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**A MULTI-METHOD APPROACH TO THE STUDY OF
“ATTITUDE” IN ORGAN DONATION RESEARCH**

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2017

**A Multi-Method Approach to the Study of “Attitude” in Organ Donation
Research**

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A thesis submitted to the Nanyang Technological University
in fulfillment of the requirement for the degree of
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ABSTRACT

The practice of organ transplantation in China has been under-regulated for many years. Reports of organ trafficking, transplant tourism, and transplant commercialism have been common in this country (Huang et al., 2008). In recent years, the Chinese government has changed the country's organ transplantation policy and launched a nationwide organ donation system in 2013 (Huang et al., 2013). This new organ donation program, however, has met with little success. By the third year of the program's implementation, only 70,217 Chinese have registered as organ donors (China Organ Donation Administrative Center, 2016). The huge shortage of organ donors in China underscores the need for social and behavioral interventions.

This doctoral thesis consists of five studies designed to understand the attitudes regarding organ donation in the context of Chinese culture. This research project begins by examining and refining the notion of attitude as conceptualized and operationalized in studies of organ donation informed by the theory of planned behavior (TPB). Study 1 categorizes the refined notion of attitude into four theoretical aspects. It then creates a reliable, valid attitude measure which contains two statistically independent dimensions: positive and negative attitudes, and establishes the measurement invariance across two distinctive Chinese samples.

Study 2 employs the refined attitude measure to predict organ donation intentions and organ-donor registration behavior based on the TPB. Results show that negative attitudes, positive attitudes, subjective norms, and the distrust of organ allocation system significantly impact the behavioral intention, which in turn predicts the registration behavior. Furthermore, the attitudinal factor is the strongest predictor of the behavior among all the TPB components.

Study 3 involves an experiment that investigates the persuasiveness of evidence

type in organ donation messages on attitudes. It finds that including narratives in persuasive message results in a significantly lower level of negative cognitive beliefs than does using statistics alone. Yet a boomerang effect exists that, when narrative messages are presented, individuals with high motivation to approach emotion is more likely to report a higher level of negative cognitive beliefs, compared with individual low in such a motivation.

Study 4 employs a qualitative approach to extend the inventories of attitudes regarding organ donation. Through qualitatively analyzing all messages about organ donation posted during 2015 on Weibo, the most popular social networking site in China, it provides supporting evidence for the refined notion of attitudes created in Study 1, and also documenting several aspects of attitudes regarding organ donation that have rarely reported in previous literature.

Study 5 retains a focus on the attitude but breaks a new ground by exploring the opinion leaders for organ donation, who are able to affect others' attitudes on organ donation. It maps the sharing network of the popular organ donation messages on Weibo and explores the opinion leadership within this network. It reveals that personal attributes, professional knowledge, and social positions predict individual's local opinion leadership. Alternatively, only personal attributes and social positions are significantly associated with one's global opinion leadership.

This research effort contributes to an understanding of organ donation in the Chinese context. The findings from this doctoral thesis will be instrumental in the design of educational interventions to expand the pool of available organs in China.

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CHAPTER 1

INTRODUCTION

On December 23, 1954, Dr. Joseph E. Murray and his team transplanted a kidney from a living donor into his identical twin at Brigham Hospital in Boston (Murray, 1992, 2005). The transplanted kidney functioned immediately, and the organ recipient lived for eight more years after the transplantation (Bailey, 2012; Murray 1992). This is considered the first successful organ transplant in history (Murray, 1992). In 1962, Dr. Murray and his team performed another transplant using a kidney from a deceased donor, which is regarded as the first successful cadaveric transplant (Murray, 1992, 2005). This extraordinary contribution to organ transplantation earned Dr. Murray the Nobel Prize in Medicine for 1990. In his acceptance speech, he alluded to the first successful kidney transplant by saying, “This spectacular success was a clear demonstration that organ transplantation could be life saving” (Murray, 2005, p. 7). Indeed, Dr. Murray was credited as the pioneer who opened the doors for people around the world to receive the gift of life (Bailey, 2012).

Since the 1960s, many countries have initiated organ donation¹ programs. In the United Kingdom, the Human Tissue Act, enacted in 1961, provides an informed consent (also called “opt-in”) organ donation system. It permits any UK citizen, who either writes or orally states the willingness with witnesses present, to donate organs for therapeutic purposes or for medical education and research purposes after his or her death (Wolstenholme & O’Connor, 1966). A similar system subsequently was adopted in the United States. The Uniform Anatomical Gift Act, launched in 1968, allows an American adult to sign a witnessed statement designating him or her as an organ donor upon death (Nathan et al., 2003). In 1979, the first presumed consent (also called “opt-out”) organ donation system was introduced by Spain (Dalal, 2015). The

Transplantation Law stipulates that any deceased individual, who has not formally registered an opposition, is considered a potential organ donor (Zink, Zeehandelaar, & Wertlieb, 2005). In practice, a “soft presumed consent” policy is applied in which organs are removed only with the consent of the potential donor’s family members (Matesanz & Domínguez-Gil, 2009). Nowadays, after more than 50 years of development, at least eighty countries are known to have a national organ donation program, according to statistics from the International Registry in Organ Donation and Transplantation [IRODaT] (2015). In spite of this progress, considerable research is needed to enhance understanding of the factors involved in organ-donation decisions.

This doctoral thesis consists of five empirical studies designed to further understanding of organ donation in China, a country with a severe discrepancy between need for donated organs (high) and availability of donated organs (low). This introductory chapter first provides a global context for understanding the scope of the problem of organ shortages, particularly on the Asian continent. Next, this chapter offers an inventory of previous communication projects and campaigns designed to address different facets of organ shortages. The third section of this introductory chapter discusses the specific cultural context of China as a site for research on organ donation. Finally, this chapter concludes with an overview of the five empirical studies that follow in chapters 2 through 4. The goal of this research is to assess Chinese university students’ beliefs, attitudes, and behavior regarding organ donation, to investigate the effect of persuasive messages on organ donation beliefs, to analyze the beliefs regarding organ donation presented on a Chinese social networking sites, and to examine the opinion leadership on organ donation messages shared on the same site. This research effort is expected to provide valuable insights to develop educational interventions and

to expand the pool of available organs in this most populous country in the world, which will help in reducing the global organ shortage as well.

1.1 Organ Donation: A Global Perspective

In 2008, the number of solid organ transplants² performed worldwide was 100,800 (World Health Organization [WHO], 2016), a number which increased by 18 percent to 119,678 in 2014 (Global Observatory on Donation and Transplantation [GODT], 2016). Yet this number of transplants meets no more than 10 percent of the global needs (GODT, 2016) and leaves an immense gap between the supply of and demand for transplantable organs. According to a recent published book on the global organ shortage, tens of thousands of people die per year around the world because of a lack of available organs (Beard, Kaseman, & Osterkamp, 2013). Moreover, the increases in human life expectancy as well as in incidence of diabetes, obesity, and alcohol-induced liver diseases amplify the demand for organs for transplantation (Levitt, 2015), which makes the shortage more acute.

Among all countries, the deceased organ donor rate in Spain, which reaches as high as 35.9 persons per million people (pmp) (IRODaT, 2015), is regarded as the global gold standard. Yet despite having the highest organ donor rate in the world, Spain still suffers from an organ shortage, and 5,500 patients are placed on its national waiting list (Levitt, 2015). In the United States, the donor rate is 27 pmp, which is the fifth highest the rate of deceased organ donors per million people around the world (IRODaT, 2015). However, more than 120,318 Americans are waiting for an organ transplant, and one new patient is added to the waiting list an average of every ten minutes (Organ Procurement and Transplantation Network [OPTN], 2016). In the meantime, twenty-two persons die per day because of the organ shortage (OPTN, 2016). The situation is similar in the United Kingdom. The updated statistics show that although its deceased

donor rate reaches 20.4 pmp (IRODaT, 2015), more than 1,300 patients on the waiting list died or became too sick to receive a transplant during the last year (National Health Service Blood and Transplant [NHSBT], 2016).

Compared to Western countries, Asian countries have a much lower rate of deceased organ donors per million people. Singapore was one of the first Asian countries to adopt an organ donation system. The Human Organ Transplant Act, implemented in 1987, provides a presumed consent organ donation system (National Library Board [NLB], 2008). It allows for the removal of kidneys, livers, hearts, and corneas from its citizens and permanent residents upon their death for transplantation purpose, unless the deceased has opted out (NLB, 2008). Yet the deceased organ donor rate in Singapore only reaches approximately 3.5 pmp (GODT, 2016). The Republic of Korea and Taiwan reportedly have the highest deceased organ donor rate in Asia, both of which are around 10 pmp (IRODaT, 2015; Shih et al., 2016). Yet this rate has not reached one third of Spain's rate. For the rest of Asian countries, none of them attains a deceased organ donor rate higher than 5 pmp, for example, 2.8 pmp in Thailand, 0.7 pmp in Malaysia, and 0.3 pmp in India (IRODaT, 2015). Nevertheless, in this most populous continent on Earth, the demand for organ transplants is immense (He, Lai, & Leong, 2010). This enormous supply-demand gap has resulted in the death of 90% of people on the waiting list in some Asian countries (The Times of India, 2016; Xinhua Daily, 2011).

The world has witnessed a massive improvement in organ transplant techniques, which gives people a chance to receive the gift of life. Nevertheless, the scarcity of available organs continues to impede this lifesaving practice around the world. According to the OPTN (2016), one deceased organ donor can save as many as eight lives. Increasing the number of such donors is considered the key in reducing the

shortage of transplantable organs (Levitt, 2015). Over the past several decades, social scientists have made considerable efforts to promote organ donation programs worldwide. As communication scholars, our research has contributed to the understanding of public attitudes and behavior regarding organ donation, interpersonal discussion on organ donation decisions, as well as media effects on donor registration behavior, all of which provide knowledge to address the problem of global organ shortage.

1.2 Organ Shortage as a Communication Problem

Communication efforts can be critical elements in organ-donation decisions. Theory-based public communication campaigns are the tools to disseminate information and knowledge, as well as to correct myths and misconceptions about organ donation. This information empowers individuals to make informed decisions about becoming potential organ donors (Morgan, 2013). As well, communicating with family members and friends is a means for potential donors to nurture understanding and support from significant others. For many years, such communication processes integral to organ-donation decisions have fascinated scholars in our field.

Communication scholars have investigated a variety of antecedents of the decision to become a potential organ donor. For example, they have examined the functions of demographics (e.g., Park, Smith, & Yun, 2009), beliefs (e.g., Bresnahan, Lee, Smith, Shearman, & Yoo, 2007a), feelings (e.g., Morgan, Stephenson, Harrison, Afifi, & Long, 2008; Morse et al., 2009; Wang, 2011), attitudes (e.g., Bresnahan, Guan, Wang, & Mou, 2008; Morgan & Miller, 2002b), altruism (e.g., Kopfman & Smith, 1996; Morgan & Miller, 2002b), knowledge (e.g., Feeley, 2007; Kopfman & Smith, 1996; Morgan & Miller, 2002b), and misconceptions (e.g., Feeley & Servoss, 2005), to name only a few. From this starting point, further research has investigated socio-

environmental influences on individuals' donation intention and donor registration behavior, such as the normative influence of peers (e.g., Marshall & Feeley, 2006; Park & Smith, 2007), social support from family members (e.g., Pitts, Raup-Krieger, Kundrat, & Nussbaum, 2009), and cultural sanctions from society (e.g., Park & Smith, 2007; Stephenson et al., 2008). Research on family communication has studied ways of facilitating interpersonal communication between the potential donor and his or her family members, such as discussing options or making the family aware of his or her wishes (e.g., Afifi et al., 2006; Morgan & Miller, 2001; Scott & Quick, 2012; Siegel, Alvaro, Hohman, & Maurer, 2011; Smith, Kopfman, Lindsey, Yoo, & Morrison, 2004).

A number of communication scholars have retained a focus on the particular role of media in influencing organ donation decisions. They have analyzed content about organ donation presented in newspapers (e.g., Feeley & Vincent, 2007) and on television (e.g., Morgan, Harrison, Chewning, Davis, & DiCorcia, 2007; Quick, Kim, & Meyer, 2009), and explored how such media content affects donation intention (e.g., Lee, Park, Choi, & Kim, 2009; Yoo & Tian, 2011) or induces medical mistrust (e.g., Quick, Morgan, LaVoie, & Bosch, 2014; Yoo & Tian, 2011). As well, researchers have investigated the roles of entertainment education and media campaigns in increasing awareness of organ shortages (e.g., Frates, Bohrer, & Thomas, 2006), educating the public about organ donation (e.g., Morgan, Movius, & Cody, 2009), and addressing people's concerns about becoming potential donors (e.g., Morgan, Harrison, Chewning, DiCorcia, & Davis, 2010). In recent years, the unprecedented growth of digital media has provided communication scholars with a rich resource for understanding public opinion on this topic and an alternative channel for delivering educational interventions. Research has been performed to assess the organ donation content presented on video-sharing websites and audiences' comments on these video clips (e.g., Tian, 2010). In

addition, some scholars have recruited peer leaders (e.g., Stefanone, Anker, Evans, & Feeley, 2012) and disseminated persuasive messages (e.g., Smith et al., 2016) to promote organ donor registration on social networking sites.

In spite of these many studies, many research questions remain. Most of the previous research has been conducted in Western countries (e.g., Anker & Feeley, 2011; Goodmonson & Glaudin, 1971; Horton & Horton, 1991; Park & Smith, 2007). While some scholars have investigated organ donation among Asian minorities in Western countries, such as Asian Americans and Asian Canadians (e.g., Hebert et al., 2010; Lam & McCullough, 2000; Molzahn, Starzomski, McDonald, & O'Loughlin, 2005), a very small number of social scientific studies on organ donation have been carried out in Asian countries (e.g., Bresnahan et al., 2007b; Lee et al., 2009; Lwin, Williams, & Lan, 2002). To provide a background for the current research project on organ donation in China, it is necessary to first review the unique history and culture regarding organ transplantation and donation in this country.

1.3 Organ Donation in China

Organ transplantation has occurred in China since the 1960s (Huang, Mao, & Millis, 2008), but its practice has been under-regulated for many years. Reports of organ trafficking, transplant tourism, and transplant commercialism have been common in this country (Huang et al., 2008). Such activities have been declared unethical, a violation of “the principles of equity, justice and respect for human dignity” by the Declaration of Istanbul on Organ Trafficking and Transplant Tourism (Steering Committee of the Istanbul Summit, 2008). In addition, claims have surfaced that China has used organs from condemned prisoners (e.g., Danovitch et al., 2011; Sharif, Singh, Trey, & Lavee, 2014; Tibell, 2007). Indeed, the Chinese government enacted the “Temporary Rules Concerning the Utilization of Corpses or Organs from the Corpses of Executed

Criminals” in 1984 (China Legal Publishing House, 2006). It stipulates that, if no one claims the body, or with the consent from the executed criminal or his/her family members, the corpses or organs of executed criminals may be provided for medical research or organ transplantation purpose (China Legal Publishing House, 2006). In July 2005, Dr. Jiefu Huang, then Vice Minister of Health of China, publicly acknowledged this practice for the first time at the International Liver Transplantation Conference (Huang, 2007). He admitted that, since the 1980s, executed prisoners have become the main source of organ transplants, providing more than 90% of organs for organ transplants in China (Danovitch, Shapiro, & Lavee, 2011; Huang, 2007; Huang et al., 2008; Huang et al., 2012). Yet this practice of using executed prisoners as the source of organ transplants has been widely criticized for its violation of human rights and basic principles of ethics (Danovitch et al., 2011; Tibell, 2007).

In recent years, the Chinese government has changed the country’s organ transplantation policy and launched a nationwide organ donation system. In 2007, China’s State Council passed the Regulation on Human Organ Transplantation, which banned transplant commercialism and also provides a guideline for developing an opt-in organ donation system that allows any Chinese citizen to become an organ donor upon his or her death through filling a written application (General Office of the State Council of the People’s Republic of China, 2007; Huang et al., 2008). In 2010, the Chinese Ministry of Health and Chinese Red Cross jointly launched an organ donation program in ten pilot regions. Three years later, the Chinese government developed a nationwide organ donation program (Huang et al., 2013) and announced the Hangzhou Resolution, which committed the practices of organ donation and transplantation in China to World Health Organization Guiding Principles and the Declaration of Istanbul (Office of the Minister & National Health and Family Planning Commission, 2013). In

January 2015, the Chinese Ministry of Health claimed that all hospitals have stopped using organs from executed prisoners, and that civilian organ donation will become the sole source for organ transplant in China (Huang et al., 2015).

This new organ donation program, however, has met with little success. According to Chinese state media, approximately 1.5 million patients³ in China need an organ transplant each year, but only 10,000 of them are able to receive one (China Central Television, 2010). By the third years of the implementation of the national organ donation program, only 70,217 Chinese have registered as organ donors (China Organ Donation Administrative Center, 2016), which barely accounts for 0.005% of the 1.376 billion population of China (United Nations, 2016). The huge shortage of organ donors in China underscores the need for social and behavioral interventions, and for theory-driven social science research in particular.

Besides being unfamiliar with the newly introduced organ donation program, some Chinese people may hold traditional beliefs that impede their willingness to donate. In China, Confucianism is the most influential philosophical framework contributing to Chinese civilization and cultural formation (Ebrey, 1991). According to Confucianism, filial piety (or *Xiao*) is the center of Chinese people's moral system (Chiu & Hong, 2006). This traditional belief requires people to comply with their parents' will and to win prestige for them (Chiu & Hong, 2006). More importantly, the belief of filial piety sees one's body as a gift from parents, and, as such, it is important to maintain the integrity of the body after death to show respect to one's parents and ancestors (Braun & Nichols, 1997; Hebert, Rivera, Eng, Lee, & Seto-Yee, 2010; Shih et al., 2001). Moreover, some Chinese who hold spiritual beliefs from Buddhism or Daoism think that bodily integrity after death is critical to their reincarnation (Braun & Nichols, 1997; Hebert et al., 2010; Lam & McCullough, 2000; Shih et al., 2001). As well, talking about

death, especially with the elderly, is taboo in Chinese culture. Chinese people believe that talking about death brings bad luck (Braun & Nichols, 1997) and can even bring about one's death (Hebert et al., 2010). To some extent, Chinese people may consider organ donation as unlucky because it reminds them of mortality, thereby eliciting mortality salience.

Research on organ donation in China has to address this unique background of Chinese culture. To do so, this thesis begins from developing an attitude scale based on Chinese people's beliefs toward registering to become an organ donor. This newly developed attitude scale reflected the unique cultural and spiritual beliefs regarding organ donation in the Chinese context and successfully predicted the organ-donor registration behavior among Chinese. Next, the thesis also examined how such beliefs have been discussed on the most popular social networking sites in China to form an in-depth understanding of the attitudes regarding organ donation in the Chinese context. In the conclusion chapter, it provided several recommendations for future organ donation campaigns to address the Chinese cultural and spiritual beliefs.

1.4 Overview of the Five Studies

The current research project begins by examining and refining the notion of attitude as conceptualized and operationalized in studies of organ donation informed by the theory of planned behavior (TPB). Chapter 2 reports two studies, Study 1 and Study 2. Study 1 identifies two major areas of improvement in the conceptualization of attitude from the reasoned action perspective (Fishbein & Ajzen, 1975; Ajzen, 1985): (a) revision of the attitude target (b) recognition of affective as well as cognitive aspects of attitudes. First, the reasoned action perspective draws a distinction between *general attitudes toward physical objects, institutions, groups, policies, and events* and *attitudes toward performing particular behavior* (Ajzen, 2012; Ajzen & Fishbein, 1980; Fishbein

& Ajzen, 1975). In order to predict a specific behavior, an attitude needs to be compatible with the behavior in terms of action, target, context, and time elements (Ajzen, 2012). A lack of compatibility, especially in the action element, is likely to produce low and non-significant relationships between general attitudes and specific behaviors (Ajzen, 2012). Hence, in order to successfully predict one's behavior regarding organ donation, the corresponding attitude component should focus on attitudes toward a specific action element. In the present context, the attitude measure employed in Study 1 focuses on "registering to become an organ donor," rather than the more generic term of "organ donation," as the attitude target. Second, Study 1 also conceptualizes attitudes as having four theoretical aspects: positive cognitive/affective as well as negative cognitive/affective attitudes. Attitudes toward a behavior is determined by the strength of behavioral beliefs and individuals' evaluations on these beliefs (Fishbein, 1963; Fishbein & Ajzen, 1975). Besides holding instrumental beliefs (i.e., perceived costs and benefits of performing a behavior), individuals also hold affective beliefs (i.e., perceived pleasant or unpleasant feelings) about performing a behavior (Ajzen & Driver, 1991). Thus, the affective component needs to be included in the examination of attitudes regarding organ donation. This study's goal of refining the notion of "attitude" is investigated through an open-ended questionnaire assessing Chinese people's salient beliefs toward registering to become an organ donor. The attitude scale was developed after analyzing their qualitative answers. After that, this attitude measure is administered to two distinctive Chinese samples. Its reliability and validity is established, and its measurement invariance is assessed through multi-group confirmatory factor analysis.

Study 2 (also reported in chapter 2) continues the examination of attitudes while introducing more antecedents of behavior based on the TPB (Ajzen, 1985) and previous

findings on organ donation to predict Chinese university students' donor registration behavior. Specifically, the antecedents examined in this study include the refined notion of attitude, subjective norms, personal level descriptive and injunctive norms adapted from Park and Smith (2007), distrust toward the organ allocation system, and behavioral intention. Further, a specific behavior, rather than behavioral intention, is employed in the form of studying whether study participants detach an organ donation application form attached to their questionnaire after they reporting all other study variables. Such a procedure permits an investigation of the ability of behavioral beliefs to predict the donor registration behavior. A hypothetical model depicting the relationships between the studied antecedents and the donor registration behavior is proposed based on the TPB, and it is examined through a survey on Chinese university students.

Next, Study 3 through Study 5 have been conducted not only in the Chinese context, but also in the context of social networking sites (SNSs). SNSs have experienced unprecedented growth during the past decade and been an integral part in the current health communication campaigns (Shi, Poorisat, & Salmon, 2016). Therefore, Study 3 (described in chapter 3) investigates how persuasive messages on SNSs affect attitudes regarding organ donation. It involves an experiment of readers' behavioral beliefs toward registering to become an organ donor, which is a replication but also an extension of previous studies on the persuasiveness of organ donation messages (e.g., Feeley, Marshall, & Reinhart, 2006; Kopfman, Smith, Yun, & Hodges, 1998). In particular, the experiment examines the independent effect of evidence type and its joined effects with need for affect on organ donation beliefs. As well, it explores how the number of user-generated cues attached to the original messages influences beliefs, given that such cues will integrate into persuasive messages in SNS health communication campaigns.

Study 4 (reported in chapter 4) extends the aspects of attitudes through examining attitudes about organ donation by analyzing organ-donation messages posted on a major Chinese SNS. It involves a search and crawling of all messages about organ donation posted on Weibo, the most popular Chinese SNS, during calendar year 2015. It then conducted a directed qualitative content analysis that follows a deductive logic (Mayring, 2000) and starts its initial coding with a theory or relevant research findings to validate or extend a conceptual framework (Zhang & Wildemuth, 2009). The initial conceptual framework developed in Study 1 consists of four theoretical dimensions of beliefs about becoming an organ donor was employed as the initial coding scheme. Additional categories were added to accommodate messages that did not fit the initial categories (Hsieh & Shannon, 2005). In addition, the content that has been coded into each main category was compared to create subcategories with further analysis to build a broader understanding of the main categories (Hsieh & Shannon, 2005). This method allows an in-depth investigation of attitudes documented in Study 1 and also extends the conceptualization of attitudes beyond its notion in the TRA and TPB.

Chapter 5 retains the focus on attitudes but reports an exploratory study on opinion leaders for organ donation, who are able to influence others' attitudes on this topic. This study (Study 5) examines the sharing network of the top-posted messages analyzed in Study 4, with the goal of investigating the features of opinion leaders in the sharing network of these messages. To provide a theoretical framework for this investigation, this study reviews previous research about opinion leadership on SNSs, introduces the role of opinion leaders in SNS health communication campaigns, and draws on Katz's (1957) hypotheses about opinion leaders. It then maps the retweet network of the popular organ donation messages and investigates how personal and environmental attributes contribute to obtaining opinion leadership in this sharing

network of organ donation information. The organizations of chapters, studies, and research goals are presented in Table 1.1.

This research project concludes in chapter 6 with a summary of findings and theoretical implications, limitations, and an overview of directions for future research. The findings are expected to be helpful for public health agencies seeking to better understand the factors that influence organ donation intention among citizens in China.

CHAPTER 2

REFINING THE NOTION OF “ATTITUDE” AND CONFIRMING ITS UTILITY

The main purpose of this chapter is to refine the notion of attitude based on the theory of planned behavior for organ donation research at both conceptual and operational levels. The refined concept covers individuals’ positive and negative assessments of their cognitive as well as affective behavioral beliefs toward organ-donor registration behavior. Such beliefs turn into four distinctive types of attitudes: positive cognitive attitudes, negative cognitive attitudes, positive affective attitudes, and negative affective attitudes *toward registering to become an organ donor*. The scale is developed based on the Chinese participants’ salient beliefs. Its reliability and invariance across samples are established (in Study 1), and its impact on donor registration behavior is examined (in Study 2).

2.1 The Theory of Planned Behavior

Explaining human behavior has been an enduring interest in the field of social science. In 1920’s, a group of psychologists, known as “radical behaviorists,” posited that external and environmental elements are the key determinants of human behavior (Schneider & Morris, 1987). Rewarding events are reinforcers, and punishing events are inhibitors. In their framework, there is no role for unobserved and internal processes, such as consciousness and cognition, in interpreting human behavior.

In the 1960’s, Dulany (1962, 1967) introduced the function of mental processes to research on human behavior through conducting a series of experiments on verbal learning. In the *theory of propositional control* (Dulany, 1967), he proposes that before selecting a certain response, individuals develop a conscious intention, which he labels as “behavioral intention.” Such an intention is determined by two components. The first

component consists of individuals' perceived reinforcement following the performance of a certain behavior and their evaluation of the reinforcer. Dulany labels it as a cross product of *distribution of the reinforcement* (RHd) and *subjective value of the reinforcer* (RSv). The second component is the perceived extent to which the behavior should be performed, and the individuals' motivation to comply with it. Similarly, it can be represented as a cross product of *behavioral hypothesis* (BH) and *motivation to comply* (MC). The sum of these two cross products becomes the behavioral intention, which is represented in Equation (2.1). This conceptual advance provided Fishbein and Ajzen with the foundational idea in the development of the *theory of reasoned action* (TRA) (Ajzen, 2012).

$$BI = (RHd) (RSv) + (BH) (MC) \quad (2.1)$$

Fishbein and Ajzen (Ajzen & Fishbein, 1970, 1980; Fishbein & Ajzen, 1975) extend Dulany's work by refining the two elements in the theory of propositional control and relabeling them as *behavioral belief* and *normative belief* (Ajzen, 2012). These beliefs are the fundamental building blocks of the TRA (Fishbein & Ajzen, 1975). In particular, a behavioral belief is an individual's perceived outcome of performing a certain behavior weighted by his or her evaluation of this outcome, which also becomes an attitude component (i.e., attitudes toward a behavior). In fact, this conceptualization of attitude is based on the model of expectancy value of attitude (which will be discussed in detail in Study 1). The second component in the TRA, normative component, refers to the perceived extent to which an individual believes he or she is expected to perform a certain behavior weighted by the individual's motivation to comply with it.

Further, in their book *Belief, attitude, intention, and behavior* (Fishbein & Ajzen, 1975), Fishbein and Ajzen explicate a causal chain from behavioral and

normative beliefs to attitudes and subjective norms, both of which influence behavioral intention, and ultimately behavior (see Figure 2.1). They suggest that available information is the starting point from which individuals form their beliefs, which will eventually lead to behavior. In addition, this information can be generated by behavior as well. Thus, this causal chain can start over again after a behavior is performed, given that it may bring new information to the individual and influence his or her beliefs. Indeed, this is the reason for recording the behavior after measuring all other antecedents in the examination. Such procedure allows an investigation of the causal direction from behavioral intention to behavior, or else it is a test on the consistency between behavioral intention and individuals' past behavior (Yzer, 2012). Study 2 in this chapter will return to this topic.

Subsequently, Ajzen (1985, 1991) added an additional determinant of intention and behavior, *perceived behavior control*, in his extension of the TRA. According to this updated theoretical framework, named the *theory of planned behavior* (TPB), attitudes toward a behavior, subjective norms, and perceived behavior control are three determinants of behavioral intention, which in turn predicts the behavior (see Figure 2.2). The definition of perceived behavioral control pertains to individuals' perceived ease or difficulty of performing this behavior (Ajzen, 1985; 1991). In sum, the TRA and its extension, TPB, are labeled as “the reasoned action perspective on persuasion” which emphasizes that behavioral belief plays a central role in explaining human behavior (Yzer, 2012).

Indeed, the TRA and TPB have been major theoretical frameworks in investigating and predicting individuals' willingness and behavior regarding organ donation in previous research (e.g., Bresnahan et al., 2007b; Hyde & White, 2009; Morgan, Harrison, Chewning, Di Corcia, & Davis, 2010; Park, Smith, & Yun, 2009;

Stephenson et al., 2008). Based on the TRA and TPB, previous research has found a significant relationship between *attitudes toward organ donation* and behavior regarding organ donation, though the association is quite weak (Morgan, Stephenson, Harrison, Afifi, & Long, 2008; Morgan et al., 2010). Further, some scholars have well noted the discrepancy between positive attitudes toward organ donation and low donor registration rates (e.g., Feeley, 2007; Quick, Anker, Feeley, & Morgan, 2016). To mitigate the attitude-registration discrepancy, the first study of this chapter begins by reviewing attitudes in previous organ donation research and then proceeds to suggest two major areas of improvement to refine the notion of “attitude” in the TPB employed in organ donation research.

2.2 Study 1

2.2.1 Attitude in Previous Organ Donation Research

Ajzen (1985) define the “attitude” in TPB as the individual’s evaluation of performing the behavior and term it as *attitude toward a behavior*. Other scholars consider *attitude* as a multidimensional construct and decompose it into three concepts: cognitively based attitudes, affectively based attitudes, and behaviorally based attitudes (Allport, 1935; Eagly & Chaiken, 1998; Rosenberg & Hovland, 1960). Still others suggest a simultaneous existence of positive and negative dimensions in an individual’s attitudes (Jonas, Broemer, & Diehl, 2000). Indeed, all these conceptualizations of attitudes have been reflected in previous organ donation research.

