from specific situations to situations that are perceived as similar or related. These generalized attitudes, beliefs, and expectancies can affect a variety of behavioral choices in many different life situations.
According to Rotter (1966), locus of control refers to individual’s belief in his or her abilities to control life events. The term locus of control is often used interchangeably with self-efficacy. However, the terms are not equivalent. While self-efficacy focuses on the perception of ability to act competently and effectively, locus of control focuses on the perception of control (Bandura, 1977a). The locus of control construct refers to the degree to which an individual believes the occurrence of reinforcements is contingent on his or her own behavior. The factors involved with reinforcement expectancy are labeled “internal” and “external” control. One with an internal locus of control believes that outcomes are related to his or her behavior or personal investment, while one with an external locus of control believes that outcomes are not related to his or her behavior but to external forces beyond his or her control. People with an external locus of control may perceive life events to be controlled by luck, chance, fate, or powerful others. In other words, individuals with an internal locus of control are more likely to change their behavior following reinforcement than are people with an external locus of control (Marks, 1998).
1.4.8 Conclusion

Behavior change is a complex process, and is often difficult to achieve and sustain. Health professionals realize that, in their work to encourage healthy behaviors, they are competing against powerful forces involving social, psychological, and environmental conditioning. Health educators use many different models to understand behavior change and design successful interventions. Bandura’s social learning theory plays a very important role in this field. Self-efficacy, belief in one’s ability to successfully change one’s behavior, is connected with another construct called “outcome expectations”, the value one places on the expected result. If the result is important to the person, the behavior change that will yield the result is more likely to happen. Further, a study of self-efficacy beliefs towards bone marrow donation has not been completed to extend social scientific knowledge regarding the registered potential donors’ and non-donors’ difference. This study is an investigation into self-efficacy and self-esteem levels of registered potential donors and non-donors. Moreover, this study also examines barriers towards bone marrow donation, in order to benefit bone marrow registries in recruiting more potential donors in a broader scope.
1.4.9 Research Questions

The present study examines people's efficacy beliefs and attitudes toward bone marrow donation. The present study addresses the following research questions:

**Research Question 1:** Are there differences in terms of the degree of "self-efficacy" between registered potential bone marrow donors and non-donors?

**Research Question 1:** Are there differences in terms of the degree of "self-esteem" between registered potential bone marrow donors and non-donors?

**Research Question 3:** What are the major impediments to bone marrow donation?
CHAPTER 2
RESEARCH METHODOLOGY

2.1 Participants

Since 1993, Tzu Chi Bone Marrow Registry unceasingly has run campaigns in Taiwan in order to overturn the stereotype of bone marrow donation. Further, Tzu Chi Foundation also has been operating its Hawaii branch in Honolulu for over a decade. The office is located in Chinatown where it continuously puts in efforts to recruit bone marrow donors via community contacts. Thus, the sample group of this study was emphasized Taiwanese. The target sample were Taiwanese who reside in Hawaii currently. There were total eighty-seven responses of this study. Participants’ ages ranged from 16 to 51 (Mean = 26.95, Std. Deviation = 5.92). Sixty-eight participants were females.

This study employed a non-probabilistic procedure for recruiting participants. The majority of participants were recruited from Taiwanese Student Association (TWSA) of the University of Hawaii, Manoa. In addition to TWSA members, participants were recruited from various community settings and through personal contacts.

Participation in this study was completely voluntary (see Appendix A & Appendix B). Potential subjects not willing to participate were excused from
participation without any consequence.

2.2 Materials

Perceived self-efficacy is an individual's self-knowledge of his or her ability to initiate necessary steps to accomplish tasks. Nevertheless, self-knowledge exists in numerous forms (e.g., self-esteem, self-concept). According to previous studies, positive correlations were indicated between self-efficacy and self-esteem (Simmons, Schimmel, & Butterworth, 1993; Hart, Gilner, Handal, & Gfeller, 1998). Therefore, in order to examine the correlations between "self-efficacy" and inclination of potential bone marrow donors, several valid scales were adapted and applied to this study. Moreover, in order to investigate the obstacle of bone marrow donation, a questionnaire was utilized to serve this purpose. In addition, in order to assist the participation, all materials presented to participants were in both English and Mandarin. The translation of the questionnaire was conducted by two bilingual translators, a teacher from National Taiwan University and a Ph.D. degree candidate from Linguistic Department of University of Hawaii at Manoa. The questionnaire was confirmed to be linguistically accurate and appropriate prior to use in the study.
2.2.1 Demographic Information

A demographic information sheet (see Appendix C) was employed to collect data from each participant. Each individual was asked to provide the information regards his/her age, gender, education level, occupation, and religion.

2.2.2 Self-efficacy Scale

According to Bandura’s social learning theory, the frequent failure of GSE to predict behavior in previous researches on GSE can be explained in terms of the concept of “specificity matching”. This means matching the specificity or generality of efficacy measured to the specificity or generality of the performance predicted. The better the match, the greater is the predictability. In this sense, GSE ought to be viewed as a supplement rather than a substitute or replacement for TSSE (Chen, Gully, & Eden, 2001).

Two self-efficacy scales were adopted and constructed as a self-efficacy scale sheet (see Appendix D), which was employed in this study to assess participants’ efficacy beliefs in terms of TSSE and GSE.
Task-Specific Self-Efficacy Scale

This scale that has been used to assess self-efficacy beliefs was adapted from the GSES-12, which proposed by Bosscher and Smit (1998). The total 12-item scale that represented the three aspects underlying the scale: (a) initiative, which is the willingness to initiate the behavior; (b) effort, which means the willingness to expend effort in completing the behavior; (c) persistence, which is the perseverance in the face of adversity. Bosscher and Smit (1998) reported a Cronbach alpha of three subscales for internal consistency of .64, .63, and .64. The alpha for all items was .69.

Consistent with conceptual framework employed by Bosscher and Smit, the scale was adapted and modified to better serve the subject of this study (see Appendix D, Question 1-12). The scale was scored on a 5-point Likert-type scale. Potential responses included “Strongly Disagree”, “Disagree”, “Neither”, “Agree”, and “Strongly Agree”, which were scored from 1 to 5. For the negative questions (item 1, 2, 3, 9, 10, 11, 12), the scores were reversely coded.

General Self-Efficacy Scale

The NGSE scale, which employed in this study was developed by Chen, Gully, & Eden to assess the general self-efficacy beliefs (2001) (see Appendix D, Question
The eight-item general self-efficacy scale was utilized to measure people’s overall judgment and feelings. Chen et al. (2001) reported high internal consistency reliability (alpha = .86 and .90, p < .01) and stable test-retest coefficients (r = .67, p < .01). The empirical evidence indicates that this scale has high content validity and is a valid tool to assess efficacy beliefs. The self-reported responses were scored on a 5-point Likert-type scale; response choices were “Strongly Disagree”, “Disagree”, “Neither”, “Agree”, and “Strongly Agree”, which were assigned values from 1 to 5.