In 1971, Goodmonson and Glaudin (1971) developed a scale to measure individuals’ attitudes toward organ transplantation and examined its relationship with a commitment to posthumous organ donation. Although they focused on organ “transplantation” rather than “donation” specially, their work nonetheless is considered foundation in the organ “donation” literature (e.g., Morgan & Miller, 2002a, 2002b).

Goodmonson and Glaudin (1971) included statements about three aspects of attitudes in their scale, such as, “I view human organ transplants as a good and realistic procedure (cognitive),” “I’d feel uneasy about being used or exploited in this way (affective),” and “I would probably be willing to give my body for transplant purposes when I die (behavioral).” All statements were evaluated through a 5-point Likert scale, and the sum of the answers was the attitude score toward organ transplantation. They found a significantly positive association between attitudes toward organ transplantation and behavioral commitment toward posthumous organ donation. This scale has been used in some organ donation research to predict the intention and behavior regarding organ donation (e.g., Horton & Horton, 1990; 1991; Lwin et al., 2002; Skumanich & Kintsfather, 1996). However, it should be noted that while Goodmonson and Glaudin (1971) admitted the multidimensionality of attitudes in their conceptualization, they did not operationalize the three dimensions of attitudes separately, and neither did the subsequent studies.

In a separate program, Parisi and Katz (1986) noted the ambivalence of attitudes toward organ donation and created a two-dimensional scale accordingly. They suggested that favorable and unfavorable attitudes about organ donation should be opposing and independent concepts, thereby building a 16-item attitude measure with positive as well as negative dimensions. For example, some items of positive attitudes are as follows: “Organ donation would enable me to help someone who is suffering” and “Donating a body part would enable that part of myself to remain alive after my death.” Alternatively, some items of negative attitudes are as follows: “Doctors are much more likely to prematurely declare the death of an organ donor” and “Transplanting organs is against God’s will.” Moreover, they demonstrated the independent and joint effects of positive and negative attitudes on behavioral

commitment to organ donation. In short, people with high positive but low negative attitudes held the highest level of behavioral commitment among four groups (Positive attitudes [High, Low] × Negative attitudes [High, Low]). Generally, only a few scholars (e.g., Bresnahan et al., 2008; Bresnahan, Lee, Smith, Shearman, & Yoo, 2007a; Bresnahan et al., 2007b) have modified Parisi and Katz's (1986) scale in their research. These scholars, however, have operationalized this scale as one-dimensional, rather than two-dimensional.

Next, Kopfman and Smith (1996) followed the definition of attitude in the TRA (Fishbein & Ajzen, 1975) and developed a set of belief-based measures to assess participants' attitudes toward organ donation. This attitude measure included eight indicators: general attitudes toward organ donation; donation as an act of compassion; donation as a frightening activity (reflected); donation as unselfish; donation as a natural way to prolong life; donation as a benefit to humanity; signed donor card indicating intent; and organ donation as a negative procedure (reflected). Each indicator was composed of a belief statement about organ donation followed by several items to assess to what extent the respondents held such a belief (i.e., belief strength) and how would they evaluate it (i.e., outcome evaluation). The final score of each attitude indicator was calculated as the product of the summed belief strength and the summed belief evaluations. Kopfman and Smith (1996) found that two indicators, general attitudes toward organ donation and donation as a frightening activity, were most critical in determining whether an individual would report low or high intention to sign an organ donor card.

In 2002, based on Goodmonson and Glaudin's (1971) as well as Kopfman and Smith's (1996) measurements, Morgan and Miller (2002a, 2002b) created a new scale of attitudes toward organ donation. This simple, one-dimensional scale contains six

items as follows: “I support the idea of organ donation for transplantation purposes,” “I believe that organ donation is an act of compassion,” “I believe that organ donation is an unselfish act,” “I see organ donation as a natural way to prolong life,” “I view organ donation as a benefit to humanity,” and “I view organ donation as a negative procedure.” Morgan and Miller (2002a, 2002b) also showed a high reliability of this scale ($\alpha = .88$). In the last decade, this scale has been widely employed or adapted to predict donation intention, donor registration behavior, and willingness to discuss organ donation with family members (e.g., Feeley & Servoss, 2005; Morgan et al., 2010; Morgan et al., 2008; Morgan & Miller, 2002b; Stephenson et al., 2008; Wu, 2008).

In a more recent study, van den Berg and colleagues (2005) argued the importance of assessing affective attitudes toward organ donation and their independence from cognitive attitudes. Correspondingly, they created a measure of attitudes toward organ donation with six independent sub-scales: positive/negative overall attitudes, positive/negative affective attitudes, and positive/negative cognitive attitudes. Their findings revealed that only positive affective attitudes significantly predicted the behavior regarding organ donation (which was operationalized as submitting one’s name and address to receive further information about organ donation).

In fact, attitudes toward organ donation have been considered as a major predictor of intention and behavior since the 1970s. However, a significant but weak association between attitudes toward organ donation and donor registration behavior (Morgan et al., 2008; Morgan et al., 2010) may indicate some limitations in conceptualization and operationalization of the notion of “attitude” in the previous research.

2.2.2 Refining the Notion of “Attitude” in Organ Donation Research

Attitude Target

According to the TRA and TPB, in order to successfully predict a behavior, the attitudinal determinant should be *an attitude toward performing a particular behavior*, which is distinct from *general attitudes toward physical objects, institutions, groups, policies, and events* (Ajzen, 2012; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). Moreover, the attitudinal predictor needs to be compatible with the behavior in terms of action, target, context, and time elements (Ajzen, 2012). A lack of compatibility, especially in the action element, is likely to produce a weak or non-significant relationship between the attitudinal concept and the behavior (Ajzen, 2012; Eagly & Chaiken, 1998). Nevertheless, a large number of researchers in the domain of organ donation have employed *attitudes toward organ donation*, instead of *attitudes toward registering to become an organ donor*, as the predictor of organ-donor registration behavior.

The *attitudes toward organ donation* can be considered as attitudes toward a social issue or an abstract notion (Feeley & Anker, 2010; Morgan et al., 2008), rather than attitudes toward the donor registration behavior. For example, it is reasonable to assume that while someone may hold a very positive attitude toward organ donation (since it is beneficial to the whole society), he or she might also believe that it will compromise his or her body's integrity, thus holding a negative attitude toward his or her registering to become an organ donor. Hence, there could be a discrepancy between these two attitudinal concepts: *attitudes toward organ donation* and *attitudes toward one's organ-donor registration behavior*.

Previous findings have shown that generally people report highly positive attitudes toward organ donation in Western as well as Asian countries (e.g., Alden & Cheung, 2000; Chen et al., 2006; Cossé & Weisenberger, 2000; Hebert et al., 2010;

Kopfman & Smith, 1996; Marshall & Feeley, 2006; Morgan & Miller, 2002b). Nevertheless, this well documented favorable attitudes toward organ donation has not resulted in a high organ donor registration rate (Quick, Morgan, LaVoie, & Bosch, 2014). Moreover, some American scholars have documented a ceiling effect in enhancing people's attitudes toward organ donation through health communication campaigns or persuasive messages (e.g., Cossé & Weisenberger, 2000; Marshall & Feeley, 2006). Such empirical evidence has shown that the favorable responses to attitudes toward organ donation may be biased and stem from social norms and social desirability (Anker et al., 2010; Morgan et al., 2008; van den Berg et al., 2005), and individuals may not hold an identical view on organ donation and their registration as organ donors. Therefore, in accordance with Fishbein and Ajzen's (Fishbein & Ajzen, 1975; Ajzen, 1985) conceptualization of attitude in the TRA and TPB, the attitude target in organ donation research needs to be changed from "organ donation" to "my registering to become an organ donor" to successfully predict individuals' organ-donor registration behavior.

Indeed, in a recent study, Quick and colleagues (2014) used two items to measure *attitudes toward joining the organ donation registry* ($\alpha = .76$), instead of attitudes toward organ donation. The authors, however, did not investigate the attitude-behavior relationship in their study. Thus, the measurement of attitudes toward "one's registering to become an organ donor" and its relationships with donation intention and donor registration behavior need further examination. Besides using *attitudes toward a target* in the notion of attitude, previous communication research on organ donation has underestimated the importance of the affective aspect in the notion of attitude as well.

Cognitive and Affective Aspects of Attitude

Although the initial attitudinal concept in the TRA and TPB paid less attention to the affective aspect of attitudes, some scholars later extended the concept of attitude in the TPB (Ajzen & Driver, 1991; Montaña & Kasprzyk, 2008). Ajzen and Driver (1991) suggested that, besides holding instrumental beliefs (i.e., perceived costs and benefits from performing a behavior), individuals also hold affective beliefs about a behavior, which are defined as perceived pleasant or unpleasant feelings produced by performing a behavior.

With respect to making organ-donation decisions, individuals may realize their vulnerability to death and experience mortality salience, which means that their own inevitable demise become front and center in their consciousness according to terror management theory (Pyszczynski, Greenberg, & Solomon, 1999). These individuals will subsequently experience the fear of death and produce defensive processes (Pyszczynski et al., 1999). Such mortality salience induced by organ-donation decisions indicates an indispensable role of affective responses in understanding donor registration behavior. In fact, emotional responses have long been documented as an influential predictor of organ-donation decisions in the literature. Researchers have found that fear (e.g., Hessing & Elffers, 1986; Kopfman & Smith, 1996) and anxiety (e.g., Afifi et al., 2006; Kopfman et al., 1998; Morse et al., 2009; Smith et al., 2004; Smith, Lindsey, Kopfman, Yoo, & Morrison, 2008; Wu, 2008) were negatively associated with donation intention, donor registration behavior, and willingness to communicate this topic with family members.

In 2008, Morgan and colleagues summarized the negative emotions toward organ donation into two categories: the *ick* factors and the *jinx* factors, and found that both factors were impediments to signing an organ donor card (Morgan et al., 2008). Specifically, the *ick* factors “are those related to a basic disgust response to the idea of

organ procurement or transplantation” (p. 648), and the *jinx* factors pertain to fear, anxiety, and some superstitious beliefs about signing an organ donor card or actually donating organs (Morgan et al., 2008). As well, negative emotions have often been cited as reasons for not consenting to donate in open-ended questions or interviews (e.g., Feeley, 2007; Marshall & Feeley, 2006; Sanner, 1994). For instance, respondents reported “gross” and “scared” as reasons of not donating in Feeley and Servoss’s (2005) study. Similarly, Chinese university students also reported these negative feelings as barriers to becoming an organ donor in a survey (Chen et al., 2006). In sum, these findings reveal that emotional evaluations are indispensable in organ-donation decision making.

Although many scholars have noted the role of emotional responses in predicting donor registration behavior, these affective evaluations have been considered separately from attitudes in their theoretical frameworks. In 2005, van den Berg and colleagues (2005) argued that emotional responses should be assessed as one aspect of attitudes toward organ donation and found only positive affective attitudes significantly predicted donating behavior. However, in a replication of van den Berg et al.’s (2005) study, Anker and colleagues (2010) found that negative cognitive attitudes, positive cognitive attitudes, overall positive attitudes, and overall negative attitudes, were significant predictors of donor status, which is largely inconsistent with van den Berg et al.’s (2005) findings. In addition, most of the behavioral targets in the above-mentioned affective responses are “organ procurement or transplantation,” “organ donation,” and “death” (excepting one target is “signing a donor card” in *jinx* factors), instead of registration as an organ donor. Such an inconsistency between the behavioral target in emotional responses and the final behavior (i.e., registering as an organ donor) may result in a weak or non-significant relationship between these two constructs,

according to the review on the TPB in the previous section (Ajzen, 2012; Eagly & Chaiken, 1998). Thus, the measurement of affective attitudes in organ donation research needs to be reworked in a more nuanced fashion.

Positive and Negative Aspects of Attitude

Besides dividing attitude into cognitive and affective dimensions, researchers have also documented the co-presence of positive and negative aspects of attitude. For example, Jonas et al. (2000) documented a simultaneous “existence of positive and negative beliefs or emotions” toward an object in an individual’s attitude (p. 41). Thus, both positive and negative valences of cognitive and affective behavioral beliefs will be included in the current research. Although such attitude ambivalence has not been emphasized in the TPB, it has been documented in previous organ donation studies (e.g., Anker et al., 2010; Paris & Katz, 1986; van den Berg et al., 2005). The literature suggests that individuals hold positive and negative beliefs (i.e., cognitive ambivalence) as well as pleasant and unpleasant emotions (i.e., affective ambivalence) toward organ donation at the same time.

In accordance with theories and previous research, the present study divides both cognitive and affective attitudes into two different dimensions according to the valence: positive and negative. Thus, the four theoretical aspects of attitudes toward registering to become an organ donor are as follows: positive cognitive attitudes, positive affective attitudes, negative cognitive attitudes, and negative affective attitudes. Further, these attitudes are functions of behavioral beliefs about registering to become an organ donor. Next, the issues of operationalization of attitude have been reviewed.

Operationalization

In 1963, Fishbein proposed a summation model of attitudes, which considered attitudes toward an object as a function of the individual’s belief toward this object. In

detail, Fishbein (1963) suggested that one's attitudes toward an object is determined by (1) one's belief about the object, which is "the probability that the object is related to other objects, concepts, values, or goals" (p. 238), and (2) one's evaluation on the belief. This theoretical framework is the foundation of the expectancy-value model of attitude in the TRA (Fishbein & Ajzen, 1975). According to this expectancy-value model, attitudes toward a behavior is a function of behavioral beliefs, which refer to individuals' perceived outcomes of performing the particular behavior. Two factors: (1) the individual's perceived extent to which the outcomes will happen (i.e., belief strength), and (2) his or her evaluations of these outcomes (i.e., belief evaluation), jointly produce the attitudes toward the behavior.

In accordance with this expectancy-value model of attitude in the TRA, Ajzen and colleagues (Ajzen, 2013; Ajzen & Driver, 1991; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) suggest that either global measures or belief-based measures can assess individuals' attitudes toward a particular behavior. Global measures ask respondents to evaluate the behavior on a set of semantic differential items (e.g., useless-useful). Belief-based measures do not directly assess attitudes but rather behavioral beliefs, the antecedents of attitudes (Fishbein & Ajzen, 1975). When answering a belief-based scale, respondents have to rate their belief strength (e.g., unlikely-likely) and subjective evaluation (e.g., harmful-beneficial) of each salient belief. Each belief's strength then multiplies by its evaluation. Finally, the cross products of all salient beliefs are summed up as the score of attitudes toward the behavior.

In the domain of organ donation research, researchers have seldom used global measures of attitudes. A small number of studies (e.g., Kopfman & Smith, 1996) have followed Ajzen and his colleagues' suggestions by measuring both the belief strength as well as belief evaluation and summing up all the products of belief strength and

evaluation. In some other studies, the respondents have only been asked to rate their agreement of each statement on a 5-point or 7-point Likert scale (e.g., Goodmonson & Glaudin, 1971; Morgan & Miller, 2002a; 2002b; Parisi & Katz, 1986). Stated differently, these researchers have only assessed either the strength or evaluation of behavioral beliefs, rather than both of them.

For instance, if one rates 7 (strongly agree) on the item “I believe that organ donation is an act of compassion” in Morgan and Miller’s (2002a, 2002b) scale, one may strongly agree that organ donation is an act of compassion (i.e., belief strength). However, it does not necessarily indicate that he or she also considers “the act of compassion” as a positive or pleasant outcome of organ donation (i.e., belief evaluation). Similarly, scoring 7 (strongly agree) on the item “Transplanting organs is against God’s will” (from Parisi & Katz, 1986) may show one’s extremely negative evaluation of organ transplant if it violates God’s will. In the meantime, however, he or she may also believe that this outcome is unlikely to occur (i.e., belief strength). Therefore, only measuring the respondents’ agreement with a statement about behavioral beliefs will not fully capture attitudes toward registering to become an organ donor.

Table 2.1 summarizes all above mentioned attitude measures in organ donation literature. Appendix A lists the items of all above mentioned attitude measures in organ donation literature.

2.2.3 The Refined Notion of “Attitude”

In the current study, attitudes toward registering to become an organ donor are treated as functions of an individual’s cognitive (positive and negative) as well as affective (positive and negative) behavioral beliefs toward his or her performance of the particular behavior: registering to become an organ donor upon his or her death.

Cognitive attitudes toward registering to become an organ donor refer to one's evaluations of his or her salient, cognitive beliefs about performing this behavior. These cognitive beliefs are one's perceived costs (i.e., negative) or benefits (i.e., positive) to oneself brought by his or her registering to become an organ donor. On the other hand, affective attitudes refer to one's evaluations of his or her salient, affective beliefs about registering to become an organ donor. The affective beliefs are defined as perceived unpleasant (i.e., negative) or pleasant (i.e., positive) feelings produced by his or her registering to become an organ donor. Hence, Hypothesis 1 (H1) predicted that these four aspects of attitudes are distinctive dimensions of attitudes toward registering to become an organ donor.

H1: Positive cognitive attitudes, negative cognitive attitudes, positive affective attitudes, and negative affective attitudes will represent four separate aspects of attitudes toward registering to become an organ donor.

2.2.4 Method

Pilot Study

A pilot study was conducted to assess the salient behavioral beliefs Chinese hold about registering to become an organ donor. Seventy-seven university students in China were recruited via snowball sampling. The participants answered four open-ended questions adapted from Ajzen and colleagues (Ajzen, 2013; Ajzen & Driver, 1991). Two questions asked what personal benefits and costs they perceived in registering to become an organ donor (i.e., positive and negative cognitive behavioral beliefs). The other two questions assessed what pleasant and unpleasant feelings they perceived in registering to become an organ donor (i.e., positive and negative affective behavioral beliefs). The questionnaire is presented in Appendix B.

The participants' responses were content analyzed, through which similar responses were grouped together. The most frequently mentioned ideas were retained to create the attitude measure.

Participants and Procedures

Two groups of participants were recruited through convenience sampling to test the attitude measure. Besides assessing the reliability and construct validity of the attitude measure for each sample, the current study also tested whether the scale was invariant across different samples.

Sample 1. The attitude scale was first administered to 482 university students (35.7% male), who held a Chinese citizenship, from three universities in southern China in December 2014. Their mean age was 19.38 years (age range: 18–26 years) with a standard deviation of 1.15 years. Participants were asked to rate their attitudes toward registering to become an organ donor on a paper-pencil questionnaire.

Sample 2. Seven months later, the same scale was administered to 322 Chinese citizens who were recruited from a city in middle China. This sample included 202 males (63.3%) and 117 females (36.7%). Three participants did not report their gender. The mean age of participants was 24.80 years (age range: 18–51 years) with a standard deviation of 5.06 years. They rated their attitudes toward registering to become an organ donor on Qualtrics.com. To avoid repeated responses, one IP address was only allowed to participate once. The participants were allowed to participate in the study at their own convenience, from wherever they were and through any devices with Internet access they chose.

The statistical results showed that these two samples were significantly different in their age, $t(802) = 22.66$, $p < .001$, and gender, $\chi^2(1) = 58.91$, $p < .001$. The institutional review board (IRB) at Nanyang Technological University approved all

questionnaires and the procedure. The study was conducted in mandarin.

The Attitude Measure

All attitudes toward registering to become an organ donor were assessed through belief-based measures, adapted from Ajzen and colleagues (Ajzen, 2013; Ajzen & Driver, 1991) and Kopfman and Smith (1996). Participants were asked to indicate their belief strength of each belief statement on a 7-point Likert scale (1 = *extremely unlikely* to 7 = *extremely likely*) and their evaluation of each belief on a -3 to 3 scale (-3 = *harmful/unpleasant*, 0 = *neutral*, 3 = *beneficial/pleasant*). The evaluations of negative cognitive and negative affective beliefs were recoded before calculating the cross products. Each belief's strength was multiplied by its evaluation as the final attitude score of each item. For positive attitudes, a higher multiplied score indicates a more positive attitude. For negative attitudes, a higher multiplied score indicates a more negative attitude.

Positive cognitive attitudes. Positive cognitive belief statements included three items: *By registering to become an organ donor, I am committed to social responsibility*; *Registering to become an organ donor reflects my life values*; and *Registering to become an organ donor helps me win respect from others*. Participants rated their belief strength and belief evaluation for each statement. The cross product of these two scores was calculated as the attitude score for each item. The standardized Cronbach's α for the measure of positive cognitive attitudes was .865 for Sample 1 and .833 for Sample 2.

Positive affective attitudes. Positive affective belief statements included three items: *Registering to become an organ donor makes me feel fulfilled*; *Registering to become an organ donor makes me proud*; and *Registering to become an organ donor makes me feel honored*. Participants rated their belief strength and belief evaluation for

each statement. The cross product of these two scores was calculated as the attitude score for each item. The standardized Cronbach's α for the measure of positive affective attitudes was .878 for Sample 1 and .896 for Sample 2.

Negative cognitive attitudes. Negative cognitive belief statements included four items: *Register to become an organ donor makes me vulnerable to misunderstandings*; *Register to become an organ donor makes me violate traditional Chinese values*; *Registering to become an organ donor impairs my relationship with my family members*; and *Registering to become an organ donor impedes me being able to be "buried and at rest."* Participants rated their belief strength and belief evaluation for each statement. The cross product of these two scores was calculated as the attitude score for each item. The standardized Cronbach's α for the measure of negative cognitive attitudes was .711 for Sample 1 and .711 for Sample 2.

Negative affective attitudes. Negative affective belief statements included three items: *Registering to become an organ donor evokes my fear*; *Register to become an organ donor elicits my anxiety*; and *Registering to become an organ donor makes me uneasy*. Participants rated their belief strength and belief evaluation for each statement. The cross product of these two scores was calculated as the attitude score for each item. The standardized Cronbach's α for the measure of negative affective attitudes was .855 for Sample 1 and .825 for Sample 2.

The Chinese and English versions of all the items are presented in Appendix C.

Analytical Measures

Confirmatory factor analyses (CFAs) and multi-group CFAs with the robust maximum likelihood (MLM) estimator⁴ were performed using Mplus (Muthén & Muthén, 1998-2015) for the data analysis. In terms of the model fit indices, Tucker-Lewis index (TLI) and Comparative Fit Index (CFI), which are "two of most commonly

used incremental indices of fit” (Byrne, 2012, p. 70), were reported. These two indices measure the proportionate improvement in the model fit by comparing the hypothesized model with the baseline model (Byrne, 2012). The current research used Wen, Hau and Marsh (2004)’s evaluation criteria for TLI and CFI, which are “better and more appropriate” (p. 194) than Hu and Bentler (1999)’s criteria. According to Wen et al. (2004), $TLI \geq 0.9$ and $CFI \geq 0.9$ are cutoff criteria for goodness of fit indices.

Besides reporting these two incremental indices of fit, the current research also reported two absolute indices of fit: Root Mean Square Error of Approximation (RMSEA) and Standardized Root Mean Square Residual (SRMR). They determine how well the hypothesized model fits the sample, such that they decrease as goodness-of-fit improves (Byrne, 2012). For RMSEA, values less than .05 indicate good fit, and values from .05 to .08 represent reasonable errors of approximation in the population (Browne & Cudeck, 1993; Byrne, 2012). A 90% confidence interval (CI) of RMSEA value was also reported according to MacCallum, Browne, and Sugawara’s (1996) recommendations. Similarly, SRMR values less than .05 indicates a well-fitting model (Byrne, 2012), and values as high as .08 are deemed acceptable (Hooper, Coughlan, & Mullen, 2008; Hu & Benter, 1999).

While chi-square is a popular global fit index of a structural equation model, it has a number of severe limitations in its use (Hooper, Coughlan, & Mullen, 2008). Because chi-square value is sensitive to sample size (Bentler & Bonnet, 1980; Kenny & McCoach, 2003), some scholars recommend the use of relative chi-square (χ^2/df) to minimize the impact of sample size on the model (Wheaton, Muthen, Alwin, & Summers, 1997). Yet the acceptable level for this statistic ranges from as high as 5.0 to as low as 2.0 (Hooper et al., 2008). On the other hand, Kline (2015) asserts that there is no statistical or logical foundation for the use of relative chi-square, and it should not

be included in the global fit testing. Thus, the current research only employed the information of chi-square statistic for model comparisons (i.e., chi-square difference tests). The reports of model fit indices included it as supplemental information, but not a major global model fit index.

2.2.5 Results

The Four-Dimensional Scale

Multi-dimensionality. Hypothesis 1 predicted that positive/negative cognitive attitudes and positive/negative affective attitudes represent four separate and distinctive aspects of attitudes toward registering to become an organ donor. CFAs with MLM estimator were conducted to test Hypothesis 1. The results showed that for both Sample 1 and Sample 2, the four-factor CFA as well as the two-factor CFA with positive and negative attitudes reached an acceptable level of model fit (See Table 2.2).

The chi-square difference tests⁵ showed that, for Sample 1, the four-factor model was significantly better than the two-factor model including positive and negative attitudes: $\Delta\chi^2 = 91.47$, $\Delta df = 5$, $p < .001$, and the two-factor model including cognitive and affective attitudes: $\Delta\chi^2 = 579.30$, $\Delta df = 5$, $p < .001$. It also significantly better than the one-factor model considering attitudes as a one-dimensional concept, $\Delta\chi^2 = 578.31$, $\Delta df = 6$, $p < .001$. For Sample 2, the chi-square different tests also showed that the four-factor model was significantly better than the two-factor model including positive and negative attitudes, $\Delta\chi^2 = 25.87$, $\Delta df = 5$, $p < .001$, and the two-factor model including cognitive and affective attitudes, $\Delta\chi^2 = 277.95$, $\Delta df = 5$, $p < .001$. It was also significantly better than the one-factor model considering attitudes as a one-dimensional concept, $\Delta\chi^2 = 250.28$, $\Delta df = 6$, $p < .001$. For both samples, all the results of Cronbach's alpha for the latent variables in the four-factor model met the minimum criterion of .70

(Nunnally, 1978). The factor loadings and reliabilities of the four-factor model for Sample 1 and Sample 2 are presented in Table 2.3 and Figure 2.3.

Convergent and discriminant validity. Convergent validity was assessed by examining composite reliability (CR) and average variance extracted (AVE) of the measures. A value of CR higher than 0.7 and a value of AVE higher than 0.5 indicate an acceptable level of convergent validity (Bagozzi & Yi, 1988; Fornell & Larcker 1981). The scale's discriminant validity was assessed though comparing the AVE of a latent variable and its squared correlation coefficients with other latent variables. If the value of AVE is larger than the squared correlations, the measurement reach an acceptable level of discriminant validity (Fornell & Larcker 1981).

The values of CR of four attitude aspects for both samples were higher than 0.7. The values of AVE for positive cognitive/affective attitudes and negative affective attitudes were higher than 0.5. The AVE value of negative cognitive attitude measure was 0.39 for Sample 1 and 0.37 for Sample 2, which indicated that the convergent validity for this construct is not satisfactory. The values of CR and AVE of the four-dimensional attitude measure are presented in Table 2.4. The comparisons between the values of AVE and the squared correlation coefficients revealed that there was a lack of discriminant validity between the measures of positive cognitive and affective attitudes and also a lack of discriminant validity between negative cognitive and affective attitudes. Thus, the data were inconsistent with H1 which predicted that these four attitude aspects are separate and distinctive. The results were presented in Table 2.5 with the values of AVE in the diagonal. The off diagonal elements represent the squared correlations among the latent variables.

The Revised Two-Dimensional Scale

Multi-dimensionality. Due to the lack of discriminant validity between

cognitive and affective attitudes, I revised the original four-dimensional scale into a two-dimensional scale including two latent variables: positive attitudes and negative attitudes. After eliminating two items of negative cognitive attitudes with low factor loading, the revised scale contained 11 items: six items for positive attitudes and five item for negative attitudes. CFAs with MLM estimator revealed that for both Sample 1 and Sample 2, the revised two-factor model reached an acceptable level of model fit (See Table 2.6). The chi-square difference tests⁵ showed that, for Sample 1, the revised two-factor model was significantly better than the one-factor model combining positive and negative attitudes: $\Delta\chi^2 = 330.79$, $\Delta df = 1$, $p < .001$. For Sample 2, the revised two-factor model was significantly better than the one-factor model: $\Delta\chi^2 = 55.55$, $\Delta df = 1$, $p < .001$. For both samples, all the results of Cronbach's alpha for the latent variables in the revised two-dimensional measure were higher than .80 which met the minimum criterion of .70 (Nunnally, 1978). The factor loadings and reliabilities of this revised attitude measure for Sample 1 and Sample 2 are presented in Table 2.7 and Figure 2.4. The Chinese and English versions of all the items for the revised scale are presented in Appendix D.

Convergent and discriminant validity. For both samples, all the values of CR were higher than 0.7 and all the values of AVE were higher than 0.5, which suggested that convergent validity is satisfactory. The values of CR and AVE of the revised two-dimensional attitude measure are presented in Table 2.8. The comparisons between the values of AVE and the squared correlation coefficients revealed that there was a satisfactory discriminant validity between positive and negative attitudes for both samples. The results were presented in Table 2.9 with the values of AVE in the diagonal. The off diagonal elements represent the squared correlations among positive attitudes and negative attitudes.

Taken together, the results of CFAs, reliabilities, convergent validity, and discriminant validity suggested positive cognitive/affective attitudes and negative cognitive/affective attitudes did not represent four distinctive dimensions of the attitudes toward registering to become an organ donor. Instead, the attitudes included two separate aspects: positive attitudes and negative attitudes. Within the positive/negative attitudes, cognitive as well as affective facets of the attitudes were highly correlated with each other.

Measurement Invariance across Samples: The Revised Two-Dimensional Scale

A series of multi-sample CFAs with the MLM estimator were performed to examine the measurement invariance across two samples for the revised two-dimensional attitude scale. The invariance of all factor loadings was tested via comparing Model 1 and Model 2. Model 1 was the configural model, which was the least restrictive and served as the baseline model for the test of invariant variance-covariance matrices (Byrne, 2012). Model 2 constrained all factor loadings across Sample 1 and Sample 2, except the factor loadings for Item 1 for negative attitudes and Item 1 for positive attitudes. The non-significant result of chi-square difference test between Model 1 and Model 2 ($\Delta\chi^2 = 9.85$, $\Delta df = 7$, $p = .20$) denoted that all factor loadings were invariant across two samples, except two loadings. A further test of invariance of factor variance and covariance was carried via comparing Model 2 and Model 3. Model 3 constrained factor variance and covariance across samples. As a result, the non-significant result of chi-square difference test between Model 2 and Model 3 ($\Delta\chi^2 = 5.01$, $\Delta df = 3$, $p = .17$) revealed that, despite the presence of two non-invariant factor loadings, the factor variances and covariance remained equivalent across two samples (see Table 2.10).