2.2.3 Rosenberg Self-Esteem Scale

The Rosenberg Self-Esteem scale (Rosenberg, 1979) was used to measure global self-esteem. The RSE contains 10 items (see Appendix E) and participants were asked to rate how strongly they agreed or disagreed with each. Responses were scored on a 4-point Likert-type scale using descriptors of “4 = Strongly Agree”, “3 = Agree”, “2 = Disagree”, and “1 = Strongly Disagree”. Negative items (items 6,7,8,9,10) were reversely coded so that a high score continued to indicate high self-esteem. The possible range for this scale is 10 to 40. This measure was chosen because it has been used-and continues to be used-among various populations and is widely accepted as
having good psychometric properties (Baker & Gallant, 1984; Blascovich & Tomaka, 1991). The scale generally has high reliability: test-retest correlations are typically in the range of .82 to .88, and Cronbach's alpha for various samples are in the range of .77 to .88 (Blascovich & Tomaka, 1993; Rosenberg, 1986). Consistent with previous research, the internal reliability for this scale within the current study was high-alpha = .82 (Wylie, 1979; Blascovich & Tomaka, 1991).

2.2.4 Marrow Donation Survey Form

The Marrow Donation Survey Form (see Appendix F) was adapted from the research conducted by American Society for Bone and Marrow Transplantation. Originally, the survey form was administered by Laver, Hulsey, Jones, Julio, Barredo, & Abboud (2001) in order to examine unrelated potential donors’ barriers towards bone marrow donation. The questionnaire served to investigate registered potential bone marrow donors’ and non-donors’ knowledge and attitudes towards bone marrow donation. In the efforts to increase donor availability for bone marrow registries, this survey was used to determine the reasons Taiwanese do not participate as registered potential donors for bone marrow.
2.3 Procedure

Prior to conducting the current study, the instruments that were adapted from previous research including the scale of the TSSE, GSE, RSE and the Marrow Donation Survey Form were distributed to a sample of nine Taiwanese students for pre-testing. The participants for this pre-test were nine females born and reared in Taiwan and who came to Hawaii for academic purposes. The ages of participants ranged from eighteen to twenty-nine years. Participants were asked their opinions of the instruments in terms of readability, clarity, and understandability of items contained in the questionnaire. The data from the pre-test group was examined in terms of possible data analysis techniques. Based on the results of pre-test, the instruments were then refined in terms of wording, grammar, and layout.

Participants for this study were recruited primarily through the Taiwanese Student Association (TWSA) at the University of Hawaii, Manoa. In addition, some participants were recruited through personal contacts as well. All participants were informed with a description of the project and offered the opportunity to provide consent before voluntarily participating in the research. The instruments that included a demographics sheet, Self-efficacy scale (Bosscher & Smit, 1998; Chen, Gully & Eden,
2001), the Rosenberg Self-esteem Scale (RSE) (Rosenberg, 1965, 1986), and the Marrow Donation Survey Form (Laver, Hulsey, Jones, Julio, Barredo, & Abboud, 2001) were completed by participants and immediately collected by the researcher. The instruments took approximately 10-15 minutes for participants to complete.
An intention of this study was to probe the differences between registered bone marrow donors and non-donors in terms of the level of self-efficacy and self-esteem. Self-efficacy beliefs were examined by several measures including the extent to which both TSSE and GSE were investigated. Bosscher and Smit (1998) created a reliable and valid scale (GSES-12), which was adapted in the current study to assess the task-specific self-efficacy regarding bone marrow donation. The general self-efficacy was examined via the NGSE scale, which developed by Chen, Gully, & Eden (2001). The scale demonstrated high reliability, and predicted specific self-efficacy for a variety of tasks in various contexts. Furthermore, the Rosenberg Self-Esteem Scale (Rosenberg, 1965, 1989) was employed to examine self-esteem by exploring people’s positive or negative orientation toward themselves.

In addition, this study also aimed to identify barriers to bone marrow donation by un-related potential donors. The investigation explored participants’ knowledge and attitudes toward bone marrow donation and the willingness to become a registered potential donor.
3.1 Data Analysis Overview

Data analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 11.0. In efforts to elucidate research results more efficiently, the following analyses were presented consistently with the sequence of the research questions. The data gathered from Demographic Information Sheet were managed and employed in cross tabulation and chi-square tests to analyze the relationships among variables. The data from the Self-Efficacy Scale and the Rosenberg Self-Esteem Scale were analyzed through descriptive statistics and inferential statistics. In addition, internal reliability analysis was conducted for the TSSE of Self-Efficacy Scale. Next, Pearson product-moment correlations were conducted between the TSSE, GSE, and RSE scale. The data from Bone Marrow Donation Survey were analyzed through descriptive statistics and the chi-square method.

3.1.1 Characteristics of Participants

There were total eighty-seven respondents of this study. Participants’ ages ranged from 16 to 51 (Mean = 26.95, Std. Deviation = 5.92), 67.8% of the participants were females, 49.2% had educational levels of graduate school and beyond, and 37.9%
had no religious preference. Further, the cross tabulation and chi-square analyses were performed to investigate the relationship between registered potential bone marrow donors and non-donors in terms of demographic characteristics such as education level, gender, and religion. The results indicated that gender was not statistically associated with bone marrow donation \( (p = .629) \). However, the relationship between education level and people's choice of being a registered potential bone marrow donor or not was considered marginally significant \( (p = .097) \). The higher the education level, the greater the chance that one would become a registered donor. Further, religious preference was positively correlated with participants' choices of being a donor \( (r = .221, p < 0.05, \text{ 2-tailed}) \). 62% of respondents reported identified themselves with a particular religious preference (44.4% were Buddhist, 26% were Taoist, 24% were Other Christians, and 6% were Catholic). Of the 38% of respondents who reported as none religious preferences, 82% were non-donors.

3.1.2 Internal Reliability of TSSE Scale

A standardized Cronbach alpha coefficient was calculated for the adapted TSSE scale. The internal consistency coefficient of .7639 \( (N = 87) \) was yielded for all items.
The alpha of three subscales were also conducted: 1) initiative: alpha = .8402; 2) effort: alpha = .7639; 3) persistence: alpha = .7804 (N = 87).

3.1.3 Descriptive and Inferential Statistics of Self-Efficacy Scale

In this section, mean scores and standard deviation scores of the TSSE and GSE scale were examined. In addition, the mean scores and standard deviation were examined by the grouping of registered potential donors and non-donors. Chi-square tests were employed to investigate the relationships between registered donors and non-donors in terms of both scales. Moreover, the independent-samples t tests were used for comparing sample means to see if there is sufficient evidence to infer that the means of the two sample distributions (donor vs. non-donors) differ significantly from each other.

3.1.3.1 TSSE Scale

The mean scores and standard deviations for the TSSE scale were presented in Table 1 (see page 62). For the negative questions (item 1, 2, 3, 9, 10, 11, 12), the scores were reversely coded. According to data, a high percentage of registered potential
donors scored higher than non-donors on the scale, and the chi-square value was 15.311 (p < .001) that suggested a significant difference between registered donors and non-donors regarding the TSSE (see page 63, Table 2).

Further, the independent-samples $t$ test analysis indicated that the 25 registered donors has a mean of 43.56 total points in the TSSE scale, the 62 non-donors has a mean of 38.10 total points in the TSSE scale (see page 63, Table 3a), and the means did differ significantly at the $p < .001$ level (see page 63, Table 3b), which indicated that donors had higher sense of TSSE than non-donors did regarding bone marrow donation.

The results of this scale corresponded with Bandura's social learning theory (1977, 1986, 1995) that when people succeed in previous tasks, the outcomes would raise their self-efficacy, which can explain why registered donors had higher sense of task-specific self-efficacy than non-donors did.

<table>
<thead>
<tr>
<th>Table 1: Mean and Standard Deviations of the TSSE Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree (1)</td>
</tr>
<tr>
<td>Grouping</td>
</tr>
<tr>
<td>Overall (N = 87)</td>
</tr>
<tr>
<td>Registered Donors (N = 25)</td>
</tr>
<tr>
<td>Non-Donors (N = 62)</td>
</tr>
</tbody>
</table>
Table 2: Crosstabulation and Chi-Square Tests of TSSE Scale

<table>
<thead>
<tr>
<th>Crosstabulation</th>
<th>Chi-Square Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you a registered potential bone marrow donor?</td>
<td>Value</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>TSSE Low</td>
<td>3</td>
</tr>
<tr>
<td>Medium</td>
<td>7</td>
</tr>
<tr>
<td>High</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
</tr>
</tbody>
</table>

a. 0 cells (0%) have expected count less than 5. The minimum expected count is 6.32.

Table 3a: TSSE Independent Samples Test - Group Statistics

<table>
<thead>
<tr>
<th>Dependent Variable (TSSE Scale)</th>
<th>Grouping Variable (Are you a registered potential bone marrow donor)</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>25</td>
<td>43.5600</td>
<td>6.6588</td>
<td>1.3318</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>62</td>
<td>38.0968</td>
<td>5.0755</td>
<td>.6446</td>
</tr>
</tbody>
</table>

Table 3b: TSSE Independent Samples Test – t test for Equality of Means

<table>
<thead>
<tr>
<th>Variances</th>
<th>Levene's Test for Equality of Variances</th>
<th>t-value</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>St. Error Difference</th>
<th>95% Confidence Interval of the difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equal</td>
<td>.994</td>
<td>.322</td>
<td>4.141</td>
<td>.000</td>
<td>5.4632</td>
<td>1.3292</td>
<td>2.8402 – 8.0862</td>
</tr>
<tr>
<td>Unequal</td>
<td>3.692</td>
<td>35.789</td>
<td>.001</td>
<td>5.4632</td>
<td>1.4796</td>
<td>2.4619 – 8.4645</td>
<td></td>
</tr>
</tbody>
</table>
3.1.3.2 GSE Scale

The mean scores and standard deviations of the GSE scale were presented in Table 4 (see page 65). The mean scores suggested a slightly higher percentage of registered potential donors ($M = 3.92$, $SD = .84$) scored higher than non-donors did ($M = 3.76$, $SD = .82$) on the GSE dimension. However, the slight difference resulting the chi-square tests was not significant (see page 65, Table 5).

Moreover, the independent-samples $t$ test analysis indicated that the 25 registered donors has a mean of 31.36 total points in the GSE scale, and the 62 non-donors has a mean of 30.15 total points in the GSE scale (see page 65, Table 6a). The means did not differ significantly at the $p < .05$ level (see page 66, Table 6b).

The result of the independent-samples $t$ tests showed that there were no significant differences among registered potential donors and non-donors in terms of general self-efficacy beliefs. The demographic characteristics of participants, which were addressed in later section of this study, might be the reasons that contributed to the insignificant result.
Table 4: Mean and Standard Deviations of the GSE Scale

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Neither (3)</th>
<th>Agree (4)</th>
<th>Strongly Agree (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall (N = 87)</td>
<td>3.81</td>
<td>.83</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Registered Donors (N = 25)</td>
<td>3.92</td>
<td>.84</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Donors (N = 62)</td>
<td>3.76</td>
<td>.82</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Crosstabulation and Chi-Square Tests of GSE Scale

<table>
<thead>
<tr>
<th>Crosstabulation</th>
<th>Chi-Square Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you a registered potential bone marrow donor?</td>
<td>Value</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>GSE Low</td>
<td>6</td>
</tr>
<tr>
<td>Medium</td>
<td>10</td>
</tr>
<tr>
<td>High</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
</tr>
</tbody>
</table>

^a. 0 cells (0%) have expected count less than 5. The minimum expected count is 7.18.

Table 6a: GSE Independent Samples Test - Group Statistics

<table>
<thead>
<tr>
<th>Dependent Variable (GSE Scale)</th>
<th>Grouping Variable (Are you a registered potential bone marrow donor)</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>25</td>
<td>31.3600</td>
<td>5.9853</td>
<td>1.1971</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>62</td>
<td>30.1452</td>
<td>5.3710</td>
<td>.6821</td>
</tr>
</tbody>
</table>
### Table 6b: GSE Independent Samples Test – t test for Equality of Means

<table>
<thead>
<tr>
<th>Variances</th>
<th>Levene's Test for Equality of Variances</th>
<th>t-value</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>St. Error Difference</th>
<th>95% Confidence Interval of the difference</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equal</td>
<td>.038</td>
<td>.846</td>
<td>924</td>
<td>.358</td>
<td>1.2148</td>
<td>1.3152</td>
<td>-1.4001 3.8298</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unequal</td>
<td>.882</td>
<td>40.439</td>
<td>.383</td>
<td>1.2148</td>
<td>1.3778</td>
<td>-1.5688 3.9984</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.1.4 Descriptive and Inferential Statistics of Rosenberg Self-Esteem Scale

The overall mean score and standard deviation and the mean scores and standard deviation scores of registered donors and non-donors for the RSE scale were presented in Table 7 (see page 67). The scores of negative items (item 6, 7, 8, 9, 10) were reversed. According to the mean scores, the results showed that average differences among scores of registered potential donors (M = 3.17, SD = .67) and non-donors (M = 3.25, SD = .64) were very low. Thus, the Pearson Chi-Square tests yielded a low Chi-square value (.195) and a significance greater than 0.6 (.659) (see page 67, Table 8).

The independent-samples t test analysis indicated that the 25 registered donors has a mean of 31.72 total points in the RSE scale, and the 62 non-donors has a mean of 32.52 total points in the RSE scale (see page 68, Table 9a). The means did not differ significantly at the p < .05 level (p = .505) (see page 68, Table 9b). The results suggested registered potential donors did not distinguishable from non-donors by global
self-esteem. The characteristics of sample groups were considered as major factor that caused the insignificant result. For example, the majority of participants were international students, who came abroad to pursue further education. These individual tended to be more goal-oriented, enthusiastic, and confident in themselves, which implied that they were inclined to have high self-esteem regardless bone marrow donation.