2.2.6 Discussion

The refined conceptualization and operationalization of attitudes about organ donation in the current research are improved in three important respects. First, it uses a specific action – “registering to become an organ donor,” instead of “organ donation” which might be considered as a social issue or abstract notion, as the attitude target. Second, besides including cognitive attitudes, the refined notion of attitude incorporates cognitive and affective attitudes as well as attitudinal ambivalence. Furthermore, with regard to the operationalization, both belief strength and belief evaluation are measured to produce the final score for attitudes toward one’s registering to become an organ donor.

Culture is regarded a background factor of beliefs in the TRA and the TPB, which forms and shapes individuals’ beliefs about a particular behavior (Yzer, 2012). Continuing with this idea, the development of the refined attitude measure in the current study begins from assessing Chinese people’s salient beliefs regarding organ donation, instead of employing the behavioral beliefs documented in previous research or another culture context. After that, this study administers this newly developed scale to two groups of Chinese participants with significantly differences in age and gender. This procedure identifies the particular beliefs regarding organ donation in the context of Chinese culture and incorporates such culture into the assessment of attitudes toward registering to become an organ donor.

In addition, the refined, two-dimensional attitude measure is administered to two samples of Chinese population. These two samples are significantly different in their age and gender and are recruited at different time points and locations. The CFA results reveal that, for both samples, the two-factor model with positive and negative attitudes fit the data well and also reach satisfactory levels of reliability, convergent validity, and discriminant validity. It indicates that attitudes toward one’s registering to become an

organ donor are not a simple and straightforward concept, which can be fully captured using a single continuum scale, but rather a more complex concept that involves two separate dimensions: positive as well as negative aspect of attitudes. Within each aspect of attitudes, cognitive as well as affective responses are co-presented. Furthermore, the test of measurement invariance demonstrates that the refined attitude measure not only fits each sample separately, but also keeps invariant across two different Chinese samples, which increases the generalizability of the refined attitude measure among the Chinese population.

In sum, this study explores salient behavioral beliefs about registering to become an organ donor among Chinese people. Based on such beliefs, it develops a reliable and two-dimensional measure of attitudes toward registering to become an organ donor. The aim of next study in this chapter is to confirm the utility of this refined attitude measure. It will continue the examination of attitude but introducing more elements as well as examining the attitude-behavior relationship according to the framework of the TPB.

2.3 Study 2

This study aims to employ the refined attitude measure developed in Study 1 to predict Chinese university students' donor registration behavior based on the TPB (Ajzen, 1985). In accordance with this theory, *attitudes toward a behavior*, *subjective norms*, and *perceived behavior control* are three determinants of behavioral intention, which in turn predicts whether an individual will perform the behavior. These antecedents of performing a behavior will be reviewed in the following sections.

2.3.1 Attitudes toward Registering to Become an Organ Donor

Attitudes have long been regarded as a critical predictor of behavioral intention (Ajzen, 2012; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). One's attitudes regarding organ donation have been significantly and positively associated with his or

her willingness of donation (e.g., Kopfman & Smith, 1996; Morgan & Miller, 2002a; 2002b; Park & Smith, 2007). Study 1 in this chapter has reviewed the notion of attitudes in organ donation research and refined the notion of attitude in the TPB at both conceptual and operational levels. The refined attitude – attitudes toward registering to become an organ donor – consists of two aspects: positive and negative attitudes. The current study adopts this refined conceptualization of attitudes to predict organ donation intention and donor registration behavior, guided by the following hypotheses:

H1a: Positive attitudes toward registering to become an organ donor will be positively associated with intent to register to become an organ donor.

H1b: Negative attitudes toward registering to become an organ donor will be negatively associated with intent to register to become an organ donor.

2.3.2 Subjective Norms, Descriptive Norms, and Injunctive Norms

In addition to attitudes, the TPB (Ajzen, 1985) suggests that subjective norms are another determinant of behavioral intention. The initial conceptualization of subjective norms drew an analogy to the expectancy-value model of attitude and suggested that this concept was the cross product of *strength of normative belief* and *individual's motivation to comply with it* (Fishbein & Ajzen, 1975). Yet, in a recent review article on the TRA and TPB, Ajzen (2012) suggests that, under certain circumstances, there is little variance in individuals' motivation element, given that people generally tend to comply with their social referents. Combining normative belief strength with motivation to comply may add little to the prediction of subjective norms in the behavior (Ajzen, 2012). In fact, a large number of scholars have employed a more general conceptualization of subjective norms from Fishbein and Ajzen (Ajzen, 1985; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), that considers it as one's perceived

opinions from important others about whether or not he or she should perform the particular behavior.

Later, Fishbein and Ajzen (Ajzen, 2012, 2013; Fishbein & Ajzen, 2010) expanded this normative factor in the TPB by including injunctive and descriptive norms from the social norms approach (Berkowitz, 1997, 2005; Perkins, 2003; Perkins & Berkowitz, 1986). Descriptive norms refer to individuals' perceived prevalence of a certain behavior; and injunctive norms refer to individuals' beliefs about if this behavior is approved or disapproved in the social context (Lapinski & Rimal, 2005). Nevertheless, some scholars have argued that subjective norms in the TPB is conceptually the same as injunctive norms in the social norms approach (Boer & Westhoff, 2006; Lapinski & Rimal, 2005). As well, in their recent work, Fishbein and Ajzen (Fishbein, 2000; Fishbein & Ajzen, 2010) used "injunctive norms," instead of "subjective norms," in the TRA and TPB to represent perceived approval from significant others. Therefore, to some extent, subjective norms in the TPB are confounded with injunctive norms in the social norms approach (Park & Smith, 2007).

Park and Smith (2007), however, distinguished different types of norms in the domain of organ donation. They demonstrated that norms influencing organ donor behaviors should be divided into five distinctive types: subjective norms, personal/societal injunctive norms, and personal/societal descriptive norms. Subjective norms refer to perceived "expectation for a given individual's behavior" (p. 197) from one's important others, and can be considered as a perceived *pressure* of performing a certain behavior (Park & Smith, 2007). Personal or societal injunctive norms refer to perceived *approval* for performing a behavior from one's important others or the society; whereas, personal or societal descriptive norms refer to perceived *prevalence* of a particular behavior among one's important others or the society (Park & Smith,

2007). In Park and Smith's (2007) study, only personal descriptive norms among these five types of norms significantly impacted American undergraduates' behavioral intent to sign the state organ donor registry.

Some studies about organ donation in China obtained different findings on norms from Park and Smith's (2007) research on American undergraduates. In general, findings among young Chinese participants are consistent with the TPB (Ajzen, 1985) that subjective norms predict behavioral intention. For example, Wu and Lu (2011) conducted a study in Macau Special Administrative Region and Fujian province of China and found that subjective norms were a significant predictor of the intention regarding organ donation. Bresnahan et al. (2008) employed Park and Smith's (2007) categorization of norms and also documented a significant effect of subjective norms on Chinese undergraduates' donating intention. Therefore, both theoretical considerations as well as empirical evidence suggest that subjective norms are critically associated with Chinese university students' willingness to register as an organ donor. H2 was proposed as following:

H2: Subjective norms will be positively associated with intent to register to become an organ donor.

Although personal/social injunctive and descriptive norms have seldom been examined in organ donation research on Chinese participants (e.g., Bresnahan et al., 2008), the role of the personal level norms has been explored in some qualitative research. For instance, all interviewees in a qualitative study conducted in Taiwan reported that consent from family members was crucial when making organ-donation decisions (Shih et al., 2001). Moreover, 28% of Chinese university student respondents in a survey reported "no permission from family" as one reason for their opposition of posthumous organ donation (Chen et al., 2006). While these qualitative findings have

documented a critical role of personal level norms in the organ donation decision-making process, little research to date has quantitatively examined their effects on donation intention. Thus, the following research questions were advanced to investigate such effects among Chinese university students.

RQ1a: Are personal injunctive norms positively associated with intent to register to become an organ donor?

RQ1b: Are personal descriptive norms positively associated with intent to register to become an organ donor?

2.3.3 Perceived Behavioral Control: Distrust of Organ Allocation System

Perceived behavioral control (PBC) is another critical factor for predicting one's behavioral intention according to the TPB (Ajzen, 1985). Perceived behavioral control are individuals' perceived beliefs in one's capabilities to perform a given behavior (Ajzen, 1985). It also refers to perceived barriers or environmental constraints that can prevent behavioral performance (Ajzen, 2002; Fishbein, 2007). With regard to organ donor registration behavior, distrust in the healthcare or organ donation system has long been regarded as perceived barrier that inhibit organ donation intention (e.g., Davidson & Devney, 1991; Hebert et al., 2010; Morgan & Miller, 2002a; Russell et al., 2012; Sanner, 1994; Siminoff & Sturm, 2000). Russell and colleagues (2012) found a significantly negative association between distrust in the healthcare and verbal donation intentions when controlling for other factors. As well, Morgan and Cannon (2003) revealed that a distrust of the organ allocation system resulted in low donation consent rates. Furthermore, some American scholars have noted that such distrust in organ allocation system is prevalent among minorities, such as African Americans and Chinese Americans. For instance, 40% of African American respondents in Siminoff and Sturm's (2000) study indicated their agreement on the item "The way it is decided

who gets an organ is unfair.” Similarly, some Chinese Americans in New York reported beliefs that rich people or people with a higher social status will have a better chance to receive an organ (Hebert et al., 2010). These Chinese Americans also believed in the existence of a black market of organs in the United States or other countries in Asia and Africa (Hebert et al., 2010).

In China, people may also have such distrust of organ allocation system because organ transplantation has long been under-regulated (Huang et al., 2008). The commercial trade of human organs in China has not been legally banned until the launch of Regulation on Human Organ Transplantation in 2007 (Huang et al., 2008). Due to this historical reason, it is reasonable to expect that Chinese people may hold some distrust of organ allocation system, which could be an obstacle to registering as an organ donor. In fact, previous findings among Chinese university students revealed that 36% of the participants who were not willing to become an organ donor expressed their concerns about the “inappropriate use of the donated organs” (Chen et al., 2006). Thus, a hypothesis was advanced as following:

H3: Distrust of organ allocation system will be negatively associated with intent to register to become an organ donor.

2.3.4 Behavioral Intention

In accordance with the TPB, behavioral intention is an immediate predictor of behavior (Ajzen, 1985). Such intention demonstrates individuals’ estimation of how likely they will be to perform the particular behavior. The relationship between behavioral intention and behavior has been verified in various contexts (Armitage & Conner, 2002; Conner & Armitage, 1998; Sheppard, Hartwick, & Warshaw, 1988). Yet in order to test the prediction of behavioral intention in behavior, the TRA theorists state that the measure of behavioral intention should be prior to the performance of the

particular behavior (Ajzen, 1985; Yzer, 2013). Otherwise, a cross sectional correlation between intention and behavior only shows a relationship between individuals' intention and their past behavior (Yzer, 2013).

Previous research has documented a positive and significant association between the intent to donate and behavior regarding organ donation (e.g., Feeley & Servoss, 2005; Horton & Horton, 1991; Kopfman & Smith, 1996; Morgan et al., 2010). Among these studies, some have used organ donor registration status as the indicator of behavior and documented significant associations between intention (e.g., Hyde & White, 2009) or attitudes (e.g., Quick, Anker, Feeley, & Morgan, 2016) with individuals' donor status. In fact, according to the TRA and TPB (Ajzen, 1985; Fishbein & Ajzen, 1975), there is a causal chain from beliefs to behavior, and a feedback chain from behavior to beliefs as well. Performing the particular behavior provides individuals new information, which may affect the beliefs and then attitudes and intention. Thus, using organ donor status as the indicator of the behavior examines the relationship between behavioral intention with previous donor registration behavior, and the intention should not be regarded as the predictor of future behavior.

In accordance with the theoretical framework of the TRA and TPB, the current study will measure the antecedents of behavioral intention and the intention prior to the performance of behavior to predict future behavior regarding organ donor registration. The following hypothesis was proposed:

H4: Intent to register to become an organ donor will be positively related with organ-donor registration behavior.

H1 through H4 and RQ1 are visually depicted in Figure 2.5.

2.3.5 Comparisons among the TPB Components

Although all of the above-mentioned three TPB components, attitudes, norms and PBC, impact the performing of the behavior, they may exert various levels of influence on it. TPB theorists have documented that some behaviors are mainly under the control of only one TPB component: some are under attitudinal control, some others are under normative control, and some others are under PBC control (Fishbein & Cappella, 2006; Montaña & Kasprzyk, 2008). For example, for the same group of participants – American adults over 40-year-old, Smith-McLallen and Fishbein (2009) found that norms are the major determinant of their intention to get three cancer screening, whereas both attitudes and behavioral control influence their intention to exercise. Hence, to obtain a comprehensive understanding of the organ donor registering behavior and its antecedents, the current study compares the effects of the three TPB components on the behavior:

RQ2: Among the three TPB components: attitudes, norms, and PBC, which one is the strongest predictor of behavior?

2.3.6 Method

Participants and Procedures

The data were collected through a paper-pencil questionnaire survey. Participants were recruited through convenience sampling from three universities in southern China. The participants received extra course credits for completing the questionnaire. Five hundred and nine students were asked to fill out a questionnaire about attitudes toward registering to become an organ donor, subjective norms, personal injunctive norms, personal descriptive norms, distrust of organ allocation system, demographic information, and their personal experience with organ donation. Because personal experience has been documented as a moderator of attitude-behavior relationship (Borgida & Campbell, 1982), the data from participants who have

registered as organ donors, have been organ recipients, and have personally known organ donors, organ recipients, or someone who needs an organ transplant were excluded. The participants who were not Mainland China residents were also excluded. Finally, the data from 384 valid cases were retained for further data analyses.

All data from the paper-pencil questionnaire were keyed in manually by the author and a research assistant. Fifty cases were keyed in and double-checked per day. The author and the research assistant finished all data entry in ten days, and conducted a random-check at the end. Approval for the questionnaire and procedure was obtained from the IRB at Nanyang Technological University. The study was conducted in mandarin.

Measures

Attitudes. The positive and negative attitudes toward registering to become an organ donor were assessed through belief-based measures, adapted from Study 1 of this thesis. The standardized Cronbach's α for positive attitudes was .936. The standardized Cronbach's α for negative attitudes was .813.

A CFA with MLM estimator was conducted to confirm the two-dimensionality of attitudes. The results showed that the two-factor solution was acceptable, $\chi^2 = 95.52$, $df = 43$, $\chi^2/df = 2.22$, CFI = 0.972, TLI = 0.965, RMSEA = 0.058, 90% CI of RMSEA = 0.042 – 0.073, SRMR = 0.044.

Norms. All measures of subjective norms, personal injunctive norms, and personal descriptive norms, were adapted from Park and Smith (2007). Since organ donation in China is in its infancy, the items in personal injunctive and descriptive norms focused on the behavior of “willing to register to become an organ donor,” rather than “have had signed an organ donor card” in the original scales. For example, one item of personal descriptive norms was “most people who are important to me are

willing to register to become an organ donor.” All the responses of normative variables were recorded on a 7-point Likert scale, where 1 = *strongly disagree* and 7 = *strongly agree*. The results of standardized Cronbach’s α of subjective norms, personal injunctive norms, and personal descriptive norms were .85, .89, and .87 respectively.

Distrust of organ allocation system. The measure of distrust toward the organ allocation system was adapted from Morgan and Miller (2002a) and Siminoff and Sturm (2000). The initial scale included three items: “*The donated organs will be sold on black market*”, “*All other things being equal, poor and rich have the same chance to receive an organ donation (reflected),*” and “*The decision about who gets donated organs is unfair.*” However, these items were poorly correlated with each other and the Cronbach’s alpha was 0.40. Thus, only one item, “*The decision about who gets donated organs is unfair*”, was used as the measurement for distrust toward organ allocation system in the current study. The responses were recorded on a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*), such that a higher score indicated more distrust of the organ allocation system.

Intent to register to become an organ donor. Three items were used to assess participants’ intention to register to become an organ donor (Bresnahan et al., 2007b): *I am willing to register to become an organ donor*, *At some time in the future, I plan to filling the organ donor registration application*, and *I have thought about filling the organ donor registration application form*. The responses were recorded on a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). Higher scores indicated more intention to register to become an organ donor. The standardized Cronbach’s α was .86.

Behavior. The current study adapted the measure of behavior from Bresnahan et al. (2007b), which is recording if the participant detaches the organ donor registration application attached at the end of the questionnaire. The registration application was

obtained from the website of China Organ Donation Administrative Center (<http://www.codac.org.cn>). After completing the questionnaires, participants were thanked and informed that this was the end of the study. Meanwhile, they were informed that they could take the attached registration application at the end of the questionnaire. Participants' behavior was recorded as a categorical variable (0 = *not detaching the application* and 1 = *detaching the application*). 10.7% of the participants detached the application.

Experience with organ donation. Two questions asked if a participant has registered as an organ donor or has been an organ recipient. The other three questions, adapted from Feely and Servoss (2005), were employed to ask if a participant personally knows an organ donor, an organ recipient, or someone who needs an organ transplant. Individuals who answer “yes” for any one of these five questions were excluded in the data analysis.

Items of all study variables (excluding attitudes) are presented in Appendix E. The correlation matrix of all study variables is presented in Table 2.11.

Analytical Measures

Model with Binary Variables. Given that behavior is a binary variable, the analytical model employed the WLSMV (correction to means and variances of diagonally weighted least squares) estimator when this variable was included (Brown, 2006). The primary fit indices of such models were RMSEA and WRMR (weighted root mean square residual), and RMSEA equal or less than 0.06 and WRMR equal or less than 1 indicating good model fit (Yu, 2002). Other model fit indices do not perform well for binary variables (Ivanova et al., 2007). Also, this estimation method is at a potential disadvantage with a markedly skewed distribution of the categorical variable (Muthén, du Toit, & Spisic, 1997). Thus, the current study followed Ivanova et al.'s

(2007) practices that reported CFI and TLI to be secondary to the results of RMSEA and WRMR, and employed the criterion of CFI and TLI > .90 for good fit and .80 to .90 for acceptable fit.

Assess Measurements. CFAs were performed using Mplus (Muthén & Muthén, 1998-2015) to assess the full measurement model using the data from 384 valid participants. The measurement model included six latent variables: positive attitudes with six indicators, negative attitudes with five indicators, subjective norms with three indicators, injunctive norms with three indicators, descriptive norms with three indicators, and behavioral intention with three indicators. The model also included two observed variables that only have one indicator: distrust toward the organ allocation system and the behavior. The distrust was measured through a 1 to 7 Likert scale. The behavior is a binary variable (1 = *Yes*, 0 = *No*). Thus, in total, the measurement model included 25 indicators. Given that *behavior* was a dichotomous variable, the CFA was performed with the WLSMV estimator according to Brown's (2006) suggestions. The CFA results showed an acceptable fit: $\chi^2 = 447.08$, $df = 249$, RMSEA = .046, 90% CI of RMSEA = .039 – .052, WRMR = 0.725, CFI = .916, and TLI = .899. All factor loadings in this measurement model were significant and ranged from .489 to .917.

2.3.7 Results

A structural equation model with the WLSMV estimator was employed to assess the hypothetical model. The statistical results demonstrated that the model is acceptable, $\chi^2 = 641.87$, $df = 260$, RMSEA = .062, 90% CI of RMSEA = .056 – .068, WRMR = 1.11, CFI = .847, and TLI = .823. The results of the hypothetical model are depicted in Figure 2.6.

For attitudes toward registering to become an organ donor, the results showed that the positive attitudes positively and significantly impacted the intention to register,

$\beta = .324, p < .001$. In addition, negative attitudes negatively and significantly affected intention to register, $\beta = -.220, p < .001$. Hence, the data were consistent with H1a and H1b, which predicted significant impacts of positive (H1a) and negative attitudes (H1b) on the intent to register to become an organ donor.

In terms with normative factors, the results showed that subjective norms were positively and significantly associated with intention to register to become an organ donor, $\beta = .385, p = .011$. Thus, the data were consistent with H2, which predicted a significant effect of subjective norms on the registering intention. Research question 1a and 1b were about personal injunctive norms and personal descriptive norms. The results showed that neither of these norms was significantly related to intent to register: $\beta = -.038, p = .468$ for personal injunctive norms, and $\beta = .209, p = .086$ for personal descriptive norms.

Moreover, distrust of organ allocation system was negatively and significantly, $\beta = -.13, p = .001$, associated with intent to register to become an organ donor, which was consistent with H3.

The results also revealed that the behavioral intention was positively and significantly related to behavior, $\beta = .584, p < .001$, which was consistent with H4. The R^2 for the final behavioral variable was .34. Furthermore, the results showed that the indirect effects from attitudinal components to behavior (mediated by intention) were equal to the total effects from attitudinal components to behavior: .218 for positive attitudes, and -.179 for negative attitudes. These results indicated that the registration intention fully mediated the relationship between attitudes to behavior.

Finally, RQ2 asked which TPB component is the strongest predictor of behavior. To answer this research question, three SEM analyses were conducted to compared the variances of behavior explained by the three TPB components. The results shown that

the R^2 for the model from attitudes to behavior (see Figure 2.7a) is .401, the R^2 for the model from subjective norms to behavior (see Figure 2.7b) is .323, and the R^2 for the model from PBC to behavior (see Figure 2.7c) is .396. Thus, among these three TPB components, attitude is the strongest predictor of behavior. However, this result needs to be interpreted with caution: although the attitudinal concept explained the largest variance in behavior, the difference of R^2 between the attitudinal concept ($R^2 = .401$) and distrust ($R^2 = .396$) may not meaningfully different from each other.

2.3.8 Discussion

The current study includes two dimensions of attitudes toward registering to become an organ donor in the TPB model to predict the organ donation behavior. Also, the donor registration behavior is performed and recorded after all the variables that theoretically predict it measured. This practice examines the predictive ability of the antecedent variables on the registration behavior. The results show that, both negative and positive attitudes are significantly associated with behavioral intention and the final behavior. Other factors proposed by the TPB, including subjective norms and perceived barrier, also significantly affect the Chinese university students' donation intention and donor registration behavior.

Major Findings and Implications

The results show that, both dimensions of attitudes – positive and negative – are significant predictors of behavioral intention to register as an organ donor, which in turn predicts the donor registration behavior. On the one hand, the negative attitudes reflect the intense fear, anxiety, and perceived costs induced by the organ donation topic, which may bring the awareness of one's mortality. Such negative beliefs regarding organ donation have been reported as barriers to becoming an organ donor in previous research in Western as well as Eastern countries (e.g., Chen et al., 2006; Morgan et al.,

2008). Furthermore, cultural backgrounds of Chinese may also explain why negative attitudes are a significant predictor. Besides being linked with death anxiety (Hessing & Elffers, 1986), organ donation is also related to some other spiritual and philosophical aspects of death in Chinese culture. For example, the dead are held to be present as supernatural entities in their graves, and Chinese people believe that the dead may return to the earth as “hungry ghosts,” receive punishment in hell, get a reincarnation, or enter into the Western Paradise (Cohen, 1988). Some people consider that failing to keep body integrity may affect the reincarnation process or may turn them into a hungry ghost. Therefore, becoming an organ donor, which is believed to compromise body integrity and harm one’s afterlife, will induce negative attitudes and impede one’s intention of registration.

On the other hand, the positive beliefs regarding organ donors reflect one’s beliefs of being valuable in a meaningful world, which could serve an anxiety-buffering function when people are facing mortality salience (Greenberg & Arndt, 2012; Pyszczynski et al., 1997). For example, people who hold such beliefs admit that becoming a registered organ donor reflects his or her life values, enables his or her to win respect, and feel being honored. Such behavioral beliefs actually enable one to believe that he or she “is a valuable contributor to that meaningful world” (Greenberg & Arndt, 2012, p. 6), therefore buffering the anxiety brought by mortality salience of organ-donation decisions. This is why individuals high in the positive attitudes are more likely to register as an organ donor.

Besides attitudinal factors, subjective norms are significantly associated with registering intention in the current research as well, which is consistent with the prediction made by the TPB. It means that when the expectation from important others is high, individuals are likely to carry out the expectation, therefore having a high level

of behavioral intention to register as an organ donor. Such significant role of subjective norms shows the importance of significant others in making organ-donation decisions for Chinese university students. It reflects previous research findings on Chinese people, i.e., that they are more likely to hold an interdependent view of self, which emphasizes individuals' connections and relationships with significant others (Markus & Kitayama, 1991). Also, previous research has found that Chinese people prefer joint decision making to individual decision making about medical issues (Kim, Smith, & Gu, 2009). Hence, as the current results reveal, perceived expectations from significant others count a lot for organ-donation decisions, especially for young people.

Two other types of personal norms, personal descriptive and injunctive norms, however, do not significantly affect the registering intention. Although previous findings reveal that what individuals believe significant others are doing (i.e., personal descriptive norms) is another critical factor in making organ-donation decisions for American university students (Park & Smith, 2007), the current findings show that neither this type of norms nor injunctive norms are influential enough among Chinese university students. One possible explanation is that the nature of organ-donor registration behavior (i.e., public versus private) affects its susceptibility to such normative influence (Lapinski & Rimal, 2005). In the United State, such behavior could be public, given that one's donor status can be revealed on one's identity card, driver license, or even his or her Facebook page. Yet it more like a private behavior in China under the current organ donation system: although an organ donor card will be issued to registered organ donors, none of the government-issued identity cards reveal one's donor status. Therefore, others may not have much access to the information about one's organ-donor registration behavior in China, which makes this behavior less susceptible to normative influence (i.e., injunctive and descriptive norms).

Furthermore, the perceived inequity of organ allocation system serves as a barrier for performing the donor registration behavior. Previous research on African-Americans has identified distrust of the healthcare system as a barrier to becoming an organ donor, and suggested that this distrust may stem from perceived discrimination and racism within healthcare setting (Russell et al., 2012). However, distrust of the organ allocation system in the current study may have little to do with discrimination or racism. As reviewed in the literature review, some practical reasons, such as under-regulated organ transplants, transplant commercialism and prisoner-organ harvesting might be highly likely lead to such distrust among Chinese citizens, which in turn could negatively affect registering intention. As well, individuals' unfamiliarity with or a lack of knowledge about this newly launched organ donation program could also be the reason for holding such distrust toward the organ allocation system. Yet these speculative explanations need further research.

Limitations

Three limitations in the current study have to be acknowledged. First, participants in this study are young and well educated, which may limit the generalizability of the findings. Nevertheless, previous research has documented that education level was positively associated with the odds to being willing to become an organ donor (Boulware, Ratner, Sosa, & Cooper, 2002). It is reasonable and valuable to initiate organ donation research in China from this subset of population. Future research could attempt to replicate this study on other subsets of the general population in China. Second, the distrust in the current study refers only the distrust toward organ allocation system and is measured through a straightforward single-item scale. The poor reliability of the initial, multi-item measurement for distrust indicates that distrust regarding organ donation might be a multi-dimensional concept. Although the current

study examined the distrust toward organ allocation system, other aspects of distrust, such as beliefs about black market and distrust toward medical system, may shape donation intention and organ-donor registration behavior as well. Further examinations are needed to investigate the concept of distrust regarding organ donation in the Chinese context. Third, although the measure of registering behavior is adapted from previous communication research on organ donation (Bresnahan et al., 2007b), it may not necessarily indicate that the participants will complete the registration process and becoming a registered organ donor in the near future. Some longitudinal research design could be employed in future studies to track if the participants complete the organ donor registration process.

CHAPTER 3

INVESTIGATING THE EFFECT OF PERSUASIVE MESSAGES ON ATTITUDES

Chapter 2 refined notion of “attitude” and outlined four theoretical aspects of the attitude incorporating individuals’ evaluations of their positive cognitive/affective as well as negative cognitive/affective behavioral beliefs toward registering to become an organ donor. The current chapter retains a focus on these behavioral beliefs, the foundational building block of attitudes, by turning to a question: how to improve favorable attitudes toward registering to become an organ donor through persuasive messages? Scholars have examined the effects of many important message factors (e.g., format, appeal, and order) on the beliefs, attitudes, and intentions in the domain of organ donation. Some of the factors have been fully examined with consistent results, such as message sidedness (e.g., Birkimer, Barbee, Francis, Deuser & Pope, 1994; Ford & Smith, 1991), and some others have not been investigated yet or with inconsistent results. Evidence type (i.e., statistical, narrative, and combined messages) is one of the message factors which has commonly employed in organ donation messages but with largely inconsistent findings (e.g., Feeley, Marshall, & Reinhart, 2006; Kopfman et al., 1998). Thus, the goal of Study 3 in this chapter is to investigate the independent effect of evidence type and its joined effects with individuals’ need for affect (NFA) on organ donation beliefs. Furthermore, it explores how the number of user-generated cues attached to the original messages influences beliefs, since such cues will become integrated with persuasive messages in health campaigns involving social networking sites (SNSs).

Although the ultimate goal of an organ donation campaign might be promoting organ-donor registration behavior, it might not realistically occur after exposure to a

single persuasive message. In a review article about the TRA and TPB, Yzer (2013) states that “persuasive messages at best create or change beliefs” (p. 122), and these changes in beliefs should eventually influence the behavioral intention and behavior. As such, belief strength about registering to become an organ donor is measured as the outcome variable of exposure to persuasive messages about organ donation in this study.

3.1 Study 3

3.1.1 Evidence Type in Persuasive Messages

Evidence, which is “information used as proof by a source” (Reinard, 1988, p. 5), is one of the critical components in persuasive messages. While some early scholars believed that evidence did not affect audience members’ reactions to the argument (e.g., Gregg, 1967), subsequent research concluded that messages with evidence produce more attitude change than do messages without evidence (Hample, 1978; Reynolds & Reynolds, 2002). Persuasion research has long examined the effectiveness of two types of evidence: statistical and narrative (e.g., Allen & Preiss, 1997; Baesler & Burgoon, 1994; Reinhart, 2006; Taylor & Thompson, 1982). Statistical evidence provides quantitative summary information across a large number of cases that offer representative and typical information on a topic (Allen & Preiss, 1997; O’Keefe, 2002). Alternatively, narrative evidence provides case stories or examples and describes the examples in detail, thus relying on the emotional impact or vividness to reach its desired effect (Allen & Preiss, 1997; O’Keefe, 2002; Taylor & Thompson, 1982).

A large amount of research to date has compared the persuasive effectiveness of statistical versus narrative evidence (e.g., Allen & Preiss, 1997; Baesler & Burgoon, 1994; Reinhart, 2006; Taylor & Thompson, 1982), yet scholars have not reached an agreement. Baesler and Burgoon (1994) found that statistical evidence is more

persuasive than stories. Allen and Preiss (1997) later meta-analyzed 15 studies similarly concluded that statistical evidence was more persuasive than narratives. However, in a more recent meta-analysis of 23 studies, Reinhart (2006) found no significant differences between statistical and narrative messages in terms of aggregated outcome measures. When considering attitude outcome independently, her results revealed a small, but significant, advantage of narrative evidence over statistical evidence.