Table 7: Means and Standard Deviations of the Rosenberg Self-Esteem Scale

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
</tr>
<tr>
<td>Grouping</td>
<td>Mean</td>
<td>SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall (N = 87)</td>
<td>3.23</td>
<td>.65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Registered Donors</td>
<td>3.17</td>
<td>.67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(N = 25)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Donors (N = 62)</td>
<td>3.25</td>
<td>.64</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 8: Crosstabulation and Chi-Square Tests of RSE

<table>
<thead>
<tr>
<th>Crosstabulation</th>
<th>Chi-Square Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you a registered potential bone marrow donor?</td>
<td>Value</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>RSE</td>
<td>Low</td>
</tr>
<tr>
<td>High</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>87</td>
</tr>
</tbody>
</table>

a. 0 cells (0%) have expected count less than 5. The minimum expected count is 12.07
b. Chi-square computed only for a 2x2 table.
Table 9a: RSE Independent Samples Test - Group Statistics

<table>
<thead>
<tr>
<th>Dependent Variable (RSE Scale)</th>
<th>Grouping Variable (Are you a registered potential bone marrow donor)</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>25</td>
<td>31.7200</td>
<td>5.4354</td>
<td>1.0871</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>62</td>
<td>32.5161</td>
<td>4.8409</td>
<td>.6148</td>
</tr>
</tbody>
</table>

Table 9b: RSE Independent Samples Test – t test for Equality of Means

<table>
<thead>
<tr>
<th>Variances for Equality of Variances</th>
<th>Levene's Test for Equality of Variances</th>
<th>t-value</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>St. Error Difference</th>
<th>95% Confidence Interval of the difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equal</td>
<td>.102</td>
<td>.751</td>
<td>85</td>
<td>.505</td>
<td>-.7961</td>
<td>1.1883</td>
<td>-3.1589 1.5666</td>
</tr>
<tr>
<td>Unequal</td>
<td>-.637</td>
<td>40.190</td>
<td>.527</td>
<td>-.7961</td>
<td>1.2489</td>
<td>-3.3198 1.7276</td>
<td></td>
</tr>
</tbody>
</table>

3.1.5 Correlations of TSSE, GSE, and RSE Scale

Pearson product-moment correlations were used to investigate the relationship between the TSSE, GSE, and RSE Scale. The correlational analysis results are presented in Table 10 (see page 69), which showed that all three possible correlations were statistically significant.

The relationship between the RSE and the GSE Scale indicated the strongest positive correlations ($r (87) = 0.587, p<0.01$, see page 69, Table 10). Also, the relationship between the TSSE and GSE Scale ($r (87) = 0.478, p<0.01$, see Table 10), as
well as the relationship between the RSE and the TSSE Scale \( r (87) = 0.342, p<0.01 \), see Table 10) both indicated significant positive correlations.

### Table 10: Correlations of TSSE, GSE, and RSE Scale

<table>
<thead>
<tr>
<th></th>
<th>TSSE</th>
<th>GSE</th>
<th>RSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSSE</td>
<td>Pearson Correlation 1.000</td>
<td>.478**</td>
<td>.342**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed) ---</td>
<td>.000</td>
<td>.001</td>
</tr>
<tr>
<td>GSE</td>
<td>Pearson Correlation 1.000</td>
<td>---</td>
<td>.587**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed) ---</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>RSE</td>
<td>Pearson Correlation 1.000</td>
<td>---</td>
<td></td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).

3.1.6 Knowledge, Attitudes, and Willingness toward Bone Marrow Donation

Data analyses were performed to identify major barriers to bone marrow donation. Participants were divided into two groups in terms of registered potential donors and non-donors in order to investigate issues associated with particular group.

3.1.6.1 Crosstabulation of Donor and Non-Donors

There were 28.7% participants registered potential bone marrow donors \((N = 87)\). Most of respondents knew about the Buddhist Compassion Relief Tzu Chi Foundation.
However, 35.62% respondents did not know about the Tzu Chi Marrow Donation Registry. Among the mentioned 35.62%, 93.54% of them were non-donors.

The majority of participants were aware of the life-saving potential of marrow donation and transplantation (92%). Nevertheless, there were still 48% of non-donors not aware of that the donation was harmless to them. On the other hand, 68% of non-donors were interested in getting more information about bone marrow donation and transplantation. The results showed that Tzu Chi bone marrow registry needs to carry out more comprehensive campaigns to introduce the institution as well as the bone marrow donation and transplantation in order to facilitate public, especially those were interested in the bone marrow donation, to gain more understanding. Table 11 showed the results of cross tabulation and chi-square tests of BMD survey.

Table 11:
Crosstabulation and Chi-square Tests for Q1, Q2, Q3, Q9, Q10, and Q11 of BMD Survey

<table>
<thead>
<tr>
<th>Crosstabulation</th>
<th>Chi-Square Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Are you a registered potential bone marrow donor?</strong></td>
<td><strong>Value</strong></td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Q1:</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>21</td>
</tr>
<tr>
<td>No</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>87</td>
</tr>
</tbody>
</table>
a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 2.30.
b. Chi-square computed only for a 2x2 table.

<table>
<thead>
<tr>
<th>Crosstabulation</th>
<th>Chi-Square Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you a registered potential bone marrow donor?</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Q2</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>23</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>87</td>
</tr>
</tbody>
</table>

a. 0 cells (0%) have expected count less than 5. The minimum expected count is 8.91.
b. Chi-square computed only for a 2x2 table.

| Q9  |     |       |        |     |                       |
| Yes | 25 | 55 | 80 | 3.070* | 1 | .080 |
| No  | 7  | 7  | 14 | 4.986 | 1 | .026 |
| Total | 25 | 63 | 87 | 3.034 | 1 | .082 |
| N of Valid Cases | 87 |    |    |       |    |     |

a. 2 cells (50%) have expected count less than 5. The minimum expected count is 2.01.
b. Chi-square computed only for a 2x2 table.

| Q10 |     |       |        |     |                       |
| Yes | 25 | 32 | 57 | 18.463* | 1 | .000 |
| No  | 30 | 30 | 60 | 26.203 | 1 | .000 |
| Total | 25 | 62 | 87 | 18.251 | 1 | .000 |
| N of Valid Cases | 87 |    |    |       |    |     |

a. 0 cells (0%) have expected count less than 5. The minimum expected count is 8.62.
b. Chi-square computed only for a 2x2 table.

| Q11 |     |       |        |     |                       |
| Yes | 24 | 42 | 66 | 7.912* | 1 | .019 |
| No  | 1  | 12 | 13 | 10.785 | 1 | .005 |
| Don't know | 8  | 8  | 16 | 7.347 | 1 | .007 |
| Total | 25 | 62 | 87 | N of Valid Cases | 87 |    |

a. 2 cells (33%) have expected count less than 5. The minimum expected count is 2.30.

See Appendix E for Individual Item Statements
3.1.6.2 Highlights of Donors

There were 25 out of 87 participants currently registered as potential bone marrow donors. Most of the respondents joined the registry because of campaign attractions (72%, see Table 12). Peer influences resulted in 40% of people becoming a potential donor and so did other reasons. Participants who reported that they joined registry because other reasons indicated that they were influenced by parents, other family members, or teachers. There were no respondents who chose to become a potential donor because his/her family or friends needed the bone marrow transplantation.

The power of interpersonal communication was well illustrated and presented a great opportunity for future campaign applications to utilize in the bone marrow drives.