Given that both statistical and narrative evidence has its own advantages, some scholars have suggested a combination of them (e.g., Allen et al., 2000; Reynolds & Reynolds, 2002). Allen and his colleagues (2000) compared the persuasiveness among statistical, narrative, and combined evidence. They found that messages using combined evidence were more persuasive than messages with either statistical or narrative evidence alone. Based on their review, Reynolds and Reynolds (2002) also maintained that using both statistical and narrative evidence is the best conclusion.

3.1.2 Evidence Type in Organ Donation Messages

Persuasive messages promoting organ donation commonly employs statistical as well as narrative evidence in both offline and online contexts. For instance, a typical example of statistical evidence messages might read, “Over 82,000 persons await an organ donor. Almost 60,000 persons have been awaiting an organ for over 1 year” (Marshall & Feeley, 2006, p. 441). Alternatively, some public service announcements (PSAs) and organ donation websites often portray stories of organ donors or recipients (Reinhart & Anker, 2012). In the field of organ donation research, scholars have long investigated the effects of these two types of evidence on individuals’ perceptions as well as cognitive and affective responses (e.g., Feeley, Marshall, & Reinhart, 2006; Kopfman et al., 1998). Yet the findings from this previous research are inconsistent.

Kopfman and colleagues (1998) asked their college-age participants to read two

persuasive messages about organ donation: one with statistical evidence and the other with narrative evidence. Prior to that, their intent of signing an organ donor card was recorded on a 7-point Likert scale. After reading each message, the participants were asked to: list their emotions and thoughts they might have while they read or after reading the message; to report their anxiety level, perceived self-efficacy, and perceived similarity and to gauge the perceived credibility and effectiveness of the message. The results showed that statistical messages produced a significantly higher number of total thoughts (including positive and negative thoughts) about organ donation than narratives. The total number of emotions listed after reading narratives was larger than after reading statistical messages, but this result did not reach the significance level. And the level of prior intent (high vs. low) caused differing effects in the numbers of listed thoughts and emotions. However, regardless of the level of prior intent, all audiences perceived statistical evidence messages as more credible and effective as compared with narratives.

This superiority of statistical evidence, however, was not replicated in a subsequent study. Feeley et al. (2006) claimed that, given that all participants in Kopfman et al.'s (1998) study read statistical messages prior to narratives, a potential order effect should have been taken into account. They replicated Kopfman et al. (1998)'s experiment by adding one more message type named "actual" and randomizing the order of message presentations. The actual messages were real news articles about a successful organ or tissue transplant that included both narrative and statistical information. The university student participants first rated their attitudes and intentions toward organ donation and then were randomly assigned to one of the three conditions: reading a statistical, narrative, or actual message about organ donation. After reporting all of their reactions to the first message, they were asked to read a second message that

employed a different evidence type from the first one, therefore balancing the potential order effect. The results revealed that reading message vignette 1 significantly produced more positive thoughts and total thoughts than reading message vignette 2, regardless of message evidence types. This could be an alternative explanation for why statistical messages, which served as message vignette 1, produced more total thoughts in Kopelman et al.'s (1998) experiment. Moreover, Feeley et al. (2006) found that the number of total thoughts was not significantly different from three evidence types, and that study participants rated narratives as credible and as effective as statistical messages, but gave the lowest rating to the actual messages.

These two studies thoroughly examined the cognitive and affective reactions to and perceived effectiveness of different evidence types in organ donation messages. However, given the inconsistent findings, further examination is warranted. Furthermore, perceived effectiveness (i.e., message rating), instead of actual persuasiveness (i.e., attitude), was the dependent variable used in the previous research. Indeed, Feeley and his colleagues (2006) noted this limitation and suggested that future research should investigate the effect of evidence types on shaping attitudes and behaviors regarding organ donation. Moreover, given that beliefs toward registering to become an organ donor have been demonstrated as a multi-faceted concept which includes positive cognitive/affective beliefs and negative cognitive/affective beliefs, the effects of evidence type on these beliefs need to be investigated in nuanced fashion.

Although little research to date has investigated the effects of evidence type on these four particular types of beliefs in the domain of organ donation, some research has documented an effect of narrative persuasion on negative cognitive responses. Indeed, narrative approach has been regarded as a subtle form of persuasion and is powerful in reducing reactance (Dal Cin, Zanna, & Fong, 2004). In a more recent study,

Kim and Niederdeppe (2015) found that, compared with non-narrative messages, narrative persuasion is effective in reducing negative cognitive responses, which is a form of defensive reactions. Thus, hypothesis 1 (H1) was advanced as follows:

H1: Among three types of evidence (statistical, narrative, and combined), narrative evidence will lead to the lowest level of negative cognitive beliefs.

In terms of other three types of beliefs about organ donation, research question 1 (RQ1) was asked to investigate the direct effects of evidence type:

RQ1: (a) Does evidence type (statistical, narrative, and combined) lead to significantly differences in audience members' other three types of beliefs about organ donation, including positive cognitive/affective beliefs and negative affective beliefs?

In addition, individual differences in personality have long been considered as a factor leading to variations in audience members' susceptibility to persuasive messages (McGuire, 2013). Due to the various levels of emotion-related information involved in different forms of evidence, the current study intends to explore how individuals' motivations to approach and avoid emotion interact with the effects of message evidence on audiences' beliefs about organ donation.

3.1.3 Need for Affect and Evidence Type

Individuals vary in their willingness to approach and avoid emotions, which affects their processing of emotion-related information. Maio and Esses (2001) termed this individual difference the need for affect (NFA) and defined it as “the general motivation of people to approach or avoid situations and activities that are emotion including for themselves and others” (p. 585). Although individuals should generally perceive some affects and emotions, such as positive emotions and good feelings, as more favorable than others, Maio and Esses (2001) suggested that there are “meaningful individual differences in the pursuit of affect on average” (p. 586). Further, these

differences are expected it to shape individuals' judgment and behavior. For instance, individuals high in NFA will actively approach to emotional situations that will intensify their emotional experience. Maio and Esses (2001) documented that compared with individuals low in NFA, individuals high in NFA were more likely to choose to watch emotional movies and involve in an emotion-inducing event. Other previous research has shown that such individual difference interacts with message content to affect individuals' post-message responses as well.

Maio, Esses, Arnold, and Olson (2004) examined the role of NFA in individuals' responding to fear-inducing messages. They speculated that individuals high in NFA are better able to deal with fear in the messages and motivated to rehearse the content of fear-inducing messages, therefore reacting more favorably to the messages than individuals low in NFA. In their experiment, participants were asked to watch two video advertisements: one was fear-inducing and the other was affectively neutral. The results showed that, for the fear-inducing advertisement, individuals who were high in NFA rated the video more favorably and were more inclined to perform the recommended behavior in the advertisement. Yet this positive association between NFA and the favorability toward the message was not found in individuals' responses to the neutral advertisement.

Subsequent research extended Maio et al. (2004)'s initial investigation on fear appeal messages to the effects of NFA on individuals' responses to affect-based versus cognitive-based messages. In Haddock, Maio, Arnold, and Huskinson's (2008, Study 2) experiment, participants were randomly assigned to either read a story about an individual's encounter with a fictitious animal named lemphur (i.e., an affect-based message) or to read a message describing a set of positive attributes about lemphurs (i.e., a cognitive-based message). Both messages were designed to induce audiences'

positive attitudes toward lemphurs. The results revealed that individuals' NFA was positively associated with their attitudes toward lemphur after reading affect-based messages but not cognition-based messages.

In sum, the previous findings have revealed an interaction effect between NFA and the message content, especially the emotion-inducing content, on readers' post-message responses. As such, individuals high in NFA will be more receptive to narrative evidence, compared with individuals low in NFA. NFA includes two distinctive dimensions: the motivation to approach emotion (NFA approach) and the motivation to avoid emotion (NFA avoidance) (Miao & Esses, 2001). Nevertheless, early research on NFA did not examine these dimensions separately but rather as the difference between NFA approach and NFA avoidance (e.g., Haddock et al., 2008; Maio & Esses, 2001, Maio, Esses, Arnold, & Olson, 2004). More recently, Bartsch, Appel, and Storch (2010)'s examined these two dimensions of NFA separately and documented that they are functionally distinct from each other. For instance, the NFA approach dimension is directly related to the seeking of strong emotions. However, the explanation of NFA avoidance is vague, and it "can be considered as either as a motive to suppress emotion or as a motive to avoid emotion-eliciting situation in the first place" (Bartsch et al., 2010, p. 173). Their findings showed that NFA approach was associated with more negative responses to a drama or horror film. Based on this finding, the first hypothesis focuses on the approach dimension of NFA and its interaction effect with evidence type on individuals' post-message beliefs toward registering to become an organ donor.

Although the literature indicates that individuals high in NFA approach are more receptive to narrative evidence than individuals low in NFA, no research to date has investigated how NFA interacts with narratives about organ donation. Indeed, narratives about organ donation may induce positive as well as negative emotions (Weber, Martin,

Members of COMM 401, & Corrigan, 2006). Thus, the direction of the interaction effect of narrative evidence and NFA approach on beliefs is unclear. Two competing hypotheses were advanced as follows:

First, people may experience negative emotions, such as fear, sorrow, and grief, when exposure to narratives about organ donation. Such negative emotions may be induced by sad events involved organ donation, such as the death of organ donors. If so, narratives will increase the negative beliefs among people in high NFA approach:

H2a: There is an interaction effect of readers' NFA approach and evidence type on readers' negative beliefs about organ donation such that, among the three evidence conditions (statistical, narrative, and combined), the positive association between negative beliefs and NFA approach will be strongest when narrative evidence is presented.

Alternatively, readers may experience positive emotions, such as sympathy, gratitude, and hope, when reading the stories about an altruistic of organ donor. If so, compare with other two evidence types, narrative evidence will decrease negative beliefs toward organ donation among individuals high in NFA approach:

H2b: There is an interaction effect of readers' NFA approach and evidence type on readers' positive beliefs about organ donation such that, among the three evidence conditions (statistical, narrative, and combined), the negative association between negative beliefs and NFA approach will be strongest when narrative evidence is presented.

On the other hand, although previous research has documented that NFA interacts with emotion-inducing content to affect post-message responses, little research to date has investigated the specific role of NFA avoidance. The current research will also explore how NFA avoidance influences individuals' responses to different

evidence in organ donation messages. Research question 2 (RQ2) is asked as follows:

RQ2: Is there an interaction effect between NFA avoidance and the evidence types in organ donation messages in the readers' beliefs toward registering to become an organ donor?

3.1.4 User-Generated Cues

Message content is not the sole source of persuasiveness, and heuristic cues are also able to influence the effectiveness of a persuasive message (Chaiken, 1980, 1987; Eagly & Chaiken, 1993). With an unprecedented popularity of employing SNSs in health communication campaigns, some heuristic cues attached to messages on SNSs, such as the number of retweets and the number of "likes," have received a lot of attention in the recent research literature.

According to Sundar and Nass (2001), there are several layers of sources for online media: visible sources (individuals who are seen by the audiences to be delivering the content), technological sources (the technological platform on which the content is presented), and receiver-sources (the online audiences or users themselves). For example, a health organization (i.e., the visible source) might disseminate a campaign message on Facebook (i.e., the technological source). Audiences exposed to this message can become receiver sources via sharing, liking, or commenting it. Such layering behavior leaves digital traces and adds user-generated cues to the original messages, such as the number of comments of a tweet received on Twitter and the number of "Reactions" of a post received on Facebook. Thus, in addition to incentive appeals, evidence, or framings, these receiver-source generated cues become another indispensable component of "messages" in SNS health campaigns (Shi et al., 2016). Although few scholars have explored the function of user-generated cues attached to health campaign messages, computer-mediated communication scholars have long

investigated the role of user-generated cues on participatory websites and SNSs in general. Their research has showed that some of these user-generated cues on Web 2.0 websites (e.g., DeAndrea, Van Der Heide, Vendemia, & Vang, 2015) and SNSs (e.g., Tong, Van Der Heide, Langwell, & Walther, 2008) shaped audience member's perceptions and judgments.

For instance, some scholars have examined the effects of user-generated cues attached to customers' reviews in the context of electronic commerce. While such electronic commerce websites are participatory websites, on which the users are not able to create connections among themselves as they are on SNSs, they are still able to generate publicly observable content. Previous research has documented the influences of user-generated content on individuals' perceptions and judgments. For instance, Flanagin, Metzger, Pure, and Markov (2011) found that the average "star" ratings (on a one to five "star" scale) a product received significantly affected individuals' evaluations of product quality. Likewise, Walther and his colleagues (2012) manipulated the ratio of people who think a review is helpful, such as "*3 out of 170 people found the following review helpful*" or "*167 out of 170 people found the following review helpful*." They found that the online shoppers who saw the greater helpfulness rating held a more positive attitude toward the reviewer compared with the shoppers exposed to the lower ratings.

Furthermore, scholars investigated user-generated cues on SNSs and revealed that such cues functioned similarly as those on participatory websites. For example, individuals evaluate the truthfulness or credibility of a tweet based on whether it has been re-tweeted (Morris, Counts, Roseway, Hoff, & Schwarz, 2012). A recent study explored the effects of Facebook pages' popularity on young females' pro-breastfeeding attitudes and future breastfeeding intentions (Jin, Phua, & Lee, 2015). The Facebook

page's popularity was operationalized as the numbers of people who "like", "talk about", and "share" the Facebook page, and people who "like" each comment on the page. For example, on the popular Facebook page, it shows that there were 68,736 people who "like" it, 1,754 people who "talk about" it, and 122 people who "share" it. Each comment on this page received more than 300 "likes." In comparison, the unpopular Facebook page showed no more than ten "likes," "talk about," and "shares", while comments on this page received fewer than five "likes." The experimental results showed that the popular Facebook page resulted in significantly higher levels of perceived trustworthiness, expertise, and information value compared to the unpopular Facebook page, as well as a higher level of wishful identification with breastfeeding women. Thus, in accordance with the findings from the previous research on user-generated cues, Hypothesis 3 (H3) is proposed as follow:

H3: Compared with organ donation messages with small number of user-generated cues, the messages with the higher number of user-generated cues will lead to more favorable beliefs toward registering to become an organ donor.

3.1.5 Method

Participants and Procedures

Approximately one thousand flyers were distributed in three universities in a large city in China to recruit participants. Besides inviting university students and staff to participant the current study, the flyers informed recipients that they may invite their relatives and friends to participate as well. Three hundred and twenty people completed the Web-based experiment hosted on Qualtrics.com and provided valid answers. The incentive for completing the experiment was 20 RMB (3.07 US Dollars), which is paid via an online money transfer service in China. To avoid repeated responses, only one IP address was allowed to participate the experiment once. The participants were

allowed to participate in the study at their own convenience, from wherever they were and through any devices with Internet access they chose. This procedure is considered helpful in enhancing ecological validity for the experiment (Lee & Jang, 2010).

The IRB at Nanyang Technological University approved the questionnaire and the experiment procedure. The study was conducted in mandarin.

When participants accessed the designed website, they were first asked to read the informed consent document. They indicated their consent to participant by checking the box next to the statement “I have read the information described above; and I voluntarily consent to participate in the current study.” They then clicked a button at the bottom of the page labeled “Next move to the online experiment.” Prior to message exposure, participants were asked to rate their agreement on items about NFA approach and NFA avoidance.

The experiment employed a 3×2 (Evidence type [narrative, statistical, combined] $\times$ The number of user-generated cues [small, large]) between-subject design. Participants were randomly assigned to one of the six groups. All stimuli messages were presented on a mock-up Weibo website, which is one of the most popular SNSs in China with 600 million registered users (Smith, 2016) and is often regarded as the equivalent of Twitter in China.

Once the participants clicked the Next button to progress to the next page, they were asked if they have read the message. The data from participants who failed to do so were eliminated from data analyses. Data from 306 participants who read the messages were retained for analyses. The participants reported their belief strength about registering to become an organ donor and basic demographic information after reading the persuasive messages. Among the 306 participants, three hundred and three participants reported their gender, and 196 (64.7%) of them were male. Two hundred

and ninety-five participants reported their age, and their mean age was 24.94 (Range = 19 - 51) with a standard deviation of 5.09.

Stimulus Messages

The content of all messages aimed to encourage readers to become organ donors via improving their favorable belief strength but using different types of evidence. Each evidence type had two different versions of messages to add generalizability. Two statistical evidence messages were created after checking updated statistics about organ donation in China from the Chinese government reports and Chinese mass media. Two narrative evidence messages were fictitious stories about young organ donors. The fictitious stories were created from two news reports about two young organ donors in China. The combined evidence messages included both the statistics about organ donation in China and a short version of the fictitious story. All six messages were written in a manner that each message's length was about the same, regardless of the type of evidence was used (Allen et al., 2000). All stimulus messages are presented in Appendix F.

The number of user-generated cues refer to the numbers of re-tweets, comments, and "Likes" attached to the proprietor organ donation messages presented on SNSs. The messages with a larger number of user-generated cues had 985 occurrences of re-tweets, 816 comments, and 1,268 "Likes." The messages with a smaller number of user-generated cues had two occurrences of re-tweets, one comment, and one "Likes." All messages were presented on a mock-up Weibo website. Furthermore, in the current experiment, all messages were shown as "*it was posted 57 minutes ago*" and were posted by the same Weibo account "*The Website of Organ Donors*," which is a real and verified official Weibo account of the online organ donor registry for the Mainland China (www.savelife.org.cn).

Manipulation Check

Sixty-four participants were recruited in the manipulation check and completed a Web-based experiment hosted on Qualtrics.com. Forty (62.2%) of them were male, and twenty-three (35.9%) of them were female. One participant did not report the gender information. The mean age of the participants was 29.04 with a standard deviation of 6.17. The participants were allowed to participate in the study at their own convenience, from wherever they were and through any devices with Internet access they chose.

The manipulation check employed the same 3×2 (Evidence types [narrative, statistical, combined] $\times$ The number of user-generated cues [large, small]) between-subject design as the main experiment. Participants were randomly assigned to one of the six groups. All stimuli messages were presented on a mock-up Weibo website. They were showed as “*it was posted 57 minutes ago*” and were posted by the same Weibo account “*The Website of Organ Donors.*” After reading the message, they were asked to identify the evidence in the message and assess the popularity and influence of the message.

First, in order to test if two versions of message using the same evidence type are perceived significant different by readers, Fisher’s exact tests were conducted. For Version 1 of the narrative evidence, 11 out of 11 participants answered “yes” for the question “*Does it tell a personal story about a young organ donor?*” For the other version of the narrative evidence, nine out of ten participants correctly identified the story in the message. The Fisher’s exact test revealed a non-significant difference between these two groups, $p = .48$. For the statistical evidence, seven out of eight participants correctly identified the statistics about organ donation in message Version 1, and all six participants correctly identified the statistical information in message

Version 2. The results of Fisher's exact test did not reach significance, $p > .99$. For the combined evidence Version 1, 13 out of 14 participants correctly identified both statistical and narrative information in the message. For the other version of the combined evidence, 14 out of 15 participants correctly identified both statistical and narrative information. The Fisher's exact test revealed a non-significant difference between combined message Version 1 and Version 2, $p > .99$. Thus, participants did not perceive the two versions of messages, which employed the same evidence type, significantly different from each other.

In terms of the number of user-generated cues, thirty-one participants read messages with a small number of user-generated cues and thirty participants read messages with a large number of user-generated cues. The results showed that people who were exposed to large number of user-generated cues perceived the messages as more popular than people who were exposed to small numbers of such cues ($t(62) = -3.45, p = .001, M_{large} = 3.39$, and $M_{small} = 2.63$). Compared with messages with a small numbers of cues, a large number of user-generated cues also resulted in a significant higher level of perception that the Weibo post attracts a lot of attention ($t(55.59) = -4.14, p < .001, M_{large} = 3.61$ and $M_{small} = 2.55$) and the message is a "hot" Weibo post ($t(62) = -2.40, p = .02, M_{large} = 3.18$ and $M_{small} = 2.58$).

Measures

Need for affect (NFA). Maio and Esses's (2001) NFA scale was employed to measure the motivations to avoid and approach emotion. The responses were recorded on a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). The items were translated by the technique of combining back-translation and discussion (Brislin, 1974; Cha, Kim, & Erlen, 2007). Items were translated into Chinese by a Chinese doctoral student who was majoring in communication studies. Subsequently, they were

translated back into English by a Chinese doctoral student who was majoring in English Literature but blind to the original English version. The back-translated version was compared with the original English version, and appropriate adjustments were made to solve the discrepancies through discussion. All items with Chinese translations are listed in Appendix G.

NFA avoidance. Thirteen items were adapted from Maio and Esses's (2001) NFA avoidance scale to measure the participants' motivation to avoid emotion. The example items were "*I do not know how to handle my emotions, so I avoid them,*" and "*I find strong emotions overwhelming and therefore try to avoid them.*" The standardized Cronbach's Alpha of this measure was .78, $M = 3.76$, $SD = 0.81$.

NFA approach. Thirteen items were adapted from Maio and Esses's (2001) NFA approach scale to measure the participants' motivation to approach emotions. The example items were "*I approach situations in which I expect to experience strong emotions,*" and "*I feel that I need to experience strong emotions regularly.*" The standardized Cronbach's Alpha of this measure was .81, $M = 4.64$, $SD = 0.67$.

Beliefs toward registering to become an organ donor. Four dimensions of the belief strength were measured: positive/negative cognitive beliefs and positive/negative affective beliefs toward registering to become an organ donor. The items for each belief were created and tested in chapter 2. All responses for the belief strength were recorded on a 7-point Likert scale (1 = *unlikely* to 7 = *likely*).

Positive cognitive beliefs. Positive cognitive belief statements included three items: *Registering to become an organ donor allows me to carry out my social responsibility*; *Registering to become an organ donor reflects my life values*; and *Registering to become an organ donor enables me to win respect from others*. Participants rated their belief strength for each statement. The standardized Cronbach's

Alpha of this measure was .80, $M = 4.85$, $SD = 1.37$.

Positive affective beliefs. Positive affective belief statements included three items, such as, *Registering to become an organ donor makes me proud* and *Registering to become an organ donor makes me feel honored*. Participants rated their belief strength for each statement. The standardized Cronbach's Alpha of this measure was .88, $M = 4.57$, $SD = 1.57$.

Negative cognitive beliefs. Four items measured negative cognitive belief strength. Example belief statements include *Register to become an organ donor makes me vulnerable to misunderstandings* and *Register to become an organ donor makes me violate traditional Chinese values*. Participants rated their belief strength for each statement. The standardized Cronbach's Alpha of this scale was .70, $M = 3.31$, $SD = 1.35$.

Negative affective beliefs. Three items measured negative affective belief strength. Example belief statements included *Registering to become an organ donor evokes my fear* and *Registering to become an organ donor makes me uneasy*. Participants rated their belief strength for each statement. The standardized Cronbach's Alpha of this scale was .88, $M = 3.86$, $SD = 1.69$.

CFA was conducted for the beliefs toward registering to become an organ donor, using data from 306 valid responses and with MLM estimation. The CFA results showed that the model of four-dimension beliefs was acceptable: CFI = .94, TLI = .92, RMSEA = .073, SRMR = .058, $\chi^2 = 155.19$, $df = 59$, $\chi^2/df = 2.63$.

The correlation matrix of all continuous variables is presented in Table 3.1.

Data Analytical Design

Given that high correlations (e.g., $r = .80$ between positive cognitive and

affective beliefs) exist among four dependent variables, including more than one dependent variable in one General Linear Model (GLM) has little advantage over analyzing the variables separately (Dattalo, 2013; French, Macedo, Poulsen, Waterson, & Yu, 2008). Thus, in the current study, the data were analyzed using a set of GLMs that treat each dependent variable separately. The four dependent variables include positive cognitive/affective beliefs as well as negative cognitive/affective beliefs. Each model includes two categorical independent variables: *evidence type* [statistical, narrative, and combined] and *the numbers of cues* [large versus small], two continuous independent variables: *NFA approach* and *NFA avoidance*, and two interaction terms: *evidence type* $\times$ *NFA approach* and *evidence type* $\times$ *NFA avoidance*.

3.1.6 Results

H1 predicted that narrative evidence will lead to the lowest level of negative cognitive beliefs on organ donor among all three types of evidence. The results showed that evidence type significantly impacted the participants' negative cognitive beliefs, $F(2, 296) = 3.57, p = .03, \eta^2 = .02$. The estimated means of negative cognitive beliefs for statistical, combined, and narrative evidence were 3.60 ($SE = 0.14$), 3.24 ($SE = 0.13$), and 3.15 ($SE = 0.13$) respectively. The LSD post-hoc analysis showed that reading statistical messages resulted in a significantly higher level of negative cognitive beliefs than reading narrative messages, $M_{\text{difference}} = 0.45, SE = 0.19, p = .02$. Further, the difference between statistical and combined messages was approaching to significance, $M_{\text{difference}} = 0.36, SE = 0.19, p = .06$. Yet, combined evidence and narrative evidence did not result in a significant difference in the levels of the negative cognitive beliefs on organ donation, $M_{\text{difference}} = 0.09, SE = 0.18, p = .61$. Thus, the data were partially consistent with H1.

Furthermore, RQ1 asked the directed effects of evidence type on other three

types of beliefs about organ donation. The results showed that the statistical evidence led to the highest level of negative affective beliefs among three evidence groups (see Table 3.2), but the differences did reach to a significant level. In addition, the participants who read messages with combined evidence reported the highest level of positive cognitive as well as affective beliefs among the three evidence groups. However, these results did not reach a significant level either. Thus, the evidence type led to significant differences only in negative cognitive beliefs regarding organ donation. In detail, statistical messages resulted in the highest level of negative cognitive beliefs among three evidence types, and such beliefs after reading narrative and combined messages were not significantly different from each other.

H2 advanced a group of competing hypotheses on the interaction effect between evidence type and NFA approach on the beliefs with opposite directions of the interaction effect. The GLMs' result revealed an approaching significant interaction effect between evidence type and NFA approach on negative cognitive beliefs, $F(2, 296) = 2.92, p = .055, \eta^2 = .02$, but not for other three types of beliefs. When narrative evidence was presented, the level of NFA approach was positively and significantly associated with the level of negative cognitive beliefs, $r = .32, p = .057$. Yet such association did not exist when two other types of evidence were presented: $r = -.06, p = .77$ for statistical evidence, and $r = -.24, p = .29$ for combined evidence. A further analysis was conducted to detect the differences between the slopes for different evidence types. The results showed that the difference between the slopes for narrative evidence and combined evidence was significant, $F(1, 296) = 4.84, p = .03$, and the difference between narrative and statistical evidence was approaching significant, $F(1, 296) = 3.58, p = .059$. The NFA approach slope for statistical and combined evidence was not significant from each other, $F(1, 296) = 0.14, p = .71$. Thus, the data were

consistent with H2a and inconsistent with H2b. As presented in Figure 3.1, the increase in the negative cognitive beliefs per unit of NFA approach under the condition of narrative evidence was significantly larger than the change under the conditions of statistical and combined evidence.

RQ2 asked if there is an interaction effect between the other dimension of NFA, NFA avoidance, and evidence type on the readers' beliefs. The results showed that NFA avoidance did not significantly interact with evidence type: $F(2, 296) = 1.61, p = .20$ for negative cognitive beliefs, $F(2, 296) = 0.30, p = .74$ for negative affective beliefs, $F(2, 296) = 1.06, p = .35$ for positive affective beliefs, and $F(2, 296) = 1.14, p = .32$ for positive cognitive beliefs.

H3 predicted an effect of the number of user-generated cues on the beliefs toward registering to become an organ donor, such that large numbers of cues will result in more favorable beliefs. The GLM results revealed that the effect of the number of user-generated cues was not significant for any type of beliefs regarding organ donation: $F(1, 296) = 0.55, p = .46$ for negative cognitive beliefs, $F(1, 296) = 0.20, p = .66$ for negative affective beliefs, $F(1, 296) = 1.84, p = .18$ for positive affective beliefs, and $F(1, 296) = 0.76, p = .39$ for positive cognitive beliefs, and. Thus, the data were inconsistent with H3.

3.1.7 Discussion

The current study extends the previous research on evidence type in organ donation messages (e.g., Feeley et al., 2006; Kopfman et al., 1998) by changing the dependent variables to the audiences' beliefs regarding organ donation and also adding a second factor, the number of user-generated cues, in the experiment. Moreover, the beliefs toward registering to become an organ donor in the current study include four distinctive dimensions: positive cognitive/affective beliefs and negative

cognitive/affective beliefs. Such practice allows investigation of the effects of evidence type in a nuanced fashion. The findings show that exposure to statistical messages result in a significantly higher level of negative cognitive beliefs than exposure to narrative and combined messages. In addition, when narratives are presented, individual's NFA approach is positively associated with the level of negative cognitive beliefs. Yet such association does not exist when two other types of evidence (i.e., statistical and combined) are presented. On the other hand, the number of user-generated cues attached to the message were found not to shape the audiences' beliefs regarding organ-donor registration behavior. Such findings have some theoretical as well as practical implications in terms of tailoring persuasive messages for organ donation promotions.

Major Findings and Implications

Evidence type and NFA. First, the current study examines how evidence type in organ donation promotion messages affects readers' beliefs toward registering to become an organ donor, which consist of four distinctive dimensions. The findings show that statistical messages induce the highest level of negative cognitive beliefs among the three types of evidence: statistical, narrative, and combined. Furthermore, introducing narrative content to the messages, whether using combined evidence or narrative evidence, results in a significantly lower level of negative cognitive beliefs. Such results are consistent with previous findings that narrative messages are effective in reducing defensive reactions (e.g., Kim & Niederdeppe, 2015).

To understand better the individual differences in receptiveness to evidence forms in organ donation messages, the current study examines the motivations to approach and avoid emotion that affect to what extent individuals are receptive to narratives. The findings reveal that although the main effect of the evidence type shows a clear advantage of narrative information, it has a boomerang effect. When narratives

are presented, readers' NFA approach will increase their negative cognitive beliefs about organ donation. However, such positive association does not exist under statistical or combined evidence condition.

Such a positive association between NFA approach and negative beliefs on organ donation could be explained by the content of the narratives. In the current study, narrative messages included stories portraying organ donors' death, which may induce predominantly negative emotions among the readers, especially the readers high in NFA approach. Indeed, a previous study (Maio & Esses, 2001) has examined the association between NFA and individuals' responses to death. The findings showed that individuals high in NFA reported a higher number of emotions and beliefs concerning the death of Princess Diana, compared with individuals low in NFA. Furthermore, high NFA individuals were more likely to report negative responses than low NFA individuals. In the current study, individuals high in NFA could be touched by and immersed in the predominantly negative emotions induced by the narrative organ donation messages portraying death. As a result, a higher level of NFA approach leads to a larger amount of negative cognitive beliefs when individuals are exposed to the narratives. On the contrary, statistical messages or combined messages involve none or less negative emotions and are thus not significantly related to individuals' NFA approach.