Table 12: Reasons of Becoming A Donor

<table>
<thead>
<tr>
<th>The reasons why you have chosen to register as a potential donor</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Family or friends need bone marrow transplant</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0 (0)</td>
</tr>
<tr>
<td>No</td>
<td>25 (100)</td>
</tr>
<tr>
<td>2. Campaign attractions</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>18 (72)</td>
</tr>
<tr>
<td>No</td>
<td>7 (28)</td>
</tr>
<tr>
<td>3. Peer influences</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>10 (40)</td>
</tr>
<tr>
<td>No</td>
<td>15 (60)</td>
</tr>
<tr>
<td>4. Others</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>10 (40)</td>
</tr>
<tr>
<td>No</td>
<td>15 (60)</td>
</tr>
</tbody>
</table>
Furthermore, all of the 25 registered potential donors were asked how their feelings about themselves had changed as a result of the enlisting. Twelve of the registered potential donors reported that their self-image had changed (see Table 13a). Ten said their self-image had not changed. Of those reported a change toward themselves, all reported positive effects on self-image enhancement (see page 74, Table 13b). Generally, this improved self-image resulted from pride in their action (Simmons, Schimmel, & Butterworth, 1993). Some were simply proud that they had done something special and unique.

Table 13a: Feelings Changed After Becoming A Registered Potential Donor

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>12</td>
<td>48.0</td>
<td>48.0</td>
<td>48.0</td>
</tr>
<tr>
<td>No</td>
<td>10</td>
<td>40.0</td>
<td>40.0</td>
<td>88.0</td>
</tr>
<tr>
<td>Don't know</td>
<td>3</td>
<td>12.0</td>
<td>12.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
Table 13b: Statements from Donors Who Reported A Change

<table>
<thead>
<tr>
<th>Donor's Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>#6: “I felt good about myself because I can help someone in his/her life. I felt happier.”</td>
</tr>
<tr>
<td>#7: “I feel great about myself that I contribute something to this world.”</td>
</tr>
<tr>
<td>#26: “feel even I am not a very successful person, but I am a useful person with a great heart because I contribute myself to help others.”</td>
</tr>
<tr>
<td>#29: “I think I see myself as a better Pearson, especial compare to others who were not willing to donate. It makes my feel special because I have done something others haven’t”</td>
</tr>
<tr>
<td>#32: “Knowing that I can help to save someone’s life makes me feel that I am a more worthy and better person.”</td>
</tr>
<tr>
<td>#35: “I think it just makes me feel great and have more respect to myself.”</td>
</tr>
<tr>
<td>#39: “I felt happier and was in a very good mood that day because I was proud of myself about doing something to help saving others’ lives.”</td>
</tr>
<tr>
<td>#47: “I think I feel better about myself in some way. I guess I felt I have achieved something greater in life.”</td>
</tr>
<tr>
<td>#54: “I feel more joyful and have a more positive attitude towards myself.”</td>
</tr>
<tr>
<td>#62: “I am very afraid of needle. But after the blood test, I was starting to feel more confident. I think helping others make me have the strength to face my fear and try to overcome it.”</td>
</tr>
<tr>
<td>#76: “I think I felt quite good about myself.”</td>
</tr>
<tr>
<td>#79: “I am not quite sure, but it’s just a feeling that you will view yourself differently. Anyway, it is a positive feeling and I like the way I felt about myself after I join the registry.”</td>
</tr>
</tbody>
</table>

In addition, 88% of registered potential donors reported that they understood what would happen if their tissue type (HLA) and recipients’ were matched (see page 75, Table 14). However, two of the respondents were not aware of the consequences of joining the registry. Intriguingly, after the original data was retraced, those two participants (#26, #32) both reported a relatively low sense of self-efficacy and self-esteem. As noted previously, they both reported a positive change of self-image.
about themselves after becoming a registered potential bone marrow donor. They represented a special point of view that the action of becoming registered potential donors might not just be the result of high sense of self-efficacy beliefs; it also could be viewed as the path to help people enhance their self-image. This finding corresponded to the Bandura's SCT that “mastery experiences” and efficacy beliefs effect each other in a bi-directional way.

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>22</td>
<td>88.0</td>
<td>88.0</td>
<td>88.0</td>
</tr>
<tr>
<td>No</td>
<td>1</td>
<td>4.0</td>
<td>4.0</td>
<td>92.0</td>
</tr>
<tr>
<td>Don’t know</td>
<td>2</td>
<td>8.0</td>
<td>8.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

3.1.6.3 Highlights of Non-Donors

Sixty-two respondents reported they were not registered potential donors. The data showed that limited knowledge to bone marrow donation (71%, see page 77, Table 15) and lack of opportunity (66.1%) were the major obstacles to bone marrow donation. Further, forty-five percent (see page 77, Table 16a) of respondents considered to register a potential donor. In addition, in Table 16b (see page 78), the association among
participants' knowledge, attitudes, and willingness to become a donor was examined.

The data showed that individuals who knew that bone marrow donation was harmless to self and were interested in getting more information about bone marrow donation were more than three times as likely to donate. Respondents who listed lack of opportunity as the reason for not donating were willing to donate 1.67 times more than those listed as afraid of pain and 1.4 times more than those listed as not convenient.

The results indicated that increasing awareness of the harmlessness and life-saving of bone marrow donation may improve the willingness of the public to become potential donors. Moreover, clarifying that cost and pain are not major issues could diminish resistance to donation. Most important, implementation of the educational programs, campaigns that target barriers discussed above, and dedication to provide more opportunities for donation would result in a significant increase in the potential donor pool.
### Table 15: Reasons of NOT Becoming A Registered Potential Donor

<table>
<thead>
<tr>
<th>Reason</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The reasons why you have NOT chosen to register as a potential donor</td>
<td></td>
</tr>
<tr>
<td>1. Limited knowledge to bone marrow donation</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>44 (71)</td>
</tr>
<tr>
<td>No</td>
<td>18 (29)</td>
</tr>
<tr>
<td>2. Afraid of pain</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>29 (46.8)</td>
</tr>
<tr>
<td>No</td>
<td>33 (52.2)</td>
</tr>
<tr>
<td>3. Cost of being a donor</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>13 (21)</td>
</tr>
<tr>
<td>No</td>
<td>49 (79)</td>
</tr>
<tr>
<td>4. No opportunity</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>41 (66.1)</td>
</tr>
<tr>
<td>No</td>
<td>21 (33.9)</td>
</tr>
<tr>
<td>5. Not convenient</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>27 (43.5)</td>
</tr>
<tr>
<td>No</td>
<td>35 (56.5)</td>
</tr>
<tr>
<td>6. Others</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>12 (19.4)</td>
</tr>
<tr>
<td>No</td>
<td>50 (80.6)</td>
</tr>
</tbody>
</table>

### Table 16a: Consider Becoming A Registered Potential Donor

<table>
<thead>
<tr>
<th>Consideration</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>28</td>
<td>45.16</td>
<td>45.16</td>
<td>45.16</td>
</tr>
<tr>
<td>No</td>
<td>5</td>
<td>8.07</td>
<td>8.07</td>
<td>53.23</td>
</tr>
<tr>
<td>Don't know</td>
<td>29</td>
<td>46.77</td>
<td>46.77</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
Table 16b: Respondents' Willingness to Become Registered Potential Donors

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Percent Willing to be a Donor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aware of the Tzu Chi Marrow Donation Registry</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>54.5</td>
</tr>
<tr>
<td>No</td>
<td>27.8</td>
</tr>
<tr>
<td>Aware that bone marrow donation and transplant save lives</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>43.6</td>
</tr>
<tr>
<td>No</td>
<td>28.6</td>
</tr>
<tr>
<td>Aware the bone marrow donation is harmless to self</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>62.5</td>
</tr>
<tr>
<td>No</td>
<td>20.0</td>
</tr>
<tr>
<td>Interested in more information about bone marrow donation</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>54.8</td>
</tr>
<tr>
<td>No</td>
<td>16.7</td>
</tr>
<tr>
<td>Don't know</td>
<td>12.5</td>
</tr>
<tr>
<td>Reason for NOT being a donor</td>
<td></td>
</tr>
<tr>
<td>Limited knowledge</td>
<td>28.0</td>
</tr>
<tr>
<td>Afraid of pain</td>
<td>27.6</td>
</tr>
<tr>
<td>Cost</td>
<td>15.3</td>
</tr>
<tr>
<td>No opportunity</td>
<td>46.3</td>
</tr>
<tr>
<td>Not convenient</td>
<td>33.3</td>
</tr>
<tr>
<td>Other</td>
<td>33.3</td>
</tr>
</tbody>
</table>

3.2 Human Subject Concerns

Prior to proceeding with any fieldwork, the Application for Approval of Studies Involving Human Subjects was completed and approved by the appropriate agencies.