In terms of NFA avoidance, it does not interact with evidence type to affect organ donation beliefs. It is possible that for the people with a high level of NFA avoidance, who represent a passive willingness to engage emotional content, intent do avoid the topic of organ donation in general regardless of the types of evidence presented. In fact, a post-hoc analysis shows that the level of NFA avoidance is positively associated with negative cognitive beliefs, $F(1, 296) = 5.58, p = .019, \eta^2 = .02$ and positively associated with negative affective beliefs, $F(1, 296) = 8.82, p = .003,$

$$\eta^2 = .03.$$

Moreover, the current findings show that negative cognitive beliefs about organ donation are the only type of beliefs influenced by the persuasive messages. One possible reason is that other types of beliefs might be more resistant to the current persuasive messages. For example, certain beliefs regarding organ donation may serve an ego-defensive function or an anxiety-buffering function when people face the threat of their inevitable mortality (Greenberg & Arndt, 2012; Katz, 1960; Pyszczynski et al., 1997), which might be more resistant to persuasion. It is worthwhile for future research to investigate how to change these beliefs toward registering to become an organ donor using some “techniques that are both more subtle and indirect than traditional procedures” (Lapinski & Boster, 2001, p. 332).

User-Generated Cues. The present study explores the effects of user-generated cues attached to persuasive organ donation messages as well. The analyses reveal that the numbers (large vs. small) of these cues do not significantly affect readers’ beliefs. However, the manipulation check shows that large numbers of cues result in significantly higher levels of perceived popularity and influence of the messages compared with the messages with small numbers of cues. Such differences are also consistent with previous findings in computer-mediated communication research. A question that arises, then, is why did the numbers of attached user-generated cues shape perceptions, but not behavioral beliefs regarding organ donation? One reason could be the asymmetries between individuals’ self- and other-perception (Davison, 1983). For instance, people see others, rather than themselves, are more susceptible to a persuasive communication on mass media (Davison, 1983). It is reasonable that individuals may also see the messages with a large number of user-generated cues are influential and persuasive to others, thus rating the messages as popular and influential. Yet, their own

behavioral beliefs are actually not subject to such user-generated cues.

In fact, Lee and Jang (2010) documented the discrepancy between the effects of user-generated cues on other- and self-perception. They explored the effects of approval ratings about a news article on audience' perceived public opinion and personal opinion. The approval ratings, including the proportion of approval versus disapproval votes from previous readers, were presented along with the news article on a Web 2.0 news website. This proportion of approval ratings is functionally similar to the number of user-generated cues, both of which present aggregate statistics of readers' reactions to the message content. Lee and Jang's (2010) results show that, for those who are high in need for cognition (i.e., more likely to engage in analytical thinking), the approval ratings significantly affected their estimated news influence on others about the focal issue. However, when it comes to reporting the readers' personal opinions on the focal issue (i.e., attitudes), the approval ratings did not affect audiences' judgment, regardless of their level of the need for cognition. Thus, this evidence, coupled with the findings from the current study, underlines that although the number of user-generated cues can affect individuals' perceptions about the influence and persuasiveness of a SNS campaign message (to others), it may not be powerful enough to affect individuals' personal behavioral beliefs or attitudes toward a certain issue. This explanation warrants further examinations in future research.

Limitations

Five limitations have to be acknowledged. First, the effect sizes in the current findings are small. Yet such effects come from exposing the participants to a single and short persuasive message outside of the controlled laboratory environment. And the small effect sizes are consistent with the previous findings in Kopfman et al. (1998) and Feeley et al. (2006) as well. In practice, health communication practitioners may

increase the length of the messages or employ repeated exposures to a series of messages during an organ donation campaign. Second, the current study examines the effects of the numbers, but not the content of user-generated information. However, in a SNS health campaign, the content or valance of the comments to the campaign messages might be also, if not more, influential to the subsequent readers' beliefs or attitudes. Future research may investigate the effects of other user-generated content in SNS on individuals' beliefs about registering as organ donors. Third, adapted from the messages used in previous research (Feeley et al., 2006; Kopfman et al., 1998), the valance of emotion in the current narrative messages are mainly negative: they are stories about people who lost his/her life because of diseases or accidents and donated his/her organs to others. Thus, the current findings may not be generalized to other types of narratives. For example, narratives used for organ donation campaigns could also tell a story depicting a person received an organ donation after a long waiting period. Contrary to what have been tested in the current study, this type of narratives introduces mainly positive emotions, which may result in different effects in readers' beliefs or attitudes. Further research is needed to examine the different types of narrative evidence in promoting organ donation. Fourth, attitude is the only outcome variable measured in the current study. Yet, some other variables may also be subjective to narratives evidence. For example, narrative persuasion has been documented as effective in improving self-efficacy (Slater & Rouner, 2002). Beside focusing on attitude, future research should investigate how evidence types affect other antecedents of donor registration behavior, such as efficacy and perceived norms. Last, the current study examines the direct effects of evidence type and its interaction effect with NFA on readers' beliefs toward organ donation, but not its persuasive mechanisms. Pervious research has shown that narrative (versus statistical) messages affect attitudes through

identification (e.g., de Graaf, Hoeken, Sanders, & Beentjes, 2012) and transportation (e.g., Green, Brock, & Kaufman, 2004). It would be beneficial if future organ donation studies adopt this approach and examine how evidence type affects people's beliefs, attitudes, or behavioral intentions relevant to organ donation.

CHAPTER 4

EXTENDING THE ASPECTS OF ATTITUDES

Study 1 through Study 3 have focused on four theoretical aspects of attitudes toward registering to become an organ donor: positive cognitive/affective and negative cognitive/affective attitudes. Such aspects of attitudes are developed from a theoretical framework – the reasoned action perspective. Although this approach is based on a solid theoretical background, it may ignore some other existing inventories of attitudes toward organ donation. To mitigate this limitation, Study 4, described in the current chapter, utilizes a qualitative method to gain a richer and more complex understanding of the attitudes in the domain of organ donation.

The present chapter focuses on the content of organ donation messages posted on Weibo and aims to validate and extend the inventory of beliefs about becoming an organ donor in a SNS context. To achieve this objective, it uses a directed content analysis to examine all organ donation messages presented on Weibo during calendar year 2015 and categorizes the beliefs regarding organ donation that emerged from the messages.

4.1 Study 4

4.1.1 Social Networking Sites and Organ Donation Messages

In accordance with boyd and Ellison (2008), social networking sites (SNSs) refer to “web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system” (p. 211). SNSs, such as Facebook and Twitter, have become a major source of public health information (Fox & Jones, 2009; Vance et al., 2009). They also provide a platform on which individuals may discuss a wide range of

health topics. In China, research has shown that 42% of Chinese Internet users report that they are interested in health and medical information online (China Internet Network Information Center [CINIC], 2014). Moreover, some Chinese also discuss health-related topics with peers on Chinese SNSs, such as Weibo (e.g., Shi & Chen, 2014).

Organ donation is one of the health topics discussed on participatory websites and SNSs. Videos on YouTube have covered kidney, liver, and heart donations as well as the organ donation registration process. Some viewers have favorably rated such videos and commented on them (Tian, 2010). Similarly, Facebook users have discussed kidney donation, and such information has been used to identify potential kidney donors (Chang et al., 2013). Such research shows that examining organ donation messages on SNSs is a way of understanding beliefs and opinions about organ donation, which may assist the future promotion of organ donation on SNSs.

4.1.2 Behavioral Beliefs about Organ Donation on SNSs

Although a SNS may contain various types of organ donation messages (e.g., Tian, 2010), one type of message is especially worth investigating because of its potential for predicting organ donation behavior: messages discussing behavioral beliefs about being an organ donor. According to Ajzen and his colleagues (Ajzen, 2013; Ajzen & Driver, 1991), behavioral beliefs are individuals' perceived outcomes of performing the behavior, including costs and benefits, as well as pleasant and unpleasant feelings. The combination of the strength and evaluation of such behavioral beliefs constitutes an individual's attitudes toward a behavior, which is a critical predictor of the subsequent behavior (Fishbein & Ajzen, 1975; Ajzen 1985). Hence, examining behavioral beliefs about being organ donors presented on SNSs can facilitate understanding of what consequences of being an organ donor are expected and

discussed. Addressing such behavioral beliefs in future SNS campaigns may effectively improve organ donation intention and behavior. Thus, the current study investigates messages about beliefs toward being an organ donor presented on Weibo, the most popular SNS in China. Research question 1 (RQ1) is advanced as follows:

RQ1: What types of beliefs toward being an organ donor exist on Weibo?

4.1.3 Method

Study Site and Data Collection

Weibo. In China, the government has blocked a number of global SNSs, such as Twitter and Facebook. As a result, some Chinese alternative SNSs have flourished. Weibo is a Twitter-like microblogging service site launched in 2009, which has become one of the most popular SNSs in China with 600 million registered users (Smith, 2016). The number of monthly active users and daily active users is approximately 261 million and 120 million respectively (Weibo Corporation, 2016). Previous research has shown that people share and discuss a large amount of health related messages on Weibo (Qi & Song, 2012; Shi & Chen, 2014).

Data collection. Messages about organ donation were collected from Weibo. In detail, the present study used the built-in Weibo main search function to retrieve all messages about organ donation posted from January 1st, 2015 to December 31st, 2015. The searching key words included “donation/donating/donated (捐)” and the names of organs and tissues listed on the Chinese organ donor registration application, including: (1) organ/organs (器官), (2) body/bodies (遗体), (3) kidney/kidneys (肾), (4) liver/livers (肝), (5) heart/hearts (心脏), (6) lung/lungs (肺), (7) pancreas (胰腺), (8) small intestines (小肠), and (9) cornea (眼角膜). This approach generated nine groups of combined keywords, such as “donation/donating/donated (捐)” and “organ/organs (器官).”

If a Weibo message only retweets a message about organ donation without any additional add-on information or comments, the Weibo research results will disregard this retweet but include the initial post. Python Web Crawler was employed to extract all available searching results on January 10th, 2016. The data contained 7,465 Weibo posts including its content, sender's Weibo username, posting time, and the numbers of retweets, comments, and "likes" the message received as of January 10th, 2016. The profile information of all senders of the 7,465 messages was extracted using Python as well.

Noise Reduction

In order to eliminate irrelevant messages, a preliminary quantitative content analysis was first performed, which treated the unit of analysis as a single Weibo post. The Weibo posts were coded into two categories: (i) relevant, which discusses organ donors, organ recipients, organ donation systems, or organ donation policy and ethics; (ii) irrelevant, which discusses issues not relevant to above-mentioned organ donation topics. An example of the irrelevant messages could be Weibo users discussing donating money for people who suffer from certain diseases, such as heart and lung diseases. For instance, one user posted "I donated some money for the little girl in our community who suffered from congenital heart defect." Given this the post contains "donated" and "heart", the message was retrieved, yet it is not relevant to organ donation.

Using the above coding scheme, two coders, who are native Chinese speakers, independently coded 10.04% ($n = 750$) of the posts to establish reliability (Cohen, 1960). The 750 messages were randomly chosen from the data. Cohen's (1960) kappa for this round of coding was 0.92. The discrepancy was then resolved, and the coding rules were established (via discussion) to avoid ambiguities in word meanings, category definitions, and coding instructions. Finally, all 7,465 posts were split in half and

separately coded by the two coders. As a result, 6,701 messages (89.77%) were coded as organ donation messages, and 764 messages (10.23%) were irrelevant.

Directed Qualitative Content Analysis

Next, a directed qualitative content analysis (Hsieh & Shannon, 2005) was conducted to answer RQ1, which asks about the types of organ donation beliefs that are presented on Weibo. Compared with quantitative content analysis, qualitative content analysis goes beyond counting words from texts to “examine meanings, themes, and patterns that may be manifest or latent in a particular text” (Zhang & Wildemuth, 2009, p. 308). Specifically, the directed qualitative content analysis employs a deductive logic (Mayring, 2000) and starts its initial coding with a theory or relevant research findings to validate or extend a conceptual framework (Zhang & Wildemuth, 2009). The objective of the current study is to validate and extend an initial inventory of beliefs toward being an organ donor in a SNS context. The initial conceptual framework developed in Study 1 consists of four theoretical dimensions of beliefs about becoming an organ donor: positive cognitive beliefs, positive affective beliefs, negative cognitive beliefs, and negative affective beliefs. However, any of these four beliefs may coexist. Thus, the initial coding scheme of the current analysis includes five categories of behavioral beliefs: positive cognitive/affective beliefs, negative cognitive/affective beliefs, and multi-dimensional beliefs.

The unit of analysis is a single Weibo post. The data were analyzed according to the following steps. First, the current author read all posts relevant to organ donations and highlighted the posts that discussed beliefs about being an organ donor (Hsieh & Shannon, 2005). Subsequently, the current author coded the highlighted posts into initial codes that were predetermined according to existing categories of beliefs toward registering to become an organ donor, which is developed in Study 1. Additional

categories were added to accommodate messages that did not fit the initial categories (Hsieh & Shannon, 2005). In addition, the content that has been coded into each main category was compared to create subcategories with further analysis to build a broader understanding of the main categories (Hsieh & Shannon, 2005).

Ethical Issues

In terms of ethical issues, Weibo is considered as a publicly available SNS, on which data are freely accessible to everyone. In this study, no consent forms were sent to the Weibo users who published messages about organ donation during year 2015. To minimize the potential harm to participants, the current study ensures their confidentiality by the following means. First, the anonymity of all the people who posted on Weibo was maintained throughout the study. Specifically, the usernames of all users were replaced with pseudonyms. Furthermore, all the messages published in this manuscript have been paraphrased to avoid the identification or matching of specific users by reference to the original messages, which can be traced through the Internet (Snee, 2008).

4.1.4 Results

Descriptive Analysis

In 2015, 6,071 messages about organ donation were posted on Weibo. There were on average 558 messages ($SD = 191$ messages) per month or 126 messages ($SD = 56$ messages) per week. The monthly and weekly frequencies of organ donation posts on Weibo are presented in Figure 4.1 and 4.2. The number of comments about the organ donation messages received ranged from 0 to 47,035. However, 90% of the messages received ten or fewer comments. Although the number of likes ranged from 0 to 67,279, only 10% of the organ donation messages received 38 or more likes. Similarly, the number of retweets ranged from 0 to 47,313, and 90% of the messages received 15 or

fewer times of retweets. The distributions of comments, likes, and retweets were highly skewed, in that a small portion of the organ donation messages received a large amount of comments, likes, and retweets (see Figure 4.3, 4.4, and 4.5).

The data show that 5,541 unique Weibo users posted these 6,071 organ donation messages on Weibo during calendar year 2015. Python Web Crawler extracted all existing accounts among them as of April 2016 that including 5,445 users. The other 96 non-existing Weibo accounts have been deleted either by themselves or by Weibo corporation. Among the 5,445 existing users, there were 777 (14.3%) verified organizational accounts and 64 (0.9%) verified individual accounts. There were also 49 medical-related accounts, which included hospitals and physicians. In terms of the geographical location, the 5,445 users were from all 31 provinces and municipalities in China ($n = 4,523$, 83.1%), Hong Kong Special Administrative Region (SAR) ($n = 75$, 1.4%) and Macau SAR of China ($n = 8$, 0.1%), as well as Taiwan ($n = 35$, 0.6%) and other countries ($n = 222$, 4.1%). The largest number of users came from Beijing ($n = 548$, 10.1%), the municipality with the highest Internet penetration rate in China (CINIC, 2016).

Beliefs Regarding Organ Donation – General-Population Donors

RQ1 asks what types of beliefs toward being an organ donor are presented on Weibo. The directed qualitative content analysis shows that the beliefs are different dependent on who is the (perceived) organ donor: general population, or condemned prisoners.

In terms of general-population donors, the messages on Weibo fit into the five predetermined categories from Study 1. As well, two additional categories emerged from the analysis: utilitarian beliefs and ambivalent beliefs. These main categories and their subcategories are reported below.

Positive cognitive beliefs. Weibo users post messages about perceived benefits of being an organ donor to the donor himself/herself. A series of subcategories were created under the main category of positive cognitive beliefs, which include “prolonging life,” “enhancing life meaning,” and “leaving a trace in the world.”

Facet 1: Prolonging life. People believed that the donors’ lives continue after their death if their organs are donated and transplanted to others. The organ recipients will live with the donors’ organs, which is regarded as a mean to keep the donor (or a part of the donor) alive. For example, one media account on Weibo wrote:

“In Wuxi city, a 7-year old little girl named Xiao Yun (Pseudonym), who was declared brain death at 4 AM on January 10th, donated her heart, liver, kidney, and cornea. Her farther, Mr. Qing, said that, ‘we hope Xiao Yun’s organs can help other children, and, to me, it seems Xiao Yun’s life continues in the hereafter’.”

Several messages posted via individual accounts also shared this perspective, for example one user wrote:

“Watching TV with my mom now. It tells a story about a little girl who lost her life because of brain cancer. Her parents donated her heart and cornea and believed this will prolong their daughter’s life. Oh, my God! It’s so touching, I can’t help myself crying.”

Similarly, a potential organ donor wrote:

“... I have thought about this seriously. Of course, I’m not cursing myself by saying this. I’d like to sign an organ donor application and to donate my cornea and heart. If I die, my eyes can still see the world for me, and my heart continues to beat in another body and to experience life.”

Facet 2: Enhancing life meaning. Enhancing the meaning of the donor's life is another benefit Weibo users perceived from organ donation and shared. An organ donor dedicates himself or herself to helping others who suffer from diseases, thus contributing to society. For example, one message illustrates this perspective:

“At the noon of May 6th, a teenager named Tian Che died after several days of coma at a hospital in Hebei province. His parents followed his will and donated his organs to six patients who need organ transplants ... His love makes his life valuable and meaningful. ... Let's show our respect to all donors!”

Another user who claimed to be a registered organ donor posted:

“Today, I officially registered as an organ donor online. I heard that my organs could save at most twelve people's lives. Wow, I think I did something meaningful today.”

Facet 3: Leaving a trace. This subcategory refers to the belief that being an organ donor helps the donor to leave a trace of their being behind. First, the organs the donors donated are seen as “traces” they left in the world. For instance, one user wrote:

“If I die, I would like to donate my cornea, heart, liver, and kidney. After that, please cremate my body. It is my will. I would like to leave some traces in the world and then go away from it.”

In addition, the “trace” is also seen as a metaphor for the spiritual existence of the donor. People believed that donating organs shows the donor's good will, and such behavior makes the donor a memorable person or even an eternal being. For instance, one message reflected this point:

“A 24-year old young lady, Xie Pei, has been suffered from colon cancer since 2013. Although she has been through surgeries, cancer has

spread to other parts of her body. ... Recently, she signed the organ donor application. She said that, 'If I my organs help others, they will be a trace of my life throughout eternity'."

In sum, all the three subcategories show that the perceived rewards of being an organ donor are symbolical or spiritual, rather than substantive. Such perceived rewards could be the motivations for individuals to register as an organ donor as well.

Positive affective beliefs. Besides seeing benefits, Weibo users also expect pleasant emotions as a consequence of organ donation. Two subcategories were created under the main inventory of positive affective beliefs, which includes “experiencing happiness” and “experiencing pride.”

Facet 1: Experiencing happiness. The analysis shows that being an organ donor would make the donor happy. Furthermore, people believe such happiness extent beyond death to the afterlife. For example, one user wrote:

“I just heard from my dad that my uncle donated all his organs after his death. I was ten years ago. I was so touched when I heard it. My uncle is a Christian. I think he must be happy in heaven now.”

Another post states:

“A 39-year-old man, Yang Huaiyuan, was declared brain death after a car accident. ... The organs he donated can save at least seven people. ‘He is a kind person, and I believe he will be happy because that he saved others’ lives [through organ donation],’ one of his family members said.”

Facet 2: Experiencing pride. In addition to happiness, pride is another pleasant feeling that people perceived as a consequence of organ donation. First, people presume

that it is an emotion a donor will or should experience. In one case, a user discussed a romantic Chinese movie released in 2015. In that movie, a young woman anonymously donates one of her kidneys to a man. After watching the movie, the user posted:

“... The true love will eventually come ... The woman who donated her kidney anonymously will be blessed and also should be proud of herself.”

As well, several messages on Weibo showed that the donor’s family members would experience the same pride the donor feel. There are two examples as follows. One user posted:

“I chit-chatted with my mom one day. I told her that I would like to donate my body for research purpose or donate my organs for transplantation in the future. I actually expected a disagreement from her, but she told me that she would like to do the same. It did surprise me! I am so proud of her. And I know that she is proud of me too.”

Another message posted via a media account states that:

“A young man, Xiao Lin (Pseudonym), who was declared brain death donated his organs on January 30th. ... He suffered a sudden stroke on January 26th and was treated in the emergency room at Min Dong Hospital for five days. However, it still tragically left him brain dead. His wife said, ‘his organs will save others’ lives ... our kid will be proud of his farther when he is grown up’.”

The analysis shows that happiness and pride are two major pleasant feelings people expected for being an organ donor. Furthermore, people believe that not only the organ donor, but also his or her significant others would be proud of the donor’s generous choice.

Negative cognitive beliefs. Negative cognitive beliefs are perceived costs of being an organ donor. Two major costs that emerged from the data: “compromising body integrity” and “violating filial piety”.

Facet 1: Compromising body integrity. Compromising body integrity is a major cost people expected from being an organ donor. One user wrote that:

“... I am totally fine with blood donation. But I definitely do not accept organ donation! If I do, I will die without an intact body. ...”

Some people expressed that organ donors are miserable because they cannot preserve body integrity. This is based on the idea that donors may suffer before or after death, because their bodies need to be cut-up for organ procurement.

One user posted his or her opinion on a news story a father gave consent to donate his son’s organs on the death of this little boy. The user’s post states:

“At the end of the boy’s life, his little body was cut-up. ... Just because of his father’s idea, this little boy had to suffer from such a torture. I hate this story. Isn’t this father mad?”

Additionally, several other messages expressed why they see losing body integrity is critical cost of donating organs. For instance, one message maintains that:

“Only poor people donate their organs. That is so miserable! Dying without an intact body will prevent their reincarnation! I don’t think rich people will do this.”

Facet 2: Violating filial piety. Another perceived cost of being an organ donor is violating filial piety. Filial piety (or *Xiao*) is the center of Confucius’ moral system, which requires people to comply with their parents’ will and to win prestige for them (Chiu & Hong, 2006). One belief attached with filial piety is that one’s body is a gift from parents, and, as such, a person cannot intentionally hurt his or her body without

permission from his or her parents (Hebert et al., 2010). As Confucius once said, “We received our body, hair, and skin from our parents and dare not harm them – This is the beginning of filial piety” (Chen, 1908). And this idea influences how Chinese people view organ donation.

A number of Weibo users express that it is deciding to become an organ donor is an irresponsible action because it violates the fundamental principle of filial piety. As well, they believe that it will be difficult, if not impossible, to obtain parental consent for such an action. There are two example messages. One user wrote:

“... You would like to donate your kidney. Have you ever asked your parents if they agree? You received your body, hair, and skin from your parents, but now you want to donate your kidney to others?! ... Thinking about having a child like you ... how sad your parents will be.”

Another user posted:

“I might donate my organs after my death but only if my parents do not strongly disagree with this idea ...”

In general, compromising body integrity and violating filial piety are two perceived costs of being an organ donor. People believe that compromising body integrity may bring pain or affect reincarnation. In addition, for some Chinese people, being an organ donor is irresponsible to one’s parents and may violate the traditional Chinese value about filial piety. Family consent seems indispensable for people who hold such a belief to register as organ donors.

Negative affective beliefs. The analysis shows that in terms of unpleasant feelings of being an organ donor, fear is the predominant emotion people perceived and discussed on Weibo. People express their fear about being an organ donor as follows. One user posted:

“I am so uncertain about my future and what it will bring. ... Maybe I can donate my organs and then leave the world. ... But I am scared, scared, scared ...”

Two other persons shared the similar feelings:

“I would like to donate my cornea after my death. I hope it will help others to see the world since they have not had such a chance. ... But I would like to keep my other organs in my body, because I am still frightened ...”

“Talked with friends about posthumous organ donation today. It seems fine for me to donate cornea or other organs, but the idea of whole body donation for research scares me. I heard that it will be very painful, if the body is cut into pieces, even it is after death.”

Multi-dimensional beliefs. Although some Weibo messages only mention one single type of beliefs about being an organ donor, some other posts indicated that people hold multiple beliefs simultaneously. For example, one message presents positive cognitive and affective beliefs as well as negative affective beliefs:

“I would like to donate my organs after my death. Well, I am a little bit scared, but maybe this will save other people lives ... I will contribute to society and be become a valuable person ... I will be very happy in my afterlife ...”

Another person expressed his/her perceived benefits and costs of being an organ donor:

“... I have thought about donating my organs ... It will prevent me to keep an intact body after my death. Well, thinking about my organs

which can keep alive in someone else's body and save his/her live. It seems pretty good, isn't it?"

Besides the five predetermined themes: positive cognitive/affective beliefs, negative cognitive/affective beliefs, and multi-dimensional beliefs, two other themes emerged from the analysis of organ donation messages on Weibo, including utilitarian beliefs and uncertain beliefs.

Utilitarian beliefs. While some people may be emotionally attached to their organs or body, others are more intent to hold a utilitarian perspective that considers organs as goods or resources. Thus, to these people, organ donation is only a process of recycle, reuse, or exchange.

Facet 1: Recycling resources. A number of messages express an idea that organs are resources that should be reused. In general, these people prefer to recycle their organs through donating them to others who are in need. They also consider the cremation of potentially useful organs as a huge waste. For instance, one message reflects this opinion:

"Donate my organs if I die ... If not, they will just become ashes.

What a waste."

Likewise, another user posted that:

"Watched a TV drama this afternoon. It mentioned about organ donation. ... If I have the chance, I will donate upon my death. I don't think that I'm a great person or I am embracing universal love or etc. ... I just think that wasting such organs is wrong."

Facet 2: Exchanging for compensation. Similarly, some other people see human organs as reusable resources too. However, these people expect monetary or non-monetary rewards for being an organ donor, even though the national organ

donation system in China adopts a voluntary and non-remunerated principle. Take the following post as an example:

“... I have racked up large amounts of debt. Now, my family suffers. I am so guilt and feel helpless. I would like to donate one of my kidneys, but I hope this can be compensable, which will help me support my family ...”

Beside monetary reimbursements, some non-monetary compensation was also anticipated. For instance, the following message shows that the person wants to gain some medical resources by being an organ donor:

“Mr. Wang Chunyi, who is a migrant worker, has worked for 16 years in Beijing. Recently, he was found to have lung cancer. He is alone and has no family. Mr. Wang decided to donate his body after his death, but he also expected hospitals can return his favor by offering him end-of-life care free.”

Uncertain beliefs. Although some people hold certain specific ideas about being an organ donor, some others are uncertain about the consequences of being an organ donor. Some people are wondering if anything supernatural would occur, thus becoming hesitant toward becoming an organ donor. A message states:

“Will anything weird happen if a person donates his or her heart to others upon his or her death?”

Another user posted a similar enquiry about donating cornea:

“In today’s class, I was thinking about donating my cornea in the future. ... But one question occurred to me: will the person who receives my cornea be able to see what I have seen before? ... ”

In sum, analyzing organ donation messages on Weibo reveals that, when organ donors are general public, positive cognitive/affective as well as negative cognitive/affective outcomes are expected. In addition, several types of these beliefs may be simultaneously mentioned in one Weibo post. This is consistent with the predetermined categories of beliefs about becoming an organ donor developed in Study 1. Furthermore, two additional categories of beliefs are emerged from the data: utilitarian beliefs and uncertain beliefs.

Beliefs Regarding Organ Donation – Condemned Prisoner Donors

In addition to general public, prisoners on the death row are considered as citizens who may voluntarily become organ donors as well, according to China's national organ donation regulations (Huang et al., 2015). Weibo users have also discussed their beliefs about this type of donors. Nevertheless, such behavioral beliefs are different from those for general-population organ donors.

In year 2015, some news, that condemned prisoners were willing to become organ donors, stimulated discussions about prison organ donors on Weibo. The analysis reveals that all messages about prison organ donors fit into two types of predetermined categories: positive and negative cognitive beliefs. No perceived pleasant or unpleasant feelings about prison organ donors are emerged from the data.

Positive cognitive beliefs. Some people see donating organs as the last chance for a condemned prisoner to dedicate him/herself to good things. It appeared from the data that people hold two types of positive cognitive beliefs about prison organ donors: atoning for a crime and counter balancing the negative impression.

Facet 1: Atoning for a crime. Given that some people think prisoners are vile, they believe being an organ donor is a chance for prisoners to compensate for their

crime. For instance, one user posted his or her comment about a potential prison organ donor:

“He wants to donate his body ... I think his sin could be expiated by this.”

Another person wrote:

“Donating his body ... It’s actually an opportunity the society offers him to atone his crime.”

Facet 2: Counter balancing negative impressions. In the Chinese society, if a person commits a crime, the person and his or her family will be humiliated and socially suffered (Bedford & Hwang, 2003). However, people think being an organ donor is something good the criminal could do to counter-balance such negative impressions. For example, one user posted:

“He is a wise person to express such willingness [donating his body] to media. After his death, he may make some good impressions on others...”

Moreover, some people think that such a benefit not only goes to the criminal himself or herself, but also to his or her family. For instance, one user expressed:

“It is good for him to be an organ donor. At least, it may give him a chance to regain face for his family. ...”

These subcategories show that, to some extent, people see becoming a posthumous organ donor is rewarding for condemned prisoners. It may help them atone their crimes or counterbalance the negative impression left by committing a crime. Furthermore, such an action may also serve to overcome the humiliation the prison donors’ family has been suffered because of the criminal record.

Negative cognitive beliefs. On the other hand, two major perceived negative outcomes are present on Weibo for prison organ donors. One cost is for the donor himself or herself: “compromising body integrity.” The other one is for the whole society: “transmitting evil.”

Facet 1: Compromising body integrity. Some people see compromising body integrity as a cost for prisoner donors. Yet, they believe such a cost is deserved and fair. For example, people believe that being an organ donor could serve as a punishment for committing certain felonies, such as murder and child abduction. They believe that death penalty is not severe enough for such criminals and becoming a posthumous (or living) organ donor who dies with a damaged body should be the final insult to them or their bodies. One message expresses such perspective:

“... For those who abducted and sold children, death penalty is too light. An eye for an eye and a tooth for a tooth. They committed such a crime, [the court] should require them to donate all their organs before death ...”

Another message presents the similar beliefs:

“Today’s morning news talked about the crazy driver who deliberately hit several people. My dad said such person deserves more than death penalty, and [the society] should take his all usable organs ...”

Facet 2: Transmitting evil. On the other hand, some people do not perceive any cost to the prison organ donors themselves, but consider “transmitting evil” as the predominated cost for the organ recipients or the society. These people see prisoners as “evil” or as possessing “genes” for criminal behavior. The organs from condemned

criminals are considered able to transmit evil to their organ recipients. One message stated that:

“No matter who receives his organs will become evil.”

Another user posted:

“Who dare to receive your organs? Your cornea will turn the recipients to killers just like you ... Your liver will poison the recipients to death ...”

Thus, for prison organ donors, only messages about positive and negative cognitive beliefs exist on Weibo. Such benefits and costs both go beyond the donor him/herself to his/her family or the whole society. No messages discuss pleasant or unpleasant feelings as perceived outcomes for this type of donors.

4.1.5 Discussion

This study analyzes the messages about organ donation presented on Weibo during calendar year 2015 by a directed qualitative content analysis. It not only provides supporting evidence for the categories of beliefs created in Study 1 in a SNS context, but also extends this inventory of behavioral beliefs regarding organ donation. The analysis reveals that people’s beliefs toward being an organ donor are different depending on who is the (perceived) donor: general population, or prisoners on the death row.

For general-population donor, people perceive costs, rewards, and pleasant as well as unpleasant feelings as the outcomes for becoming an organ donor. Various types of beliefs may simultaneously present in a single Weibo post as well. In addition, the current investigation extends the investigation from convenience samples to an analysis on more than 6,000 posts about organ

donation on Weibo from various types of users. This analysis provides supporting evidence for the theoretical framework created in Study 1 in a SNS context. Moreover, the subcategories developed for each dimension provide a profound understanding each type of beliefs. The detail and specific perceived outcomes describing in subcategories, such as prolonging life and experiencing happy, could be addressed in future campaign messages to promote organ donation for Chinese citizens.

In addition, other two types of behavioral beliefs about organ donation, not included in the predetermined categories, are presented on Weibo: uncertain and utilitarian beliefs. The uncertain beliefs come from suspicions about supernatural consequences of organ donation. Such concerns have been documented in previous research on spiritual beliefs about organ donation in United States, China, and other Asian countries (Bresnahan et al., 2010; Bresnahan et al., 2007a). For example, some items in Bresnahan et al.'s (2007a) scale on spiritual beliefs about organ donation ask people if it is wrong to donate their organs to someone else because it causes a spiritual change in the recipients' body, or if donating organs will disturb their dying process.

Furthermore, the current findings show that no religions are co-mentioned with the ambivalence about donating organs in Weibo posts, even though religions induced similar uncertainties among some other populations (e.g., Lam & McCullough, 2000; Shih et al., 2001). Molzahn and colleagues (2005) have speculated the possible role of religions in forming spiritual suspicions among Canadian Chinese. However, their interviewees said that "It is kind of a Chinese culture, not religion," and "It is superstitious" (Molzahn et al., 2005). Indeed, China's ruling party since 1949, the Chinese Communist

Party, is officially atheist, and has imposed its basic worldview – Marxist atheistic materialism – on every child from kindergarten up to university in mainland China (Lambert, 2001). Thus, it is possible that the Chinese’s uncertain beliefs about being an organ donor stem from the traditional Chinese cultural or some superstitions, rather than religions. Yet this speculation needs further examinations.

The other newly created category is utilitarian beliefs. First, the Weibo posts show that some people consider donating organs as recycling resources. Such beliefs have been documented in other countries as well, such as United Kingdom (Richardson & Hurwitz, 1995) and Australia (Neate, Marck, & Skinner, 2015). For instance, some respondents in Richardson and Hurwitz’s (1995) study believe that the dead body is organic waste or rubbish and see the donation as a form of recycling. Some campaign messages, such as “recycle yourself” (Joralemon, 1995), have also addressed this type of beliefs to promote organ donation. However, health communication scholars seldom draw attention to this “recycling” belief about organ donation. Little research in the field of health communication to date has investigated the determinants of registering to become an organ donor among the population who hold such beliefs.

The other subcategory of utilitarian beliefs pertains to expecting monetary or non-monetary compensation for donating organs. Although this type of beliefs seems to be another type of perceived reward (i.e., positive cognitive beliefs) for being an organ donor, such rewards literally cannot be redeemed under the voluntary and non-remunerated organ donation system in China. Yet, it is possible that some Chinese people are not familiar with the

newly launched national organ donation system, thus expecting remunerations. The history of organ transplant commercialism in China may also induce such beliefs that organ donors may exchange their organs for financial reimbursements. Health communication practitioners may provide more information and knowledge about the current Chinese organ donation system to their audiences who hold this type of utilitarian beliefs.

Besides general-population donors, condemned prisoners are another type of donors discussed on Weibo during calendar year 2015. In fact, according to the Chinese government, from January 2015, all hospitals has stopped using organs from executed prisoners, and the civilian organ donation has become the sole source for organ transplant in China (Huang et al., 2015). However, the current Chinese organ donation system redefines capital prisoners as citizens with the right to voluntarily become organ donors (which been widely criticized and considered unethical) (Torsten, Shari, Singh, Khalpey, & Caplan, 2015). Hence, in 2015, several stories about voluntary prisoner organ donors captured by news headlines have triggered discussions about prison donors on Weibo. Form analyzing the Weibo posts, two major types of beliefs emerge: positive and negative cognitive beliefs.

With regard to perceived rewards, first, some people see that becoming an organ donor is a chance for criminals to atone their crime. Some scholars suggested that such viewpoint is generally acceptable in the Chinese society and “fulfill the ‘eye for eye’ and ‘blow for blow’ principle of justice” (Huang et al., 2015, p. 420). As well, some proponents in academia for executed prisoner donors also believe that as long as prisoners are giving informed consent, becoming organ donors allows prisoners to atone their crimes (Lin, Rich, Pal, &

Sade, 2012). Additionally, some Weibo posts show that people consider being an organ donor may counterbalance some negative impressions the condemned prisoner brought to himself/herself and his/her family. In Chinese culture, behavior that seriously infracts moral code of society may lead to “losing face” for ego (Hu, 1944), which includes the individual as well as his/her family members (Bedford & Hwang, 2003; Markus & Kitayama, 1991). Thus, people see committing a crime as humiliating the person and his/her family. They believe that devoting oneself to good, such as becoming an organ donor, may help the person regain the lost face (i.e., change negative impressions).

On the other hand, people discussed about costs for prison organ donors as well. Similar to the beliefs about general public, people consider compromising body integrity as the cost to the prison donors. However, people think that such condemned prisoners deserve an incomplete body, which usually had a symbolic meaning of a “bad death” in ancient China (Lee, 1996). This is the reason why some people may see being an organ donor is a punishment that more severely than death penalty for criminals committed to felonies. The other type of costs people perceived is that prison organ donors may transmit “evil” to the organ recipients through organ transplant, therefore opposing to the use of organs from executed prisoners. It is worth mentioning that although the possible coercion, and violation of human rights and transplant ethics are major reasons for against prison donors (Danovitch et al., 2011; Lin et al., 2012), these concerns are rarely presented with discussions on prison organ donors posted on Weibo.

In sum, to some extent, the behavioral beliefs for prison donors are distinctive from those for the general population. For general population donors,

people feel great empathy with them and see them as their ingroup. Yet, people treat condemned prisoner donors as their outgroups, dehumanized them, and rarely have emotional responses toward their donating behavior. Some people view such prisoners as “having denied themselves the right to make choices on their own” (Vasiljevic & Viki, 2014), thus believing that it is fair to require them to be an organ donor. In addition, some other Weibo users think that criminals should be expelled from the human moral circle and be severely punished for what they have done (Vasiljevic & Viki, 2014): harvesting their organs and damaging their body is the final and most severe punishment for them.

Nevertheless, these two sets of beliefs toward different donors share two commonalities. First, people see the failure of keeping body integrity as one major cost of organ donation. Some believe that organ donors suffer because of organ procurement process and feel sorry for them. Others worry that donating organs may inhibit reincarnation or create a handicap in one’s afterlife. Although it is a cost for both general-population and prisoner donors, the cost is interpreted as more deserved and fair to prisoner donors than to members of the general public. For prison donors, people are more likely to see the incomplete body as a symbol of “bad death” (Lee, 1996), and to believe that the prisoners deserved such punishment. The second common point is that certain perceived outcomes relate to not only the donor self, but also his/her family members. It reflects the interdependent view of self in Chinese culture, in which people see “self” as a broad concept including the individual as well as others in his/her social relationship, such as his/her family members (Markus & Kitayama, 1991). For example, the analysis of posts on Weibo reveals that the donor’s close relatives are perceived to be as honored and as proud as the donor him/herself.

As well, the responsibilities as well as the consequences for the crime extend beyond the single individual who perpetrated the crime (Bedford & Hwang, 2003). The individual's parents will be blamed for not teaching their child better and suffer socially for the crimes of the offspring (Bedford & Hwang, 2003). As a result, a prison donor is considered able to regain face for himself or herself and also for his or her parents through his/her becoming an organ donor. These two perspectives about being an organ donor stemming from Chinese culture may provide some insights for future organ donation promotions for Chinese audience.

Limitations

Two limitations need to be acknowledged. First, the current analysis focuses only on beliefs toward being an organ donor. Some other content in the organ donation messages on Weibo may also worth investigation by health communication scholars, such as how mass media influence people's discussions about organ donation on SNSs. Second, the current study explores the inventories of beliefs and attitudes toward organ donation presented on Weibo, which in particular focuses on the content of organ donation messages on Weibo. Yet, beside presenting content, SNSs embodies social relations and enables a broad disseminating of information. Future research may investigate the sharing network of such messages and examine opinion leadership on organ donation on SNSs. Identifying the characteristics of potential opinion leaders will be instrumental in designing SNS organ donation campaigns.

CHAPTER 5

EXAMINING THE OPINION LEADERSHIP FOR ORGAN DONATION:

WHO IS INFLUENCING OTHERS' ATTITUDES?

This chapter breaks a new ground by conducting an exploratory study to investigate the opinion leadership about organ donation on Weibo using social network analysis. It identifies potential opinion leaders on Weibo who may be recruited in SNS organ donation campaigns to affect others' attitudes toward organ donation and act as role models. Study 5, described in the current chapter, focuses on a small subset of the dataset of Study 4: the organ donation messages whose number of retweets ranked in the top three percentiles out of all 6,701 messages ($n = 206$). It analyses the completed sharing network of these 206 organ donation messages and examines the opinion leadership in this network using social network analysis and general linear model (GLM).

5.1 Study 5

5.1.1 Opinion Leadership on Social Networking Sites

The classical two-step flow of communication hypothesis suggests that opinion leaders are individuals who directly receive information from mass media and, in turn, pass on what they know to their every-day associates through interpersonal communication (Katz, 1957; Katz & Lazarsfeld, 1955). While this definition concerns opinion leaders' access to information via mass media, the subsequent definitions of "opinion leaders" are focused on the extent of influence they exert on others. Rogers and Cartano (1962) state, "opinion leaders are defined as those individuals from whom others seek advice and information" (p. 435). Valente and Pumpuang (2007) extend such influence from "seek advice and information" to a more general impact on "the opinions, attitudes, beliefs, motivations, and behaviors of others" (p. 881).

Recent research has discussed how opinion leadership on SNSs may differ from its classical definition, given that SNSs have offered individual users great access to information and enabled them to share information to mass audiences (boyd & Ellison, 2008). It seems that the opinion leaders' privilege in accessing and disseminating information, which is suggested by the "two-step flow" hypothesis, no longer exists in the context of SNSs. Thus, opinion leadership online, especially on SNSs, may not rest on the ability to access or disseminate information, but "the ability to influence information flow" (Xu, Sang, Blasiola, & Park, 2014, p. 1280). Further, opinion leaders on SNSs not only contribute to information flow and receive attentions, but also lead others to disseminate information in order to maximize their influence (Xu et al., 2014).

Moreover, besides the "two step flow" process (Katz & Lazarsfeld, 1955), other models of information dissemination, including direct one-step and complex network flows, also exist on SNSs (Hilbert, Vasquez, Halpern, Valenzuela, & Arriagada, 2016; Park, 2013). A recent analysis of communication flows on Twitter reveals that general Twitter accounts directly receive information from traditional media and official accounts as well as indirectly from intermediating amplifiers, who are individual or organizational users with public authority or or public visibility (Hilbert et al., 2016). Meanwhile, the information dissemination on Twitter also follows a network step-flow that refers to a co-existing of one-step flow, two-step flow, and a multi-step, back-and-forth flow of communication among media and official accounts, general Twitter accounts, and amplifiers (Hilbert et al., 2016). Thus, under such complex model of information dissemination on Twitter, influential users emerge from a local part as well as the overall communication network (Hilbert et al., 2016).

In fact, the above-mentioned, unique features of opinion leadership on SNSs have been reflected in Bodendorf and Kaiser's (2009) recent conceptualization of online

opinion leadership, which consists of two dimensions: local and global. Although both dimensions involve the ability of influencing and controlling information flow, they are slightly different from each other. Local opinion leadership refers to the influence in a direct but limited environment, for example, a direct influence on one's neighbors. Alternatively, global opinion leadership refers to the influence on indirect others during the information exchange. For instance, this could be an ability to control the overall information flow in a whole network. In general, such local as well as global opinion leaders on SNSs function crucially for the implementation of successful health promotion and intervention in the online communities (Valente, 2010).

5.1.2 The Role of Opinion Leaders in SNS Health Campaigns

Opinion leaders may be change agents during a health campaign (Valente & Pumpuang, 2007), thus assisting the implementation of behavior change efforts. For example, they can legitimize the behavior change program, convey the health messages, and act as role models for behavior change (Valente & Pumpuang, 2007). These roles of opinion leaders in SNS health promotions have been documented in some recent research. For instance, Ko, Hsieh, Wang, Lee, and Chen (2013) trained 369 gay opinion leaders to lead discussion on a HIV-prevention Facebook page. The results showed that the individuals who participated the intervention Facebook community were more likely to discuss HIV issues with others than those who visited the control website without trained peer leaders.

SNSs are becoming popular platforms for organ donation interventions and campaigns as well. Scholars and public health professionals have employed Facebook and other SNSs to promote positive attitudes toward organ donation and to encourage online registration among young people (e.g., D'Alessandro,

Peltier, & Dahl, 2012; Smith et al., 2016; Stefanone, Anker, Evans, & Feeley, 2012). In particular, Stefanone et al. (2012) recruited peer leaders to endorse organ donation on SNSs and employed challenge campaigns. They reported an increase in request of organ donor cards and donor registrations among college students at the end of the campaign. Such empirical evidence indicates that opinion leader interventions could encourage organ-donor registration behavior in SNS communities. Yet little research to date has identified opinion leaders on organ donation topic in a SNS context. Furthermore, while the advantages of introducing opinion leaders to SNS health campaigns have been well documented, a substantial variation in how opinion leadership is measured has been reported in the literature. The next section draws on the previous work on the methods of measuring opinion leadership and discusses the indicators of opinion leadership on SNSs.

5.1.3 The Indicators of Opinion Leadership on SNSs

In 1962, Rogers and Cartano summarized three main methods of measuring opinion leadership: sociometric technique, key informants, and self-designating (Rogers & Cartano, 1962). In a more recent review article, Valente and Pumpuang (2007) created a thorough inventory of opinion leader identification methods including ten selecting methods through analyzing 191 studies that employed opinion leaders for promoting behavior change. Among these ten means, they considered sociometric as “the most valid and reliable” method of identifying opinion leaders (Valente & Pumpuang, 2007, p. 888). In a separate program, Weimann, Tustin, van Vuuren, and Joubert (2007) also summarized six measures of opinion leadership and claimed that sociometric is “more precise than self-designating method” (p. 178).

In detail, the sociometric technique requires interviewing all members of a social system and asking them whom they turn to for advice and information about a topic. A small number of members who received frequent nominations will be selected as opinion leaders (Rogers & Cartano, 1962; Valente & Pumpuang, 2007). Furthermore, this sociometric method is able to capture not only the direct flows of information, but also a completed network of information dissemination and exchange. If individual i goes to j for information about a certain topic, there will be a connection between i and j with a direction from i to j . Within this network, several network metrics can be calculated to delineate the structural position a member has secured. For example, indegree centrality calculates the number of incoming ties an individual received (Borgatti, Everett, & Johnson, 2013). Betweenness centrality measures how often a node falls along the shortest path between two other nodes, which is an indicator of a gatekeeper role for information dissemination within the network (Freeman, 1979).

Among all network metrics, scholars have used in-degree centrality most frequently to measure opinion leadership when employing the sociometric technique (Valente, 2010). As early as 1947, Stewart defined the influentials in a city as people who received the most nominations (i.e., indegree) from others (Stewart, 1947). The subsequent sociometric studies also well documented the positive relationships between in-degree centrality and self-reported as well as other-identified opinion leadership in offline and online environments (e.g., Bodendorf & Kaiser, 2009; Kratzer & Lettl, 2009; Lee, Cotte, & Noseworthy, 2010). In a retweet network on SNSs, indegree represents the number of direct ties an actor receives from its neighbors, and an actor with a large number of indegree is prominent or has high prestige (Hanneman & Riddle, 2005). Hence, this indegree centrality is a good indicator of one's local opinion leadership (Bodendorf & Kaiser, 2009). Yet this metric does not measure an actor's indirect

connections in the network. In order to capture such indirect influence (i.e., global opinion leadership), Bodendorf and Kaiser (2009) proposed two other network metric indicators: closeness centrality and betweenness centrality.

Closeness is the sum of shortest distances from an actor to all other actors in the network (Freeman, 1979), and the normalized version of closeness is divided into $n - 1$ (n is the number of all actors in the network) (Borgatti et al., 2013). In a directed network, this closeness can be calculated for sending (i.e., out-closeness) and receiving (i.e., in-closeness) (Hanneman & Riddle, 2005). In a retweet network of information on SNSs, an actor with a high in-closeness score secures a position with a short distance through retweet ties from most others. It also means that the information posted by such actors will spread to a random actor via retweet ties speedily. Alternatively, betweenness measures how often an actor falls along the shortest path between two other actors in the network (Freeman, 1979). Actors with high betweenness play gatekeeper roles in network that can control the flows of information and facilitate information dissemination beyond the boundaries of local groups (Burt, 1992, 2000, 2002). With regard to retweet networks, high betweenness actors are intermediaries to efficiently disseminate information to others via retweet ties, therefore facilitating the spread of information within the whole network.

Based on the above review of opinion leadership and social network literature, the current study adopted the measure from Bodendorf and Kaiser (2009) that employs three sociometric indicators for opinion leadership in a retweet network: indegree for local opinion leadership, and in-closeness and betweenness for global opinion leadership.

5.1.4 The Predictors of SNS Opinion Leadership

In addition to the indicators of opinion leadership, scholars have also long investigated the factors associated with such leadership. In 1957, Katz's classical article on opinion leaders proposed three sets of predictors of such personal influence: (1) one's personal attributes (who one is); (2) one's competence (what one knows); and (3) one's social position (whom one knows). The current research will examine how these three sets of factors are associated with opinion leadership for the organ donation topic on a Chinese SNS.

Personal Attributes

Three personal attributes of users were examined in the current study, which were one's activeness and verification status on the SNS and the degree of information communication technology (ICT) development in the user's geographic location.

Activeness. Sociability is the first factor related to leadership in offline and online contexts (Huffaker, 2010). Individuals who engage in more communication activities can more easily obtain information and build relationships (Rice, 1987), thus having more potential to extend their reach to and influence others (Weimann, 1994). A number of studies on opinion leaders found that they socialize often with others and actively involve social events (Weimann, 1994). Such association between activeness and influence has been well documented in the SNS context as well. Research has found that one's activeness on SNSs was positively associated with the number of retweets his or her posts received (Zhang, Peng, Zhang, Wang, & Zhu, 2014) and the probability of building a communication tie with others (Shi, Wang, Peng, & Chen, 2016). Hence, Hypothesis 1 (H1) is proposed as follows:

H1: A user's activeness on a SNS will be positively associated with his or her (a) local and (b) global opinion leadership for organ donation on SNSs.

Verification. On SNSs, some users' accounts include a verified badge on their profile that shows the authenticity of their identities as key individuals or organizations (Twitter, 2016). Previous research has stated that the verification badge indicates a user's credibility (Zhang et al., 2014) or eliteness (Grabowicz, Babaei, Kulshrestha, & Weber, 2016) on the SNS. For example, Zhang et al. (2014) claimed that verified accounts were perceived to be more credible than unverified accounts and found that messages posted via verified accounts attracted a larger number of retweets than did the messages posted via unverified accounts. Thus, having a verified badge on one's profile on SNSs may lead to more influence on the SNS platform. Hypothesis 2 (H2) is thus advanced as follows:

H2: Compared with unverified users, verified users will show more (a) local or (b) global opinion leadership for organ donation on SNSs.

ICT development in one's location. Besides being associated with one's activeness and identification on the SNS platform, the opinion leadership in the cyberspace may be subject to certain external environmental factors as well, such as the opportunities to access information communication technologies (ICTs) (Wang, Shi, Chen, & Peng, 2016). The opportunities of accessing and utilizing ICTs in one's geographic location are tightly associated with one's ability to develop and maintain social relationships online (DiMaggio, Hargittai, & Neuman, 2001; Eastin & LaRose, 2000). Indeed, Lyons and Henderson (2005) revealed that one's computer skill and Internet self-efficacy are positively associated with his or her opinion leadership in a computer-mediated environment. Moreover, a recent study on users' influence in SNS communities has found that, within a Weibo community about HIV/AIDS, the users coming from the areas with well-developed ICTs secured more influential positions in their follower-following network, compared with those who come from areas with

underdeveloped ICTs (Wang et al., 2016). Thus, it is reasonable to expect a positive effect of the level of ICT development in one's location on his or her influence on the organ donation topic in virtual communities. Hypothesis 3 (H3) is advanced as follows:

H3: The degree of ICT development in a user's location will be positively associated with his or her (a) local and (b) global opinion leadership for organ donation on SNSs.

Competence

One's expertise or knowledge about a social issue has long been regarded as a critical contributor to one's stature as an opinion leader on the topic (Katz, 1957; Weimann, 1994). The research on product diffusion has found that opinion leaders are more knowledgeable about the product class than non-leaders, and such individuals who are superior in professional knowledge are also more likely to become opinion leaders in computer-mediated environments as well (Lyons & Henderson, 2005). In terms of organ donation, medical knowledge is critical in improving the willingness of donation and reducing refusal from potential donors' relatives (Lima et al., 2010). Therefore, individuals with medical knowledge may be considered credible and authoritative in terms of offering information and advices about organ donation. Such individuals may also exhibit more opinion leadership for organ donation topic on SNSs, which is illustrated in Hypothesis 4 (H4):

H4: Users with a medical-focused profile on SNSs will have more (a) local and (b) global opinion leadership organ donation on than others without medical-focused profiles.

Social Positions

SNS users not only integrate their offline social relationships into a cyber network, but also develop new online social ties on SNSs (boyd & Ellison, 2008). In a

network of social relationships on SNSs, a user disseminates information directly to his or her followers. Meanwhile, the user him/herself is exposed to the information his or her connections send out. Having a large number of followers enables a user to disseminate information efficiently, while a large number of followings provides the user with a broad source of information. Indeed, previous research has showed that individuals who are well connected on SNSs are more influential than others in the virtual environment (Park, 2013). Thus, users with numerous followers and followings obtain a well-connected location and are influential in the SNS network. For example, Zhang et al. (2014) found that one's number of followers was positively associated with the number of retweets and comments one's post received. Hence, Hypothesis 5 (H5) and Hypothesis 6 (H6) predict positive effects of the number of followers as well as followings on the opinion leadership:

H5: The number of followers a user has will be positively associated with his or her (a) local and (b) global opinion leadership for the organ donation topic on SNSs.

H6: The number of followings a user has will be positively associated with his or her (a) local and (b) global opinion leadership for organ donation on SNSs.

5.1.5 Method

Sample

The popular organ donation messages were defined as the organ donation messages whose number of retweets ranked in the top three percentiles out of all 6,701 messages posted on Weibo during calendar year 2015. The total number of such popular organ donation messages was 206.

The retweet network of the 206 popular organ donation messages was extracted using Python Web Crawler in April, 2016, resulting with a retweet network with 505,047 unique Weibo users. Next, Python Web Crawler was employed to extract the

profile information of the Weibo users who received at least one retweet from others in the retweet network. Among the 505,047 nodes, 44,074 of them received at least one retweet. The Python Web Crawler extracted all existing accounts among them as of April 2016, which included 43,510 users. The other 564 non-existing Weibo accounts have been deleted either by themselves or by Weibo corporation. The information about these users' profiles included the account's username, verification status, self-introduction, self-reported location and gender, as well as his/her the numbers of followers, followings, and posts on Weibo.

Constructing the Retweet Network

I constructed the retweet network for the popular organ donation messages. The retweet network was constructed in such a way that if user i retweets the post of member j , then i was connected to j . The direction of the tie was from i to j and with a weight which equals the number of times that i retweets posts from j . Thus, the retweet network is a directed, weighted network. I constructed and analyzed the retweet networks using the igraph computer program (Csardi & Nepusz, 2006) in R.

Measures

Opinion leadership. Based on the literature review, the current study measures an individual's opinion leadership via three indicators, including his/her indegree, incloseness, and betweenness in the retweet network. The indegree ranged from 1 to 59,061 with a mean of 12.51 ($SD = 515.32$). The incloseness ranged from $3.92e-12$ to $6.20e-12$ with a mean of $3.95e-12$ ($SD = 1.17e-13$). The betweenness ranged from 0 to 58,442,335.20 with a mean of 80,485.50 ($SD = 939,107.11$).

Activeness. The measurement of users' activeness on Weibo was adapted from Zhang et al. (2014), which used the total number of messages a user has posted as the

indicator. Among the 43,510 users, the number of posts ranged from 0 to 677,495 with a mean of 11,170.01 ($SD = 16,617.82$).

Verification. If a user has a verified badge in his or her profile on Weibo, this account is regarded as a verified account. It is a dichotomous variable: *verified* = 1 and *unverified* = 0. There were 4,158 (9.6%) verified accounts and 39,352 (90.4%) unverified individual accounts.

Location. The users were from all 31 provinces and municipalities in China ($n = 34,640$, 79.3%), Hong Kong SAR ($n = 240$, 0.6%) and Macau SAR ($n = 42$, 0.1%) of China, as well as Taiwan ($n = 120$, 0.3%) and other countries ($n = 3,492$, 8%). 27.4% of the users came from three large cities in China: Beijing ($n = 4,556$, 10.5%), Guangdong ($n = 3,927$, 9.0%), and Shanghai ($n = 3,434$, 7.9%). 4,961 users' location information was missing, because they did not report their location or report "others" as their geographic location information in the profile.

In order to examine the influence of location on users' opinion leadership in the retweet network on Weibo, the current study coded location as a continuous variable according to its degree of ICT development. According to the China's ICT Development Index (Song, Liu, Ma, & Dunford, 2013) and the Internet Coaching Library's (2016) digital access index (DAI) for all countries in the world, the location was coded into a continuous variable from 1 to 6 such as a higher value represents a better degree of ICT development. This continuous variable had a mean of 3.83 ($SD = 1.29$).

Medical-focused. Adapted from Harris, Moreland-Russell, Tabak, Ruhr, and Maier (2014), if a user has a medical-focused profile (e.g., it is a hospital or physician account), it was coded as 1. If not, it was coded as 0. There were 84 (0.2%) medical-focused accounts among the 43,510 users.

The number of followers. The number of followers is listed in users' profiles. The number of followers was ranged from 0 to 50,563,948 with a mean of 38,801.45 ($SD = 827,423.30$).

The number of followings. The number of followings is listed in users' profiles. The number of followers was ranged from 1 to 5,832 with a mean of 543.84 ($SD = 545.83$).

Gender. Gender reported in one's Weibo profile is included in the data analysis as a control variable. It is coded as a dichotomous variable: male = 1 and female = 0. There were 43,128 accounts reported their gender including 11,520 males (26.5%) and 31,608 females (72.6%). Gender information from 382 (0.9%) accounts was missing.

The correlation matrix among all continuous variables is presented in Table 5.1.

Analytical Design

The associations between the opinion leadership and the predictors were analyzed using General Linear Model (GLM). Given that all three dependent variables (indegree, incloseness, and betweenness) are indicators of opinion leadership on SNSs, the GLM was employed to consider the correlation among dependent variables (Bray & Maxwell, 1985). Given that the highly skewed distributions of indegree, incloseness, betweenness, as well as the numbers of posted messages, followers, and followings, these six variables were square-root transformed to meet the assumptions of GLM.

5.1.6 Results

Mapping the Retweet Network of Popular Organ Donation Messages

The 206 popular organ donation messages on Weibo were posted via 96 unique accounts. Figure 5.1 presents the monthly frequency of popular organ donation posts. Among these 96 Weibo accounts, 78 (81.3%) were verified accounts including 44 organization accounts and 34 individual accounts. The remaining 18 are unverified

individual accounts. The 96 Weibo accounts also include two medical-focused accounts. In total, the 206 posts received 606,631 retweets, 295,828 comments, and 1,070,364 “likes” as of April 2016.

The retweet network of popular organ donation message is a connected network including 505,047 nodes and 545,312 edges. The length of the maximum distance between nodes (i.e., diameter) of this network is 100, and the average of the distances between all the nodes in the network is 24.12. In this retweeting network, every user is on average 24.12 steps away from everyone else in the network. The network has a low density of 0.000002: only 0.0002% of possible edges between all the nodes are connected in this network. The values of reciprocity and clustering coefficient of this network are extremely low as well, which are 0.0016 and 0.000003 respectively. The low values of density, reciprocity, and clustering coefficient indicate a sparse network. In addition, *centralization* measures if some nodes send or receive a disproportionate number of links. For this retweeting network, indegree centralization is 0.1169, and outdegree centralization 0.00017. It shows that, in general, there is no clear tendency that the retweeting links are disproportionately distributed to a small group of users. Yet, compared with outdegree, the indegree (i.e., the receiving of retweets) is more disproportionately distributed among the users in the network. All the network-level statistics indicate that this retweeting network is a sparse and decentralized network. Table 5.2 summarizes these network-level statistics.

The number of retweets received (i.e., indegree) ranged from zero to 59,061, and the number of retweets sent out (i.e., outdegree) ranged from zero to 86. On the average, each node sent and received 1.08 times of retweets. However, only 44,074 nodes (8.73%) within the network received at least one retweet, the rest of them (91.27%, $n = 460,973$) did not receive any retweets from others. The distribution of

indegree within this retweet network is highly skewed (see Figure 5.2). Figure 5.3 visualizes this retweet network with nodes whose indegree is equal or larger than 50.