The survey is voluntary. Throughout the data collection process, the primary researcher
stresses that participation in this study was strictly voluntary. All subjects were asked to sign an Informed Consent Form prior to proceeding to any part of the study. To protect the participants’ identity and prevent any harm, the information collected through the questionnaire will remain completely confidential. If the potential participants feel uncomfortable about taking parts in the study, they are free to excuse themselves during anytime of the participation. There are no penalties or negative consequences if they decide that they do not want to take part in the study.

3.3 Limitations of the Present Study

Presented are the limitations of the this study in terms of the cross-culture consideration, sample characteristics, TSSE instruments, and generalizability. They were considered influential to the results, and if replicated and changed, might produce significant discovery.

3.3.1 Cross-Cultural Consideration

Cultural influences can impact many psychologically relevant variables such as motivation, orientation toward learning, ways of thinking, and unconscious beliefs and
values (The American Psychological Association, 2001; Claxton, 1999; Matsumato, 1994; Munro; Schumaker & Carr 1997). Dembo & Eaton (1997) also note that cultural factors reflect and shape an individual’s mental functioning as well as their beliefs and behaviors.

In the complex processes of health-related behavior changes, culture plays an important role in the development of the individual’s learning orientation, which will ultimately shape people’s willingness to participate in the different tasks (Smith, 1990). Therefore, when instruments are used for respondents with different cultural backgrounds, it is necessary to establish the cross-cultural validity of these instruments (Van Hemert, Baerveldt & Vermande, 2001). However, there are no existing valid and well-recognized instruments that can be applied to this study. Therefore, in this study, translating techniques were utilized with an intention to minimize the impact of language barriers for participants. Nevertheless, cultural factors still might affect the way in which individuals define and interpret “self-efficacy” and “self-esteem”. The perception of physical and social events is influenced by the concept of the self, which is dispositional or situational depending on one’s cultural background (Morris & Peng, 1994). Cultural differences are extremely complicated and individuals are heterogeneous that this study was not able to probe and investigate deeply regarding the
relationship between culture and self-efficacy.

3.3.2 Sample Characteristics

Due to the time range and limited resources to complete the current study, the method of non-probability sampling was employed. However, this method of sampling did not control for an accurate and precise representation of a sample production. Therefore, the desired sample characteristics could not be obtained. As a result, the registered potential donor sample had 25 respondents, which is a lot less than the non-donor sample (n = 65). The unequal distribution between two groups does reduce the accuracy of the findings. Moreover, most of the participants were international students who were more goal-oriented and tended to have higher self-esteem, which might have caused the insignificant results in both GSE and RSE scales.

3.3.3 TSSE Instruments

The scale used was not the original questionnaire. The current study altered the GSES-12 and adapted the scale into the questionnaire (Bosscher & Smit, 1998). To some degree, one could question that the altered questionnaire no longer represents the original intent of measurement.
Moreover, in all tests of this nature, the subjects do manage to get insight into what the research purpose is. As such, there is a factor of “social desirability and faking”. Thus, the contingency factors must be taken under consideration.

3.3.4 Generalizability

The generalizability of the current study is limited due to the study’s focus on a unique group, Taiwanese who reside in Hawaii currently. Participants were primarily recruited from the University of Hawaii at Manoa resulting in a significant number of respondents 30 years old or below (82.8%).

Next, current study examined the self-efficacy beliefs and self-esteem of participants. Previous researches indicated the positive associations between academic achievements and self-efficacy beliefs (Schunk, 1989, 1991). Parker (1990) reported a strong correlation between self-esteem and education level. However, due to the unequal sample obtained in the current study, 93.1% of respondents had an education level at college / university or higher, which caused the data to be less representative.

Further, the findings from this study are not comparable or generalizable to Taiwanese people living in Taiwan because the sample population were limited and were
not sufficient to represent the characteristics of entire Taiwanese population.

3.4 Directions for Future Research

The findings from this study present several opportunities for future researchers. Some studies have explored the relationship between culture and an individual’s sense of self-efficacy (Earley, Gibson & Chen, 1999; Oettingen, 1995). However, no research to date examines the relationship between self-efficacy beliefs and health behaviors from the perspective of individual differences among Taiwanese. Moreover, no existing research has focused on the potential cultural and disciplinary differences of the individual different variables of self-efficacy in bone marrow donation of America and Taiwanese. Therefore, the foregoing lack in research may be suggested to future studies to further investigate and explore.

Second, the future studies should obtain a larger and more diverse sample of population, which would improve the generalizability of the study. In addition, recruiting a desired size of sample would yield more precise and unique findings.

Next, to date, there is no particular TSSE scale for bone marrow donation. Therefore, it would also be important for future researchers to develop a task-specific
self-efficacy scale for bone marrow donation. A valid and well-developed scale would result in findings that are more precise.

Furthermore, this study indicates that self-efficacy beliefs (TSSE) have a strong positive correlation with bone marrow donation. According to the findings of this study, in order to increase the registration of bone marrow donation, educational programs that address the particular determinants are strongly needed to be developed. The self-efficacy enhancement intervention needs to be evaluated and tested in a larger field of experiment.

In addition, if future studies replicate this current one and design a longer-term time scale that closely monitors the bone marrow registry campaigns and investigates the detail of demographic information and self-efficacy beliefs of participants, it would be significantly more beneficial to the registry recruitment.
CHAPTER 4
CONCLUSION

Previous studies have shown that people who are good to others tend to be more confident, happier, positive, achieving, and also less self-centered or dominant (Myers, 1992; Wilson, 1976; Whiting & Whiting, 1975). More specifically, in a study conducted by Simmons, Schimmel, & Butterworth (1993), bone marrow donors view themselves as altruists, more willing to give than most people. The results of this study indicated that people's willingness to donate was influenced by attitudes toward donation, knowledge, and fear about donation, subjective norms, and the level of altruism.

Specifically, this study investigated the differences among registered bone marrow donors and non-donors in terms of the level of self-efficacy and self-esteem. In addition, the major barriers among non-donors to bone marrow donation were examined. Several interesting and unique findings have emerged from this study.

First, the examining self-efficacy beliefs among participants, registered potential bone marrow donors had higher sense of task-specific self-efficacy than non-donors did. According to Bandura's social cognitive theory, when people succeed in previous tasks, the desirable outcomes would raise their self-efficacy. This provided a practicable approach to bone marrow registries to consider while conducting campaigns and
educational interventions. By reinforcing people's "vicarious experiences" and "positive social persuasion", people's confidence about his/her ability to donate bone marrow could be enhanced.

Next, corresponding to Bandura's (1995, 1997) affirmation that behavior is best predicted by considering both self-efficacy and outcome expectations. This study found that besides self-efficacy beliefs, the outcome expectations played an important role in predicting people's behavior as well. People who perceived the donation is harm to themselves were not likely to donate. Thus, for future campaign applications, executives should also dedicate their efforts to overturn the negative stereotype to bone marrow donation and to inculcate public with a correct attitude for the donation.

Moreover, in broad terms, the donation of bone marrow, blood and organ is considered the ultimate act of humanity as it involves the voluntary and anonymous exchange between two people of a life saving commodity. Yet, motivating people to be involved in the donation is a significantly difficult task. In attempting to increase the database of bone marrow registry, how to attract more people to register as potential donors is always the priority of bone marrow registries. Therefore, it makes intuitive sense to focus on those "non-donors" who have a higher propensity or intention to donate.
in the future. This study provided scientific evidences to bone marrow registries to have more understanding to “non-donors”. Limited knowledge and lack of opportunity were identified as the major obstacles to bone marrow donation. Thus, bone marrow donor drives would need to put in more efforts to eliminate these impediments in order to recruit more people to join the registry.

In conclusion, this study indicated that an educational program focusing on improving individuals’ knowledge and efficacy beliefs could overcome some of the barriers to bone marrow donation. Therefore, the continuing effort of studies that aim to investigate the characteristics and motivations for donation is essential. By gaining more understanding of these determinants, educational programs, public health campaigns, and donation curricula can be developed and benefit more people with blood related diseases.
APPENDIX A
Informed Consent Form and Study Information

AGREEMENT TO PARTICIPATE IN
Self-Efficacy Beliefs and Barriers among Unrelated Donors to Bone Marrow Donation
同意參與關於
自我效能信念及非親屬骨髓捐贈之阻礙

Project Description 研究簡介
This study, which involves research, is designed to differentiate donors and non-donors via self-efficacy beliefs and identify the obstacle of bone marrow donation.

此研究旨在探究捐贈者及非捐贈者的差異，以及調查骨髓捐贈在宣導與執行上的變數和困難

Duration of participant 所需時間
The questionnaire should take not longer than 10 to 15 minutes to complete.

本問卷需花費至多 15 分鐘完成

Benefits 益處
This study may lead to further review and adoption of better policies and strategies for health communication campaigns design and developments of Bone Marrow Registry especially from the standpoint of encouraging more people register as volunteer donors.

此研究將可能有助於鼓勵骨髓捐贈及建議未來關於骨髓捐贈之計畫與宣導策略

Confidentiality 機密性
To protect your identity and prevent any harm, the information collected through the questionnaire / interview and the records used to keep the information will remain completely confidential.

此研究所蒐集之任何資料將完全保持機密性以維護您的權益

Voluntary Participation 參與自主權
This questionnaire / interview is completely voluntary. If you feel uncomfortable about answering any question, you are free to skip the question and continue. If, at any time, you feel uncomfortable continuing with the entire questionnaire / interview, you are perfectly free to stop and have the questionnaire / interview disregarded. There will be
no penalty or obligation if you should decide to stop the questionnaire / interview.
您擁有完全的自主權決定參與與否。如果您對於問卷內容感到不舒服，您有自由不回答該問題或甚至退出研究。您將不會受到任何義務及處罰的規範。

Certification 權益聲明

I certify that I have been told of the possible risks involved in this project, that I have been given satisfactory answers to my inquiries concerning project procedures and other matters and that I have been advised that I am free to withdraw my consent and to discontinue participation in the project or activity at any time without prejudice.

I give my consent to participate in this project with understanding that such consent does not waive any of my legal rights; nor does it release the principle investigator or the institution or any employee or agent thereof from liability for negligence.

我聲明得到這份研究問卷的相關資料包括可能性的風險並獲得滿意的答案。我明白參與這份問卷的絕對自主權。我同意參與這項研究，並且明白在法律上，自身的權利將不受影響以及認知到研究者，機構，工作人員充分達到告知的責任。

Signature of participant 簽名

Date 日期

If you have any questions, comments, or problems regarding this study, please contact:
如果您有關於這個研究的任何意見，建議或問題，請聯絡：
Ching-Min Chiu
747 Amana St., #1816. Honolulu, HI 96814. Home: (808) 943-7187. Email: chingmin@hawaii.edu

If you cannot obtain satisfactory answers to your questions or have comments or complaints about your treatment in this study. Contact:
如果您還是無法得到滿意的答案及回覆，或是您有對參與過程所受到的待遇的投訴，請聯絡：
Committee on Human Studies
University of Hawaii, 2540 Maile Way, Honolulu, HI 96822. Phone: (808) 956-5007

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To participants,

The proposed study is being conducted as part of the Master’s Paper. This paper is to be submitted in partial fulfillment of the requirements for the degree of Master of Art in Communications. The study is required for my graduation from University of Hawaii at Manoa.

The topic of my research is: Self-Efficacy Beliefs and Barriers Among Unrelated Donors To Bone Marrow Donation. The purpose of this research is to differentiate donors and non-donors and investigate the obstacle of bone marrow donation. In order to conduct this study, I need your cooperation in completing my questionnaire. It is estimated this questionnaire will take about 5 to 10 minutes of your time.

I will be pleased to have your comments on any aspect of this study. I assure you that all information provided will be treated with utmost confidentiality. No respondents will be identified in any writing that may result from the study. The data collected will only be used for academic purposes. All the data will be kept private and confidential. In appreciation of your participation, I will be available for consultation on absenteeism and methods to deal with it. If you have any questions about the survey please contact me for clarification.

Thank you for your participation and contribution in the study.

Ching-Min Chiu
Candidate of Master of Art
Communications Department of university of Hawaii at Manoa
E-mail: chingmin@hawaii.edu
Phone: (808) 943-7187
Address: 747 Amana St., #1816, Honolulu, HI 96814
APPENDIX C
Demographic Information

1. Age 年齡: ____________

2. Gender 性別: □ Male 男 □ Female 女

3. Education Level 教育程度: □ High School 高中
   □ College / University 專科大學
   □ Graduate School and Beyond 研究所及以上
   □ Others 其他 (Please indicate 請說明) __________

4. Occupation 職業: ________________

5. Religion 宗教信仰: □ Buddhist 佛教
   □ Catholic 天主教
   □ Other Christians 基督教
   □ Taoist 道教
   □ None 無
   □ Other 其他 (Please indicate 請說明) ________________
APPENDIX D
Self-Efficacy Scale

Please indicate your responses based on the scale provided below:
請以提供的量表回答下列問題:
1-Strongly Disagree  2-Disagree  3-Neither  4-Agree  5-Strongly Agree
1-非常不同意  2-不同意  3-沒意見  4-同意  5-非常同意