The Predictors of Opinion Leadership

The GLM results are reported in Table 5.3. The results showed that all predictors accounted for 34.4% of variance in indegree, 5.2% of variance in incloseness, and 4.2% variance of betweenness. Personal attributes, professional knowledge, and network positions significantly affected the number retweets one node received (i.e., local opinion leadership). Nevertheless, in terms of global opinion leadership, only personal attributes and network positions were significant predictors. Professional knowledge did not significantly affect this type of opinion leadership.

Personal attributes. H1 predicted a positive effect of users' activeness on Weibo on (a) local and (b) global opinion leadership on the organ donation topic. The analysis revealed that the number of messages one posted on Weibo was significantly and positively associated with one's local opinion leadership ($B = 0.001$, $s.e. = 0.0003$, $t = 3.98$, $p < .001$) as well as global opinion leadership ($B = 0.000000000006$, $s.e. = 0.0000000000003$, $t = 22.29$, $p < .001$ for incloseness and $B = 0.89$, $s.e. = 0.03$, $t = 35.74$, $p < .001$ for betweenness) within the retweet network. Hence, the data were consistent with H1a and H1b.

H2 proposed that, compared with an unverified user, a verified one will show more (a) local as well as (b) global opinion leadership within the retweet network about organ donation. Yet the results showed an opposite direction of effect. The unverified users exhibited significantly more local opinion leadership than verified users within the retweet network, $B = -0.33$, $s.e. = 0.05$, $t = -6.44$, $p < .001$. With regard to the global opinion leadership, they obtained a significantly higher value of betweenness than verified users, $B = -17.36$, $s.e. = 4.98$, $t = -3.45$, $p < .001$. The results of the other

indicator, incloseness, did not reach significance, $B = -0.0000000007$, $s.e. = 0.0000000005$, $t = 1.47$, $p = .14$. Hence, the unverified users showed significantly more opinion leadership than did verified users, and the data were inconsistent with H2a and H2b.

H3 predicted positive effects of the ICT development level in users' location on his or her (a) local and (b) global opinion leadership in the retweet network of organ donation message. The results showed that level of ICT development was not significantly associated with local opinion leadership ($B = 0.02$, $s.e. = 0.01$, $t = 1.66$, $p = .10$). However, it was positively associated with two global opinion leadership indicators: incloseness, $B = 0.0000000005$, $s.e. = 0.0000000001$, $t = 4.36$, $p < .001$, and betweenness, $B = 3.72$, $s.e. = 1.05$, $t = 3.56$, $p < .001$. Thus, the data were inconsistent with H3a, but consistent with H3b.

Competence. H4 made predictions about the effects of professional, medical knowledge on (a) local and (b) global opinion leadership in the retweet network of organ donation messages. The results showed that medical-focused users significantly exhibited more local opinion leadership than other users, $B = 1.14$, $s.e. = 0.30$, $t = 3.74$, $p < .001$. Yet such effect on global opinion leadership did not reach significance: $B = 0.0000000001$, $s.e. = 0.0000000003$, $t = 0.37$, $p = 0.71$ for incloseness, and $B = -8.02$, $s.e. = 29.35$, $t = 0.27$, $p = .79$ for betweenness. Thus, the data were consistent with H4a, but inconsistent with H4b.

Social location. H5 and H6 considered the effects of the social positions on Weibo on one's opinion leadership on the organ donation topic. H5 predicted a positive effect of the number of followers on (a) local and (b) global opinion leadership. The results showed that users with a higher number of followers were more likely to exhibit more local as well as global opinion leadership in retweet network about organ

donation: $B = 0.01$, $s.e. = 0.00008$, $t = 134.00$, $p < .001$ for indegree, $B = 0.000000000002$, $s.e. = 0.00000000000008$, $t = 25.37$, $p < .001$ for incloseness, and $B = 0.02$, $s.e. = 0.007$, $t = 2.49$, $p = .01$ for betweenness. Hence, the data were consistent with H5a as well as H5b.

H6 anticipated a positive effect of the number of followings on (a) local and (b) global opinion leadership. The analysis revealed that users with a higher number of followings showed more global opinion leadership: $B = 0.00000000002$, $s.e. = 0.000000000002$, $t = 9.24$, $p < .001$ for incloseness, and $B = 0.34$, $s.e. = 0.16$, $t = 2.20$, $p = .03$ for betweenness. Yet it did not significantly affect local opinion leadership, $B = -0.003$, $s.e. = 0.002$, $t = -1.60$, $p = .11$. Therefore, the data were inconsistent with H6a but consistent with H6b.

5.1.7 Discussion

The current study investigates organ donation information on Weibo through mapping its sharing (i.e., retweet) network and examining the local as well as global opinion leadership on this topic. Besides mapping the retweet network, the current research explores the roles of personal attributes, professional knowledge, and social positions in obtaining influence according to Katz's (1957) treatise. The findings reveal that all these three sets of factors predict individual's local opinion leadership in the retweet network of popular organ donation messages. Alternatively, personal attributes and social positions, but not professional knowledge, are significantly associated with global opinion leadership. The findings gained from the current examination significantly improve the understanding of the organ donation information on SNSs and will be instrumental in the design of SNS organ donation promotions.

Major Findings and Implications

The sharing network of the popular organ donation messages on Weibo is extremely sparse with a star-like network structure. Only a very small portion of users in this network receives retweets from others, and more than ninety percent of the users do not receive any retweets from others and occupy peripheral positions in the network. After mapping the network, the subsequent analysis explores how individual and social factors affect these users' ability to influence the flow of organ donation information on Weibo. In addition, the current study employs a two-dimension conceptualization of opinion leadership on SNSs that includes a direct influence in neighborhood (i.e., local opinion leadership) as well as an indirect impact in the whole environment (i.e., global opinion leadership).

First, the findings show that two personal attributes are significant predictors of both local and global opinion leadership on organ donation: activeness on Weibo and the verification status. In detail, users who are more active on Weibo are more likely to show greater local and global opinion leadership in the organ donation information diffusion network on Weibo. This finding is consistent with theory on developing influence (Huffaker, 2010; Weimann, 1994) as well as previous empirical research on Weibo (e.g., Shi et al., 2016, Zhang et al., 2014).

Nevertheless, the other personal attribute, verification status, negatively impacts opinion leadership, which is opposite to H2's prediction. It shows that, compared with verified users, unverified users are more likely to show greater local as well as global opinion leadership about organ donation on Weibo. One possible explanation is that user's influence on SNSs is topic-sensitive (Weng, Lim, Jiang, & He, 2010). Although a previous study has claimed that verified users are perceived to be more credible than unverified ones and has found their posts on Weibo received more retweets than others' posts, this examination is not topic-specific and contains nine different topics from

personal interests to political news (Zhang et al., 2014). However, the current examination focuses a specific topic – organ donation. It is possible that the role of verification status varies for different topics, and Weibo users would turn to unverified, rather than verified, users for opinions about organ donation.

The other possible explanation could be that, in general, verified users may not enjoy more, if not less, credibility than unverified ones. Indeed, the Chinese government has hired a large number of people to fabricate posts on popular websites and social media, and the number of pseudonymous and deceptive social media posts could reach 488 million a year (King, Pan, & Roberts, 2016). Although the government has never publicly or officially admitted such an operation, the general public in China is fully aware of it. Thus, the verification badge on Weibo could backfire; that people may regard those users received official verification as government employees who may intentionally manipulate public opinion on Weibo. This could be why unverified users exhibit greater local as well as global opinion leadership about organ donation than verified users on Weibo. Yet both explanations need further examinations.

The third personal attribute examined in the current research is the level of ICT development in one's location. Unlike the above-mentioned two attributes tightly relevant to one's activities and identity on Weibo, this one is an environmental factor. The results show that one's direct impact on the neighborhood (i.e., local opinion leadership) is highly associated with his or her characteristics and identity on Weibo, but not with the ICT development level in his or her area. However, one's indirect influence on other users (i.e., global opinion leadership) depends on one's characteristics on Weibo as well as this environmental factor. Indeed, a previous study has found that this environmental factor was highly associated with users' influence in friendship networks on SNSs (Wang et al., 2016). The current examination extends the

previous research on social (i.e., following-follower) networks to an information network on Weibo. It shows that, with regard to the organ donation topic on Weibo, although the ICT development level in one's local does not affect his or her direct influence on others, it significantly impacts the user's indirect influence and the ability to control information flows in the retweet network.

The second type of predictors of opinion leadership suggested by Katz (1957) is professional knowledge on the topic. The current investigation shows that users with medical knowledge exhibit significantly greater local opinion leadership about organ donation on Weibo than users without such knowledge. Yet this effect does not reach significance for global opinion leadership. It is possible that one's professional knowledge on a certain topic is critical for obtaining opinion leadership when the information flows follow the "two-step flow" as in Katz's (1957) statements. Hence, as the results show, it significantly affects the local opinion leadership on the organ donation topic. However, such professional knowledge may become less important when individuals want to wield global influence over the retweet network on SNSs, within which multiple processes of information flow co-exist. Yet this speculative explanation needs further validation.

The last set of predictors of opinion leadership included in the current analysis is one's social position on Weibo. The results reveal that, for one's local opinion leadership, the number of followers, but not followings, is a significant predictor. Actually, the number of one's followers is the number of users on Weibo who will be directly exposed to his or her posts. As documented in the current results, a larger size of such direct audience positively affects one's local influence. Alternatively, global opinion leadership depends on not only the size of one's direct audiences, but also the number of one's followings who are also the user's information sources on Weibo.

Users with large numbers of audiences as well as information sources occupy well-connected positions in the social network on Weibo, thus exhibiting more global opinion leadership than others who occupy peripheral social positions.

Limitations

There are three areas of improvement for future examination of opinion leadership in the topic of organ donation on SNSs. First, examining the retweet paths of all the organ donation messages ($n = 6,701$) will yield an extremely large dataset and be computationally intensive, so the current investigation contains only the most popular organ donation message posted during year 2015 on Weibo. In fact, the current research initiates an exploration of the opinion leadership of organ donation on SNSs with an innovative and advanced method. Future research may replicate this research on another SNS platform or using a larger scale of dataset. Second, the retweet network in the current research pools all popular organ donation messages together regardless of their specific content. However, the retweet paths might vary for different sub-topics under the main topic of organ donation. Future examination may investigate for organ donation messages with different content or appeals to see if such features of messages affect the structure of its retweet network. Third, the current study analyzes a snapshot of the retweet network, instead of a dynamic and diffusion network that evolves over time. Subsequent work may employ more sophisticated data mining and data analyzing techniques to detect how does one organ donation message go viral on a SNS platform and who facilitates such dissemination.

CHAPTER 6

CONCLUSION

6.1 Major Findings and Theoretical Implications

This doctoral thesis begins by refining the notion of attitude based on the TPB in domain of organ donation and validating its utility in predicting the organ-donor registration behavior (chapter 2). It first adopts a reasoned action perspective of persuasion (Ajzen, 1985; Fishbein & Ajzen, 1970) and creates a belief-based attitude measure based on the theoretical framework and the salient beliefs regarding organ donation reported by Chinese participants. The refined attitudinal concept consists of four theoretical aspects of attitudes: positive cognitive/affective attitudes and negative cognitive/affective attitudes. The data from two distinctive Chinese samples indicate that these four aspects represent two statistically separate and independent dimensions of attitudes toward registering to become an organ donor: positive and negative attitudes. Continuing with the same theoretical framework, it documents both aspects of attitudes (i.e., negative and positive attitudes) significantly predict the behavioral intention, which in turn predicts organ-donor registration behavior. Furthermore, the results show that, among all three TPB components, attitude is the strongest predictor of the registration behavior.

Such findings provide a multi-dimensional construct of attitudes and document the role of positive as well as negative aspects of attitudes in the TPB. Although previous research on the TPB has documented a co-existence of and a distinction between cognitive and affective aspects of attitudes, it has not paid much attention on the valence of attitudes (e.g., Montaña & Kasprzyk, 2008; Yzer, 2013). However, the results from Study 1 and Study 2 document that the cognitive and affective aspects of attitudes are not separate from each other, at least in the domain of organ donation.

Instead, people simultaneously hold positive and negative aspects of attitudes at the same time, which are independent from each other. Furthermore, the distinction between the positive and negative aspects is more prominent than the distinction between the cognitive and affective aspects of attitudes. And both positive and negative attitudes significantly predict behavioral intention and behavior. In sum, Chapter 2 advances the current literature on the TPB by offering a comprehensive examination on the attitudinal concept, documenting a critical role of attitude ambivalence, and strengthening the attitude-behavior relationship in the domain of organ donation.

Chapter 3 describes an experimental study examining how evidence type in persuasive messages affects the four types of behavioral beliefs regarding organ donation, which are the funding blocks of the attitudes. The results reveal an independent effect of narratives in reducing negative cognitive beliefs and a joint effect of evidence type with motivation to approach emotion on such beliefs. Previous research on evidence type in the domain of organ donation have reported largely inconsistent results. By replicating the previous studies but examining the beliefs in a nuanced fashion, the current findings indicate that evidence type may affect only one aspect, instead of all aspects, of the post-message beliefs or attitudes on organ donation.

Furthermore, previous research on narrative persuasion has majorly investigated the mechanism of this approach and documented the effectiveness of narrative messages in affecting attitudes and reducing reactance. Yet, the moderation effect in Study 3 illustrates a boomerang effect that among people with a high motivation to approach emotions, narrative messages, especially that containing negative emotions, may induce unfavorable, instead of favorable, beliefs. The current findings extend the literature by examining the individual difference in the effects of narrative persuasion and also revealing the boomerang effect of using such an approach.

The next question to be asked is: Besides the four aspects documented in the theoretical framework and examined in Study 1 through Study 3, are there any other inventories of attitudes have yet to be discovered? To answer this question, Chapter 4 describes a qualitative study on the organ donation messages posted on the most popular Chinese SNS, Weibo. Its results not only provide supporting evidence for the aspects of attitudes developed and examined in the previous chapters, but also extend the aspects of attitudes. The findings provide a richer and more complex understanding on the notion of attitude in the domain of organ donation through a qualitative perspective and also suggest future directions for examining the attitudes in the domain of organ donation, especially in the Chinese context.

Chapter 5 retains a focus on the attitude but breaks a new ground by exploring the opinion leaders for organ donation, who are able to affect others' attitudes on organ donation. It is the very first study investigating opinion leadership for organ donation on social networking sites and also in the Chinese context. In the study, a social network approach is employed to map the sharing network of popular organ donation messages on Weibo and to investigate the opinion leadership. It illustrates the characteristics of local and global opinion leaders for organ donation on Weibo in terms of personal attributes, professional knowledge, and social positions. In general, the study extends the current literature on SNS opinion leadership in two major dimensions. First, it adopts a multi-dimensional conceptualization for opinion leaderships on SNSs: local and global opinion leadership, and reveals that the factors contributed to these two aspects of opinion leaderships are not identical. Second, previous findings have shown that verified users are perceived more credible or receive more retweets than their unverified counterparts on Western as well as Chinese SNSs. Yet the current findings indicate that they do not obtain more, if not less, opinion leadership for organ donation

on Weibo compared with unverified users. Such a counter-intuitive result indicates the formation of opinion leadership for organ donation topic may be a special case. Or with an increasing awareness on the large numbers of fabricated social media posts by the Chinese government, now Chinese SNS users in general are less likely to turn to verified users for information or opinions.

To sum up, this doctoral thesis provides a coherent and comprehensive understanding of the notion of “attitude” in the domain of organ donation. It also advances the current literature on the TPB, evidence type in persuasive messages, as well as the formation of opinion leadership on SNSs. Also, by conducting the studies in the Chinese context, this thesis extends the current understanding of organ donation issues and provides valuable insights for future organ donation campaigns.

6.2 Practical Applications

In addition to discussing theoretical implications of the findings from each study, the current section outlines practical applications derived from the five studies in this doctoral thesis. Based on the results, I offer the following recommendations which are of value to design educational interventions on organ donation, especially for Chinese citizens.

First, Chinese people’s cultural and spiritual beliefs are integrated into their attitudes toward organ-donor registration behavior. For example, “impairing one’s relationship with my family members” is considered as a cost of registering to become an organ donor for Chinese. It indicates that some people, who follow the traditional beliefs of filial piety, see being an organ donor is an irresponsible behavior to one’s family members and may lead to conflicts. As well, such a belief reveals an interdependent view of “self” among Chinese people: the cost of organ-donor registration behavior is not only about the “ego,” but also about one’s social relationship

with significant others. Therefore, it is important to promote family communication about organ donation in China to help potential donors to nurture understanding and support from significant others and to receive family consent. In addition, the philosophical and spiritual aspects of death in Chinese cultural also influence how people see organ donation. Although cremation was introduced in China two decades ago and becomes a common practice now (China Daily, 2016), the spiritual and philosophical beliefs about death remain deeply rooted cultural values for Chinese. The findings from Study 1 and Study 4 indicate that, for some people, cutting one's body after his or her death is disrespectful to, or even torturing, the deceased and will impede him or her from resting in peace in afterlife. To change this mindset, health communication professionals need to understand and respect such spiritual beliefs, thereby designing campaign strategies attached to these cultural beliefs to promote organ donation. For example, although being an organ donor compromises body integrity, it also shows one's altruism and willingness to save others' lives. For some Chinese who are subject to traditional beliefs from Buddhism that highly values altruism, the act of saving others' lives is believed to accumulate positive momentum and generate enormous benefits for afterlife and reincarnation. Therefore, framing organ donation as a mean to accumulate credits for a better afterlife could be a campaign strategy for this segment of Chinese people to reduce their perceived costs and anxiety as well as fear associated with being an organ donor."

Second, negative attitudes and positive attitudes are two independent aspects of attitudes that significantly affect donation intention, which in turn predicts organ-donor registration behavior among Chinese university students. Such attitudinal factors also are the strongest predictor of behavior among all the antecedents, which indicate that attitudes should be the first concept addressed in the organ donation campaigns. Health

communication professionals first should target on the attitudes toward “registering to become an organ donor,” instead of the attitudes toward “organ donation,” to promote the donor registration behavior. Second, they should address the two attitudes (i.e., positive and negative) at the same time in organ donation promotions to increase consent rate.

Third, some people distrust the organ allocations system, which is a barrier impeding the organ-donor registration behavior, and some others expect monetary compensation for organ donation. This might stem from being unfamiliar with the newly introduced organ donation program or being affected by reports about organ transplant commercialism in China. Campaign designers need to provide information and facts about the current organ donation program and its allocation system to the Chinese citizens, to improve their knowledge on organ donation and to mitigate their distrust toward to the system as well.

Forth, significant others are integral to Chinese people’s beliefs, attitudes, and perceived norms regarding organ donation, all of which will further shape the donation intention and donor registration behavior. Future educational interventions or communication campaigns should target not only potential donors, but also members of their close social networks. Especially for young generations, opinions from parents are crucial for their organ-donation decisions. Encouraging the discussion of organ donation between young people and their parents may help potential donors nurture understanding and support.

Fifth, including statistical as well as narrative information in a campaign message about organ donation is a strategy to reduce perceived costs associated with registering to become an organ donor. In addition, individuals’ motivation to approach emotion will not interfere with the effect of this type of messages, which can help avoid

a potential boomerang effect. Another possible strategy could be using only narratives but avoiding negative emotions in the organ donation messages. Instead of describing the death of the organ donor, providing the stories of organ recipients that inducing happiness, hope, and gratitude, might be effective in reduce the boomerang effect, or induce more positive beliefs, among the people high in motivation to approach emotion.

Sixth, health campaign designers may recruit peer leaders in their SNS organ donation interventions to facilitate information sharing between audiences. For example, they can recruit popular, active, and unverified users, who may accelerate the sharing of organ donation messages in their neighborhood as well as within the whole environment. Organ transplant professionals, who can wield a great amount of influence on their direct connections on Weibo, should also be invited and involved in SNS organ donation campaigns.

Last, the current organ donation program in China defines condemned prisoners as citizen who can voluntarily become organ donors. The results from the qualitative study indicate that the general public see this type of donors largely different from other donors and to some extent dehumanize them, such as associating their organs as evil. Although it is not documented in the current research project, it is possible that some people may associate “organ donation” with “prisoners” or “punishment,” thus holding negative attitudes toward organ donation and abstaining from organ-donor registration. Health communication practitioners may need to address this issue in campaigns and promotions for organ donation, if necessary.

6.3 Limitations and Future Research

There are some limitations of this doctoral thesis to be acknowledged and several areas of improvement for future communication research on organ donation, especially in the Asian context.

First, although the thesis preforms a comprehensive investigation on attitudes, it does not pay much attention on other important antecedents of organ-donor registration behavior, such as distrust and subjective norms. Future studies should explore the communication strategies to reduce distrust and alter subjective norms regard organ donation.

Second, interpersonal communication is not a focus of this doctoral thesis. Previous research conducted in Western countries has shown that interpersonal and family communication about organ donation is critical in the process of making organ-donation decision, but such research in the Asian context is rare. Yet, the current findings show family consent is critical in Chinese people's organ donation decision making. Thus, future research on organ donation in Asia should examine how family communication in Asian families affects organ-donation decisions to help potential donors nurture support and seek consent from significant others.

Third, Asian countries have suffered from severe organ shortages, and it is worth examining how mass media in this region cover such issues and affect the general public's beliefs, attitudes, and intentions regarding organ donation as well as the public policy about this issue.

Forth, the issue of prisoner donors in China emerges from the qualitative study on organ donation posts on Weibo. Yet little social science research to date has examined this issue. Future communication studies should explore the possible impacts of this issue on Chinese people's beliefs and opinions about organ donation. For example, if Chinese people associate "organ donation" with "prisoners," and if such an association negatively impacts their attitudes and behavioral intention regarding organ donation.

In addition, the social marketing approach may also be employed to increase the

registry rate in China. For example, in December, 2016, Alipay, the most popular mobile payment system in China, launched organ donor registration function. This function is developed and managed by the China Organ Transplantation Development Foundation. The state news says that it only takes around 10 seconds and a few steps for users to complete the registration on smart phones. Although we do not know if it is effective in increasing the registration rate yet, it does make the enactment of the desired behavior (i.e., organ-donor registration) more convenient for the target audience. Thus, besides relying on health communication research, some other perspectives and also a more comprehensive approach may need to be adopted to improve the organ donor registry rate in China.

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Table 1.1
 Organization of Chapters, Studies, and Research Goals.

Chapter	Study	Research Goals
1	Introduction	
2	Study 1: Refining of the notion of attitude (survey)	Refining the notion of attitude by changing the attitude target to a specific behavior, “registering to become an organ donor,” and including positive and negative as well as affective and cognitive aspects of attitudes.
3	Study 2: Confirming the utility of the refined attitude (survey)	Assessing the effects of attitudes, subjective norms, personal level descriptive and injunctive norms, and distrust on donation intention, and then to organ-donor registration behavior.
	Study 3: Investigating the effects of persuasive messages on attitudes (experiment)	Examining the independent effect of evidence type (statistical, narrative, and combined) and its joint effect with need for affect on organ donation beliefs, the funding block of attitudes. Examining the independent effect of the number of user-generated cues on organ donation beliefs.
	Study 4: Extending the aspects of attitudes (directed qualitative content analysis)	Categorizing organ donation beliefs presented on a Chinese social networking site (SNS), Weibo.
5	Study 5: Examining the opinion leadership for organ donation (social network analysis)	Investigating opinion leadership in the sharing network of popular organ donation messages on Weibo and illustrating the characteristics of opinion leaders for organ donation in terms of personal attributes, professional knowledge, and social positions.
6	Conclusion	

Table 2.1

Attitude Measures in Organ Donation Research.

Year	Scholars	Attitude Target	Components	Measurements	Used by
1971	Goodmonson & Glaudin	Organ transplantation	Cognitive Affective Behavioral	A Likert scale	Horton & Horton, 1990; 1991; Lwin, Williams, & Lan, 2002; Skumanich & Kinsfather, 1996
1986	Parisi & Katz	Organ donation	Positive attitudes Negative attitudes	A Likert scale	Bresnahan et al., 2007b; Bresnahan, Guan, Wang, & Mou, 2008; Bresnahan, Lee, Smith, Shearman, & Yoo, 2007a
1996	Kopfman & Smith	Organ donation	Cognitive	A set of belief-based measures	Feeley & Servoss, 2005; Marshall & Feeley, 2006
2002	Morgan & Miller	Organ donation	Cognitive	A Likert scale	Feeley & Servoss, 2005; Morgan, Harrison, Chewning, DiCorcia, & Davis, 2010; Morgan, Stephenson, Harrison, Afifi, & Long, 2008; Morgan & Miller, 2002b; Stephenson, Morgan, Roberts-Perez, Harrison, Afifi, & Long, 2008; Wu, 2008
2005	van den Berg et al.	Organ donation	Positive/negative attitudes Positive/negative attitudes Positive/negative attitudes	overall A Likert scale cognitive affective	Anker, Feeley, & Kim, 2010
2014	Quick et al.	Joining the organ donation registry	Cognitive	A Likert scale	

Table 2.2

The CFA and Model Comparison Results of the Four-Dimensional Attitude Scale for Sample One and Sample Two.

Model	χ^2	df	RMSEA	90% CI of RMSEA	CFI	TLI	SRMR	Scaling factor for MLM	Correction for MLM	Compare with the four-factor model
Sample 1 ($n = 482$)										
Four factors	83.39	59	0.030	0.012 – 0.044	0.989	0.986	0.037	1.4158		
Two factors: positive & negative attitudes	202.02	64	0.069	0.058 – 0.079	0.939	0.926	0.055	1.4555		$\Delta\chi^2 = 91.47$, $\Delta df = 5$, $p < .001$
Two factors: cognitive & affective attitudes	893.46	64	0.168	0.159 – 0.178	0.635	0.555	0.201	1.4659		$\Delta\chi^2 = 579.30$, $\Delta df = 5$, $p < .001$
One factor	933.23	65	0.171	0.161 – 0.181	0.618	0.541	0.201	1.4879		$\Delta\chi^2 = 578.31$, $\Delta df = 6$, $p < .001$
Sample 2 ($n = 322$)										
Four factors	135.74	59	0.064	0.050 – 0.078	0.947	0.930	0.049	1.5805		
Two factors: positive & negative attitudes	159.85	64	0.068	0.055 – 0.082	0.933	0.919	0.055	1.5643		$\Delta\chi^2 = 25.87$, $\Delta df = 5$, $p < .001$
Two factors: cognitive & affective attitudes	564.69	64	0.156	0.144 – 0.168	0.652	0.576	0.192	1.7155		$\Delta\chi^2 = 227.95$, $\Delta df = 5$, $p < .001$
One factor	567.77	65	0.155	0.143 – 0.167	0.651	0.581	0.191	1.7145		$\Delta\chi^2 = 250.28$, $\Delta df = 6$, $p < .001$

Note: Given that the CFAs employed the MLM estimator, the calculation of chi-square differences followed the steps in Bryan (2012), $CD = (df_{M1} * C_{M1} - df_{M2} * C_{M2}) / (df_{M1} - df_{M2})$, $\Delta\chi^2 = (\chi^2_{M1} * C_{M1} - \chi^2_{M2} * C_{M2}) / CD$, C refers to scaling correction factor for MLM.

Table 2.3

Items, Factor Loadings, and Reliabilities for the Four-Dimensional Attitude Scale.

Item ^a	Factor Loading	
	Sample 1	Sample 2
Positive cognitive attitudes ($\alpha = .865$ for Sample 1, $\alpha = .833$ for Sample 2)		
By registering to become an organ donor, I am committed to social responsibility.	.744	.759
Registering to become an organ donor reflects my life values.	.879	.877
Registering to become an organ donor helps me win respect from others.	.865	.753
Positive affective attitudes ($\alpha = .878$ for Sample 1, $\alpha = .896$ for Sample 2)		
Registering to become an organ donor makes me feel fulfilled.	.708	.807
Registering to become an organ donor makes me proud.	.923	.871
Registering to become an organ donor makes me feel honored.	.906	.893
Negative cognitive attitudes ($\alpha = .711$ for Sample 1, $\alpha = .711$ for Sample 2)		
Register to become an organ donor makes me vulnerable to misunderstandings.	.547	.512
Register to become an organ donor makes me violate traditional Chinese values.	.645	.510
Registering to become an organ donor impairs my relationship with my family members.	.667	.682
Registering to become an organ donor impedes me being able to be "buried and at rest."	.632	.702
Negative affective attitudes ($\alpha = .855$ for Sample 1, $\alpha = .825$ for Sample 2)		
Registering to become an organ donor evokes my fear.	.878	.681
Register to become an organ donor elicits my anxiety.	.729	.850
Registering to become an organ donor makes me uneasy.	.855	.834

Note: The items are behavioral belief statement. For each belief statement, the attitude score equals to the cross product of *belief strength* and *belief evaluation*.

Table 2.4

The Values of Composite Reliability (CR) and Average Variance Extracted (AVE) of the Four-Dimensional Attitude Scale.

	Sample 1		Sample 2	
	CR	AVE	CR	AVE
Positive cognitive attitudes	0.87	0.69	0.84	0.64
Positive affective attitudes	0.89	0.72	0.89	0.74
Negative cognitive attitudes	0.72	0.39	0.70	0.37
Negative affective attitudes	0.86	0.67	0.83	0.63

Table 2.5

The Values of Squared Correlation Coefficients and Average Variance Extracted (AVE) for the Four-Dimensional Attitude Scale.

	Sample 1				Sample 2			
	1	2	3	4	1	2	3	4
1. Positive affective attitudes	0.72				0.74			
2. Positive cognitive attitudes	0.80	0.69			0.92	0.64		
3. Negative affective attitudes	0.001	0.0002	0.67		0.06	0.04	0.63	
4. Negative cognitive attitudes	0.02	0.0002	0.57	0.39	0.04	0.01	0.75	0.37

Table 2.6

The CFA and Model Comparison Results of the Revised Two-Dimensional Attitude Scale for Sample One and Sample Two.

Model	χ^2	<i>df</i>	RMSEA	90% CI of RMSEA	CFI	TLI	SRMR	Scaling correction factor for MLM	Compare with the revised two-factor model
Sample 1 (<i>n</i> = 482)									
Revised two-factor model	106.24	43	0.056	0.043 – 0.070	0.969	0.961	0.042	1.4787	
One-factor model	696.63	44	0.179	0.168 – 0.191	0.684	0.605	0.184	1.5064	$\Delta\chi^2 = 330.79$, $\Delta df = 1, p < .001$
Sample 2 (<i>n</i> = 322)									
Revised two-factor model	77.34	43	0.050	0.031 – 0.067	0.972	0.964	0.039	1.6980	
One-factor model	389.73	44	0.156	0.142 – 0.171	0.716	0.645	0.183	1.9103	$\Delta\chi^2 = 55.55$, $\Delta df = 1, p < .001$

Table 2.7

Items, Factor Loadings, and Reliabilities for the Revised Two-Dimensional Attitude Scale.