1. If the process of becoming a bone marrow donor looks too complicated, I will not even bother to try it.
如果成爲骨髓捐贈自願者的過程看起來很複雜,我會連試都不想去試。

2. I avoid trying to learn about Bone Marrow Donation when it looks too difficult.
當骨髓捐贈看起來很困難時,我會拒絕去了解與學習相關的知識。

3. When trying to become a bone marrow donor, I soon give up if I am not initially successful.
當我一開始嘗試想要成爲骨髓自願捐贈者時,如果我並沒有馬上成功,我會很快就放棄。

4. When I make plans to become a bone marrow donor, I am certain I can make it work.
當我計畫成爲骨髓捐贈自願者時,我有把握可以使這計畫實現。

5. If I cannot become a bone marrow donor successfully the first time, I keep trying until I can.
如果第一次不能成功的成爲自願者的話,我會繼續嘗試直到成功爲止。

6. When I have something unpleasant within the process of becoming a bone marrow donor, I stick to it until I finish it.
當有些不愉快發生在成爲自願捐贈者的過程中時,我會堅持到完成。

7. When I decide to become a bone marrow donor, I go right to work on it.
當我決定要成爲一個自願捐贈者時,我會立刻朝這個目標努力。

8. Failure just makes me try harder.
失敗只會使我去更努力嘗試。

9. When I set important goals for myself, I rarely achieve them.
當我爲自己立下重要的目標後,我很少真正達成它們。
<table>
<thead>
<tr>
<th>No.</th>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>I do not seem to be capable of dealing with most problems that come up in my life.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>11</td>
<td>When unexpected problems occur, I do not handle them very well.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>12</td>
<td>I feel insecure about my ability to do things.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>13</td>
<td>When facing difficult tasks, I am certain that I will accomplish them.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>14</td>
<td>In general, I think that I can obtain outcomes that are important to me.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>15</td>
<td>I will be able to achieve most of the goals that I have set for myself.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>16</td>
<td>I believe I can succeed at most any endeavor to which I set my mind.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>17</td>
<td>I will be able to successfully overcome many challenges.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>18</td>
<td>I am confident that I can perform effectively on many different tasks.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>19</td>
<td>Compared to other people, I can do most tasks very well.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>20</td>
<td>Even when things are tough, I can perform quite well.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>
APPENDIX E
Rosenberg Self-Esteem Scale

Please indicate your responses based on the scale provided below:
請以提供的量表回答下列問題:
1-Strongly Disagree 2-Disagree 3-Agree 4-Strongly Agree
1-非常不同意 2-不同意 3-同意 4-非常同意

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I feel that I am a Pearson of worth, at least on an equal plane with others.</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>我覺得我是有價值的人,至少同等於他人.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I feel that I have a number of good qualities.</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>我覺得自己有一些不錯的特質.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I am able to do things as well as most other people.</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>我有能力和別人做事做的一樣好.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I take a positive attitude toward myself.</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>我對自己持以正面的態度.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. On the whole, I am satisfied with myself.</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>整體而言,我對自己感到滿意.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. All in all, I am inclined to feel that I am a failure.</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>整體而言,我傾向覺得自己是個失敗者.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I feel I do not have much to be proud of.</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>我覺得沒什麼能讓自己感到驕傲的.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. I wish I could have more respect for myself.</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>我希望能對自己多些尊敬.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. I certainly feel useless at times.</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>我確實常常感到自己無用.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. At times I think I am no good at all.</td>
<td>1 □</td>
<td>2 □</td>
<td>3 □</td>
</tr>
<tr>
<td>我常認為自己一無是處.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Marrow Donation Survey Form

<table>
<thead>
<tr>
<th>No.</th>
<th>Questions</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Do you know about the Buddhist Compassion Relief Tzu Chi Foundation?</td>
<td>□ Yes 是&lt;br&gt;□ No 不是</td>
</tr>
<tr>
<td>2.</td>
<td>Do you know about the Tzu Chi Marrow Donation Registry?</td>
<td>□ Yes 是&lt;br&gt;□ No 不是</td>
</tr>
<tr>
<td>3.</td>
<td>Are you a registered potential bone marrow donor?</td>
<td>□ Yes 是&lt;br&gt;□ No (skip to 8)&lt;br&gt;不是 (跳至第八題)</td>
</tr>
<tr>
<td>4.</td>
<td>Check reasons why you have chosen to register as a potential marrow donor. (Please circle all that apply.)</td>
<td>□ Family or friends need bone marrow transplant&lt;br&gt;親戚朋友需要骨髓移植&lt;br&gt;□ Campaign attractions&lt;br&gt;受宣導的吸引&lt;br&gt;□ Peer influences&lt;br&gt;同儕朋友影響&lt;br&gt;□ Others: (Please indicate)&lt;br&gt;其他: (請說明)</td>
</tr>
<tr>
<td>5.</td>
<td>Would you say that your feelings about yourself have changed more as a result of becoming a volunteer donor?</td>
<td>□ Yes 是&lt;br&gt;□ No 不是&lt;br&gt;□ Don’t know 不知道</td>
</tr>
<tr>
<td>6.</td>
<td>If yes, in what way?</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Do you understand what is involved in being a registered potential marrow donor? (What happens if your tissue type matches someone on the list)</td>
<td>□ Yes 是&lt;br&gt;□ No 不是&lt;br&gt;□ Don’t know 不知道</td>
</tr>
</tbody>
</table>

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8. If you are already a registered donor, please skip this question.
(已經註冊為自願捐贈者,不需作答此題)
Check reasons why you have not chosen to register as a potential bone marrow donor. (Please circle all that apply.)
選擇為什麼你沒有註冊成為骨髓捐贈自願者的原因. (可多選)

- □ Limited knowledge to bone marrow donation 
  對骨髓捐贈所知有限
- □ Afraid of pain 怕痛
- □ Cost of being a donor 捐贈的代價
- □ No opportunity 沒機會
- □ Not convenient 不方便
- □ Others: (Please indicate) 其他: (請說明)
  __________________________
  __________________________

9. Are you aware that marrow donation and transplantation saves lives? 
(你知道骨髓捐贈跟移植能拯救生命嗎?)

- □ Yes 是
- □ No 不是

10. Do you know donating your bone marrow is harmless to you? 
(你知道骨髓捐贈無害於己嗎?)

- □ Yes 是
- □ No 不是

11. Would you be interested in more information about bone marrow donation and transplant? 
(你有興趣得到更多關於骨髓捐贈移植的相關資訊嗎?)

- □ Yes 是
- □ No 不是
- □ Don't know 不知道

12. If you are already a registered donor, please skip this question. 
(已經註冊為自願捐贈者,不需作答此題)
Would you consider registering as a potential bone marrow donor?
and please indicate the reasons of your answer.
(你會考慮註冊成為骨髓捐贈自願者嗎? 請提供原因.)

- □ Yes, because: 是, 因為:
  __________________________
  __________________________

- □ No, because: 不, 因為:
  __________________________
  __________________________

- □ Don’t know, because: 不知道, 因為:
  __________________________
  __________________________

Thank you very much for completing this questionnaire. If you have any questions and concerns regarding this survey or if you would like to receive a brief summary of the results of this survey, please feel free to contact me.
謝謝您協助完成這份問卷。如果您有任何疑問及建議, 請與我聯繫.
REFERENCES