Item ^a	Factor Loading	
	Sample 1	Sample 2
Positive attitudes ($\alpha = .917$ for Sample 1, $\alpha = .823$ for Sample 2)		
By registering to become an organ donor, I am committed to social responsibility.	.718	.747
Registering to become an organ donor reflects my life values.	.836	.852
Registering to become an organ donor helps me win respect from others.	.823	.743
Registering to become an organ donor makes me feel fulfilled.	.699	.799
Registering to become an organ donor makes me proud.	.897	.867
Registering to become an organ donor makes me feel honored.	.890	.889
Negative attitudes ($\alpha = .922$ for Sample 1, $\alpha = .852$ for Sample 2)		
Registering to become an organ donor impairs my relationship with my family members.	.558	.631
Registering to become an organ donor impedes me being able to be "buried and at rest."	.475	.652
Registering to become an organ donor evokes my fear.	.872	.692
Register to become an organ donor elicits my anxiety.	.729	.833
Registering to become an organ donor makes me uneasy.	.852	.837

Note: The items are behavioral belief statement. For each belief statement, the attitude score equals to the cross product of *belief strength* and *belief evaluation*.

Table 2.8

The Values of Composite Reliability (CR) and Average Variance Extracted (AVE) of the Revised Two-Dimensional Attitude Scale.

	Sample 1		Sample 2	
	CR	AVE	CR	AVE
Positive attitudes	0.87	0.66	0.84	0.67
Negative attitudes	0.86	0.51	0.83	0.54

Table 2.9

The Values of Squared Correlation Coefficients and Average Variance Extracted (AVE) for the Revised Two-Dimensional Attitude Scale.

	Sample 1		Sample 2	
	1	2	1	2
1. Positive attitudes	0.66		0.67	
2. Negatives attitudes	0.0002	0.51	0.06	0.54

Table 2.10

The Results of Measurement Invariance Tests for the Revised Two-Dimensional Attitude Scale.

Model	χ^2	df	Scaling Correction Factor for MLM	RMSEA	90% CI RMSEA	CFI	TLI	SRMR	Model Comparison
M1: baseline model for testing measurement invariance	181.59	86	1.5883	0.053	0.024–0.064	0.970	0.962	0.041	
M2: factor loading invariant ^a	192.36	93	1.5646	0.052	0.042–0.063	0.969	0.963	0.045	M2-M1: $\Delta\chi^2=9.85, \Delta df=7, p=.20$
M3: factor variance and covariance invariant	197.12	96	1.5752	0.052	0.042–0.062	0.968	0.964	0.064	M3-M2: $\Delta\chi^2=5.01, \Delta df=3, p=.17$

Note: ^aExcepting Item 1 of negative attitudes and Item 1 of positive attitudes. Given that the CFAs employed the MLM estimator, the calculation of chi-square differences followed the steps in Bryan (2012), $CD = (df_{M1} * C_{M1} - df_{M2} * C_{M2}) / (df_{M1} - df_{M2})$, $\Delta\chi^2 = (\chi^2_{M1} * C_{M1} - \chi^2_{M2} * C_{M2}) / CD$, C refers to Scaling Correction Factor for MLM.

Table 2.11

The Correlation Matrix for all Study Variables in Study 2 (n = 384).

	1	2	3	4	5	6	7	8
1. Positive attitudes	–							
2. Negative attitudes	.007	–						
3. Subjective norms	.330**	-.587**	–					
4. Personal injunctive norms	.321**	-.460**	.827**	–				
5. Personal descriptive norms	.277**	-.535**	.946**	.797**	–			
6. Distrust	-.115*	-.285**	-.232**	-.159**	-.222**	–		
7. Intent	.490**	-.545**	.809**	.668**	.770**	-.173**	–	
8. Behavior	.358**	-.292**	.400**	.357**	.398**	-.061	.623**	–

* $p < .05$. ** $p < .01$.

Table 3.1

The Correlation Matrix for all Continuous Variables in Study 3 (n = 306).

	1	2	3	4	5	6
1. Need for affect – approach	–					
2. Need for affect – avoidance	-0.183**	–				
3. Positive affective beliefs	0.262**	-0.101	–			
4. Negative affective beliefs	0.053	0.159**	-0.315**	–		
5. Positive cognitive beliefs	0.353**	-0.111	0.801**	-0.187**	–	
6. Negative cognitive beliefs	0.028	0.114*	0.193**	0.584**	0.087	–

* $p < .05$. ** $p < .01$.

Table 3.2

Estimated Means and Standard Errors for Beliefs by Evidence Type.

	Negative cognitive beliefs		Negative affective beliefs		Positive cognitive beliefs		Positive affective beliefs	
	Mean	s.e.	Mean	s.e.	Mean	s.e.	Mean	s.e.
Statistical	3.60 ^a	0.14	3.99	0.18	4.49	0.16	4.81	0.13
Combined	3.24 ^b	0.13	3.84	0.16	4.65	0.15	4.91	0.13
Narrative	3.15 ^b	0.13	3.75	0.17	4.58	0.15	4.82	0.13

Note: There is a significant difference among the mean negative cognitive beliefs of readers in the three evidence groups. No significant differences among group means exist for the rest types of beliefs.

Table 5.1

The Correlation Matrix among all Continuous Variables in Study 4 (n = 43,510).

	1	2	3	4	5	6	7
1. Indegree (square root)	—						
2. Incloseness (square root)	0.266**	—					
3. Betweenness (square root)	0.117**	0.567**	—				
4. The Number of Followers (square root)	0.587**	0.163**	0.043**	—			
5. The Number of Followings (square root)	0.068**	0.115**	0.076**	0.133**	—		
6. Activeness on Weibo (square root)	0.117**	0.163**	0.200**	0.171**	0.361**	—	
7. Location (degree of ICT development)	0.037**	0.043**	0.041**	0.045**	0.027**	0.111**	—

* $p < .05$. ** $p < .01$.

Table 5.2

The Network-Level Characteristics of the Retweeting Network.

Social Metric	Network	Definition	Possible Range	Value
Size		The number of nodes (e.g., users) in the network.	N/A	505,047
Diameter		The largest geodesic distance, which is the shortest distance from one node to another, in the network.	N/A	100
Average path length		The average distance between any two nodes in the network.	N/A	24.12
Density		The proportion of all possible dyadic connections that are presented in the network.	0 – 1	0.000002
Reciprocity		The proportion of all pairs in the network which have a reciprocated tie between them.	0 – 1	0.0016
Clustering coefficient		The degree to which nodes in the network tend to cluster together.	0 – 1	0.000003
Indegree centralization		The extent to what the distribution of indegree centrality in the network deviates from a perfectly equal distribution.	0 – 1	0.1169
Outdegree centralization		The extent to what the distribution of outdegree centrality in the network deviates from a perfectly equal distribution.	0 – 1	0.00017

Table 5.3
The GLM Effects of Predictors on Individuals' Opinion Leadership in the Retweet Network of Popular Organ Donation Messages on Weibo.

	Local Opinion Leadership		Global Opinion Leadership		Betweenness	
	Indegree		Incloseness		Coefficients	
	Coefficients	s.e.	Coefficients	s.e.	Coefficients	s.e.
Intercept	1.57***	0.31	0.000002***	0.0000000003	-53.76	29.67
Personal Attributes						
Activeness on Weibo	0.001***	0.0003	0.000000000006***	0.00000000000003	0.89***	0.03
Verification (<i>Yes</i> = 1, <i>No</i> = 0)	-0.33***	0.05	-0.000000000007	0.000000000005	-17.36***	4.98
Location (degree of ICT development)	0.02	0.01	0.000000000005***	0.000000000001	3.72***	1.05
Competence						
Medical-focused (<i>Yes</i> = 1, <i>No</i> = 0)	1.14***	0.30	0.0000000001	0.0000000003	-8.02	29.35
Social Position						
The number of followers	0.01***	0.00008	0.000000000002***	0.000000000000008	0.02**	0.01
The number of followings	-0.003	0.002	0.000000000002***	0.00000000000002	0.34*	0.16
ΔR^2	34.4%		5.2%		4.2%	
Control Variable						
Gender (<i>Female</i> = 1, <i>Male</i> = 0)	-0.14***	0.03	-0.0000000002***	0.000000000003	7.60*	3.16
ΔR^2	0.0%		0.0%		0.0%	
Total R^2	34.4%		5.2%		4.2%	

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

Figure 2.1. The theory of reasoned action. Adapted from Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research* (p. 16). Reading, MA: Addison-Wesley.

Figure 2.2. The theory of planned behavior. Adapted from Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, p. 182.

Figure 2.3. The four-factor CFA results of sample one and sample two....

Figure 2.4. The revised two-factor CFA results of sample one and sample two.

Figure 2.5. The hypothetical model for predicting organ-donor registration behavior.

Figure 2.6. The SEM results of the hypothetical model. Dash lines indicate non-significant relationships. Distrust is measured using a single indicator. Behavior is a binary variable and measured using a single indicator.

a. The model from attitudes to behavior.

b. The model from subjective norms to behavior.

c. The model from PBC (i.e., distrust) to behavior.

Figure 2.7. The comparison among the variances of behavior explained by the three TPB components.

Figure 3.1. The interaction effect between need for affect approach and evidence type on negative cognitive beliefs toward registering to become an organ donor.

Figure 4.1. The monthly frequency of organ donation posts on Weibo in 2015.

Figure 4.2. The weekly frequency of organ donation posts on Weibo in 2015. Week 1 and Week 53 contain only four days.

Figure 4.3. The log-transformed distribution of comments.

Figure 4.4. The log-transformed distribution of likes.

Figure 4.5. The log-transformed distribution of retweets.

Figure 5.1. The monthly frequency of popular organ donation posts on Weibo in 2015.

Figure 5.2. The log-transformed distribution of indegree in the sharing network of popular organ donation message.

Figure 5.3. Visualization of the sharing network of popular organ donation messages (including nodes whose indegree equal or larger than 50). Nodes represent Weibo users ($n = 362$). The size of node depends on its indegree. The larger the node, the greater amount of retweets the user received. Lines represent retweet relationship between Weibo users. The weight of line depends on the number of retweets.

Appendix A

Items of all Attitude Measures in Organ Donation Literature

Goodmonson & Glaudin, 1971¹

I view human organ transplants as a good and realistic procedure.

I don't want a part in it and nobody can take me apart after I'm gone.

I would probably be willing to give my body for transplant purposes when I die.

Human parts are considered sacred to the individual even after death.

I'd feel uneasy about being used or exploited in this way.

Parisi & Katz, 1986¹

Positive attitudes

Organ donation would enable me to help someone who is suffering.

A person willing to donate is almost a hero.

Donating a body part would enable that part of myself to remain alive after my death.

Negative attitudes

Organ donation leaves the body mutilated and disfigured.

Doctors are much more likely to prematurely declare the death of an organ donor.

Transplanting organs is against God's will.

Kopfman & Smith, 1996

General attitudes toward organ donation

Donation as an act of compassion

Donation as a frightening activity (reflected)

Donation as unselfish

Donation as a natural way to prolong life

Donation as a benefit to humanity

Signed donor card indicating intent

Organ donation as a negative procedure (reflected).

Morgan & Miller, 2002

I support the idea of organ donation for transplantation purposes.

I believe that organ donation is an act of compassion.

I believe that organ donation is an unselfish act.

I see organ donation as a natural way to prolong life.

I view organ donation as a benefit to humanity.

I view organ donation as a negative procedure.

van den Berg et al., 2005

Positive overall attitudes

My overall attitude toward organ donation is good.

My overall attitude toward organ donation is positive.

My overall attitude toward organ donation is pro.

My overall attitude toward organ donation is likeable.

Negative overall attitudes

My overall attitude toward organ donation is dislike.

My overall attitude toward organ donation is negative.

My overall attitude toward organ donation is anti.

My overall attitude toward organ donation is bad.

Positive cognitive attitudes

I think organ donation is safe.

I think organ donation is useful.

I think organ donation is wise.

I think organ donation is healthy.

Negative cognitive attitudes

I think organ donation is unhealthy.

I think organ donation is improper.

I think organ donation is useless.

I think organ donation is disadvantage.

Positive affective attitudes

Organ donation makes me feel agreeable.

Organ donation makes me feel gratifying.

Organ donation makes me feel pleasurable.

Organ donation makes me feel enjoyable.

Negative affective attitudes

Organ donation makes me feel nasty.

Organ donation makes me feel abominable.

Organ donation makes me feel dreary.

Organ donation makes me feel miserable.

Quick et al., 2013¹

Joining the organ donation registry is a good thing for you to do.

Footnote

¹The scale is incomplete. Only one item is available in the article.

Appendix B

The Questionnaire of Behavioral Beliefs about Registering to Become an Organ

Donor

Instructions: Please take a few minutes to tell us what you think about the possibility of registering to become an organ donor upon your death. There are no right or wrong responses; we are merely interested in your personal opinions. In response to the questions below, please list the thoughts that come immediately to mind. Write each thought on a separate line.

(1) What do you see as the advantages for yourself in registering to become an organ donor?

(2) What do you see as the disadvantages for yourself in registering to become an organ donor?

(3) What pleasant feelings do you perceive in registering to become an organ donor?

(4) What unpleasant feelings do you perceive in registering to become an organ donor?

Appendix C

Items for Four Dimensions of Belief-Based Attitudes (with English Translations)

Positive affective belief statements

1. 注册成为器官捐献者让我有成就感

Registering to become an organ donor makes me feel fulfilled.

2. 注册成为器官捐献者让我感到满足

Registering to become an organ donor makes me feel honored.

3. 注册成为器官捐献者让我觉得自豪

Registering to become an organ donor makes me proud.

Positive cognitive belief statements

1. 注册成为器官捐献者体现了我的社会责任感

By registering to become an organ donor, I am committed to social responsibility.

2. 注册成为器官捐献者体现了我的人生价值

Registering to become an organ donor reflects my life values.

3. 注册成为器官捐献者会让我获得社会的尊重

Registering to become an organ donor helps me win respect from others.

Negative affective belief statements

1. 注册成为器官捐献者让我感到害怕

Registering to become an organ donor evokes my fear.

2. 注册成为器官捐献者让我感到担心

Register to become an organ donor elicits my anxiety.

3. 注册成为器官捐献者让我感到不安

Registering to become an organ donor makes me uneasy.

Negative cognitive belief statements

1. 注册成为器官捐献者会让我遭到他人的不理解和非议

Register to become an organ donor makes me vulnerable to misunderstandings.

2. 如果我注册成为器官捐献者，我会违背中国传统观念

Register to become an organ donor makes me violate traditional Chinese values.

3. 注册成为器官捐献者会影响我和家人之间的关系

Registering to become an organ donor impairs my relationship with my family.

4. 注册成为器官捐献者让我在离世之后不能“入土为安”

Registering to become an organ donor impedes me being able to be “buried and at rest.”

Appendix D

Items for Revised Two Dimensions of Belief-Based Attitudes (with English Translations)

Positive belief statements

1. 注册成为器官捐献者让我有成就感

Registering to become an organ donor makes me feel fulfilled.

2. 注册成为器官捐献者让我感到满足

Registering to become an organ donor makes me feel honored.

3. 注册成为器官捐献者让我觉得自豪

Registering to become an organ donor makes me proud.

4. 注册成为器官捐献者体现了我的社会责任感

By registering to become an organ donor, I am committed to social responsibility.

5. 注册成为器官捐献者体现了我的人生价值

Registering to become an organ donor reflects my life values.

6. 注册成为器官捐献者会让我获得社会的尊重

Registering to become an organ donor helps me win respect from others.

Negative belief statements

1. 注册成为器官捐献者让我感到害怕

Registering to become an organ donor evokes my fear.

2. 注册成为器官捐献者让我感到担心

Register to become an organ donor elicits my anxiety.

3. 注册成为器官捐献者让我感到不安

Registering to become an organ donor makes me uneasy.

4. 注册成为器官捐献者会影响我和家人之间的关系

Registering to become an organ donor impairs my relationship with my family.

5. 注册成为器官捐献者让我在离世之后不能“入土为安”

Registering to become an organ donor impedes me being able to be “buried
and at rest.”

Appendix E

Items of Study Variables in Study 2 (Excluding Attitudes)

Subjective Norms

1. Most people who are important to me think that I should be willing to register to become an organ donor.
2. Most people whose opinion I value consider that I should be willing to register to become an organ donor.
3. Most people close to me expect me to register to become an organ donor.

Personal descriptive norms

1. Most people who are important to me are willing to register to become an organ donor.
2. Most people whose opinions I value are willing to register to become an organ donor.
3. Most people who are close to me are willing to register to become an organ donor.

Personal injunctive norms

1. Most people whose opinion I value would approve of my wish to register to become an organ donor.
2. Most people who are important to me would endorse my wish to register to become an organ donor.
3. Most people who are close to me would support my wish to register to become an organ donor.

Distrust of organ allocation system

1. The decision on who gets donated organs is unfair.

Intention to register to become an organ donor

1. I am willing to register to become an organ donor.
2. At some time in the future, I plan to fill the organ donor registration application.
3. I have thought about filling the organ donor registration application.

Experience with organ donation

1. Have you registered as an organ donor?

YesNo
2. Are you an organ recipient?

YesNo
3. Do you personally know someone who is an organ donor?

YesNo
4. Do you personally know someone who is an organ recipient?

YesNo
5. Do you personally know someone who needs an organ transplant?

YesNo

Appendix F

The Stimuli Messages in the Experiment of Study 3 (with English Translations)

Statistical Message 1 (characters: 303)

卫生部的统计数字显示，我国每年约有 150 万人因器官功能衰竭需进行器官移植，但每年仅仅有 1% 的患者（1 万人左右）能够得到移植治疗，其余超过 99% 的患者都要在无望的等待中死亡。我国的器官需求与供给的比例是 150:1；而世界卫生组织统计的全球平均数是 20 或 30:1。在一些西方发达国家，器官供需比则更高，比如，美国是 5:1，英国则是 3:1。我国于 2010 年在十个省、市、自治区启动人体器官捐献试点，旨在探索人体器官捐献体系，缓解器官源稀缺。截至 2014 年 9 月，我国器官捐献志愿报名登记人数已经达到 29077 人，累计实现公民逝世后器官捐献 2336 例，累计捐献器官 6445 个。但由于我国人口众多，器官供不应求的状况仍然十分严峻。只有更多的公民自愿成为器官捐献志愿者，才能打破这一窘境。

According to the statistics from the Ministry of Health, approximately 1.5 million of Chinese people need organ transplant each year, but only 1% of them (around 10,000) are able to receive a transplantation. The remaining more than 99% of them could only hopelessly wait for death. In China, the demand-supply ratio for organs is 150:1; but the worldwide average demand-supply ratio is 20:1 or 30:1 according to World Health Organization. In some developed countries, the demand-supply ratio is much higher than the average, for example, 5:1 in the United States and 3:1 in the United Kingdom. The national government has launched an organ donation program in ten pilot regions to expand the pool of available organs. As of September 2014, the number of registered organ donors reached 29,077, and in total 2,336 posthumous organ donors donated 6,445 organs. However, we still face a serious shortage of organs, which could only be solved if more people are willing to register as organ donors.

Statistical Message 2 (characters: 303)

据卫生部统计，我国每年约有 150 万人因器官功能衰竭需进行器官移植，但每年仅有 1% 的患者（1 万人左右）能够得到移植治疗，其余超过 99% 的患者都要在无望的等待中死亡。我国于 2010 年在十个省、市、自治区启动人体器官捐献试点，旨在探索人体器官捐献体系，缓解器官源稀缺。但是，到目前为止，我国仍面临严峻的器官短缺问题。2003 年我国“公民逝世后器官捐献”数字还是零，经过多年的努力，我国器官捐献率达到了每百万人 0.03 例；而在欧盟，捐献率是每百万人 17.8 例，在美国捐献率则是每百万人 26.5 例。与全球器官捐献率最高的西班牙相比（每百万人 35 例），我国的器官捐献率只有其千分之一。只有更多的公民自愿成为器官捐献志愿者，才能使我国严峻的器官短缺问题得到缓解。

According to the statistics from the Ministry of Health, approximately 1.5 million of Chinese people need organ transplant each year, but only 1% of them (around 10,000) are able to receive a transplantation. The remaining more than 99% of them could only hopelessly wait for death. The national government launched an organ donation program in ten pilot regions in 2010 to expand the pool of available organs. Yet the shortage of organs is still huge. In 2013, the number of posthumous organ donors was zero in China. Now, the organ donor rate reaches to 0.03 per million population (pmp). However, it is a very small number compared with other countries. The organ donor rate is 17.8 pmp in the European Union and 26.5 pmp in the United States. Compared with Spain, which has the highest organ donor rate per million population (35 donors pmp), our organ donor rate only equals to its one out of thousand. The shortage of organs in China could only be solved if more people are willing to register as organ donors.

Narrative Message – Version 1 (characters: 303)

吴金，19 岁，是山东省潍坊市一名高三毕业生。去年 8 月 1 日，他接到电话得知自己被山东财经大学录取，但通知书却被寄回了老家。8 月 7 日，吴金一家四口专程赶回老家取通知书。就在路上，车祸发生了，吴金被甩了出去。经过抢救，吴金被医生宣告脑死亡。这时，吴金的妈妈想起来，他以前对自己说过身后要进行器官捐献的话。“他跟我说这个事的时候，特别的认真，还给我看了他填写的《中国人体器官捐献志愿登记表》。现在，也算帮他完成了这个愿望……”吴妈妈哽咽着说。8 月 11 日，吴金的肝脏、心脏和两个肾脏被获取，并成功移植到了四位病人的体内。接受吴金心脏移植的病人之前患有严重的心肌炎，病情最严重时甚至想过放弃生命，移植手术过后她的病情大幅好转。

Jin Wu, 19 years old, is a high school graduate in Weifang, Shandong Province. On last August 1, he got a phone call that informed his acceptance of Shandong University of Finance and Economics. Nevertheless, for some reasons, his acceptance letter was mailed to his hometown, instead of his current address. On August 7th, Wu family drove to their hometown. Unfortunately, an accident was taken place, and Jin was thrown out of the car during a crash. He was declared brain dead in spite of a rescue effort. While Jin's mother was extremely sorrowful, she still remembered that Jin's willingness to become an organ donor, "He talked to me and I knew that he genuinely wants to become an organ donor. Now, it seems the time to help him realize this wish ...". Ms. Wu sobbed out. On August 11, Jin's heart, liver, and kidney have been transplanted to four patients. One patient who received Jin's heart has suffered from severe myocarditis and was thinking about suicide. However, she was able to recover substantially after this organ transplantation.

Narrative Message – Version 2 (characters: 303)

21 岁的李静是郑州大学外语系的学生。今年春节过完，李静开始觉得左侧腰疼痛难忍。刚开始，李静以为只是小毛病，就在学校医院里拿了点药。可是，疼痛逐渐加重，李静每天弓着腰一点点挪到教室。后来，她甚至连书也拿不起来了。今年3月9日，她在河南省人民医院被确诊得了肾癌，并伴随双肺转移，即肾癌晚期。虽然父母、老师、还有同学都日夜陪伴着她，李静的病情还是日趋恶化。住院一周后，李静突然陷入昏迷。虽然承受着巨大的悲痛，李静的父母还是告知了主治医生，她一直以来的愿望是做一名器官捐献志愿者，并且已填写了《中国人体器官捐献志愿登记表》。经过两个小时的抢救，医生宣告李静死亡。随后，李静的心脏和眼角膜成功地移植到了三位病人的体内。

21-year-old Jing Li is an undergraduate from Foreign Language Department, Zhengzhou University, Henan Province. After this Chinese New Year Jing started feeling sudden pain on the left side of her lower back. At the beginning, Jing thought it might be just a small problem, so she went to the university's medical center and got some painkillers. However, the pain became aggravated and impeded her physical performance. She was not able to straighten her back and had even no strength to carry a single book. On March 9, she was sent to Henan Provincial People's Hospital where she was diagnosed with advanced kidney cancer, which was also metastasized to her lungs. During her hospitalization, her parents, teachers, and classmates accompanied her for support. Yet Jing's condition deteriorated, and she slipped into a coma on the 7th day of hospitalization. While Jing's parents were under tremendous grief, they followed Jing's will and told the physician that she wants to become an organ donor and has signed the organ donor application form. After an almost two-hour rescue effort, she was declared dead. However, her heart and cornea were successfully transplanted to three patients.

Combined Message – Version 1 (characters: 303)

吴金，19岁，山东省潍坊市一名高三毕业生。去年8月7日，在回老家取录取通知书的路上，他不幸遭遇了车祸。经过抢救，吴金被医生宣告脑死亡。这时，吴金的妈妈想起他以前说过身后要进行器官捐献的话。“他跟我说这事的时候，特别的认真，还给我看了他的《器官捐献志愿登记表》。现在，也算帮他完成了这个愿望……”吴妈妈哽咽着说。随后，吴金的心脏、肝脏和两个肾脏被获取，并成功移植到了四位病人的体内。据悉，我国于2010年在十个省、市、自治区启动人体器官捐献试点。截至14年9月，我国器官捐献志愿者登记人数已经达到29077人，已实现器官捐献2336例。但我国仍面临着严峻的器官短缺问题。只有更多的公民自愿成为器官捐献志愿者，才能满足我国器官移植的需求。

Jin Wu, 19 years old, is a high school graduate in Weifang. On August 7th, Wu family drove to their hometown. Unfortunately, an accident was taken place, and Jin was thrown out of the car during a crash. He was declared brain dead in spite of a rescue effort. While Jin's mother was extremely sorrowful, she still remembered that Jin's willingness to become an organ donor, "He talked to me and I knew that he genuinely wants to become an organ donor. Now, it seems the time to help him realize this wish ..." Ms. Wu sobbed out. On August 11, Jin's heart, liver, and kidney have been transplanted to four patients. The national government has launched an organ donation program in ten pilot regions to expand the pool of available organs in 2010. As of September 2014, the number of registered organ donors reached 29,077, and in total 2,336 posthumous organ donors donated 6,445 organs. However, we still face a serious shortage of organs, which could only be solved if more people are willing to register as organ donors.

Combined Message – Version 2 (characters: 303)

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21-year-old Jing Li is an undergraduate from Foreign Language Department, Zhengzhou University, Henan Province. After this Chinese New Year Jing started feeling sudden pain on the left side of her lower back. Later, the pain became aggravated and impeded her physical performance. On March 9, she was diagnosed with advanced kidney cancer. On the 7th day of her hospitalization, Jing's condition deteriorated, and she slipped into a coma. While Jing's parents were under tremendous grief, they followed Jing's will and told the physician that she wants to become an organ donor. After an almost two-hour rescue effort, she was declared dead. However, her heart and cornea were successfully transplanted to three patients. The national government launched an organ donation program in ten pilot regions in 2010 to expand the pool of available organs. Now, the organ donor rate in China is 0.03 per million population (pmp). Compared with Spain, which has the highest organ donor rate per million population (35 donors pmp), our organ donor rate only equals to its one out of thousand. We still face a serious shortage of organs, which could only be solved if more people are willing to register as organ donors.

Appendix G

The Items from Maio and Esses (2001)'s Need for Affect Approach and Avoidance Scales Used in Study 3 (with Chinese Translations)

Need for Affect – Approach ($\alpha = .81$)

1. It is important for me to be in touch with my feelings.

随时感知自己的感觉很重要。

2. I think that it is important to explore my feelings.

我认为探索自身的感受很重要。

3. I am a very emotional person.

我是个多愁善感的人。

4. It is important for me to know how others are feeling.

对我来说，了解他人的感觉很重要。

5. Emotions help people get along in life.

情感帮助人们在生活中相处。

6. Strong emotions are generally beneficial.

总的来说，强烈的情感是有益的。

7. I feel that I need to experience strong emotions regularly.

我觉得自己时常需要体验一些强烈的情感。

8. I approach situations in which I expect to experience strong emotions.

对于一些我认为可能体验到强烈情感的情境，我会主动接近。

9. I feel like I need a good cry every now and then.

我会不时地觉得自己需要好好哭一场。

10. I like to dwell on my emotions.

我乐意宣泄自己的感情。

11. We should indulge our emotions.

我们应该放纵自己的感情。

12. I like decorating my bedroom with a lot of pictures and posters of things emotionally significant to me.

我喜欢用很多在情感上对于我重要的照片和海报来装饰我的卧室。

13. The experience of emotions promotes human survival.

体验情感促进人类的生存。

Need for Affect – Avoidance ($\alpha = .78$)

1. I do not know how to handle my emotions, so I avoid them.

我不知道该怎么处理我的感情，所以我回避它们。

2. I find strong emotions overwhelming and therefore try to avoid them.

我发现强烈的感情会带来压力，所以我试着回避它们。

3. Emotions are dangerous—they tend to get me into situations that I would rather avoid.

感情是危险的，它很可能把我卷入我避之不及的境况中。

4. I would prefer not to experience either the lows or highs of emotion.

我不愿去体验那些情感的跌宕起伏。

5. If I reflect on my past, I see that I tend to be afraid of feeling emotions.

回忆过去，我发现我害怕体验情感。

6. I would love to be like “Mr. Spock,” who is totally logical and experiences little emotion.

我愿像《星际迷航》里的Mr. Spock一样，完全用逻辑来思考而不体验情感。

7. I have trouble telling the people close to me that I love them.

告诉亲近的人“我爱他们”，让我觉得有些不自然。

8. Displays of emotions are embarrassing.

表露情感是尴尬的。

9. Acting on one's emotions is always a mistake.

感情用事总是错的。

10. I am sometimes afraid of how I might act if I become too emotional.

如果我变得非常情绪化，有时候我都害怕自己可能会做出什么行为。

11. Avoiding emotional events helps me sleep better at night.

回避情绪事件让我晚上睡得更好。

12. I wish I could feel less emotion.

我希望自己体验到更少的情感。

13. People can function most effectively when they are not experiencing strong emotions.

人们在不体验强烈情感的时候，能够最有效率地工作。

Appendix H

Re-Analysis of Study 3' Results: Using Positive and Negative Beliefs as the Dependent Variables

The dependent variables are positive beliefs and negative beliefs. Adopted from Study 1, the measure of positive beliefs includes six items, $M = 4.71$, $SD = 1.30$, $\alpha = .91$, and the measure of negative beliefs includes five items, $M = 3.67$, $SD = 1.46$, $\alpha = .85$.

The data were analyzed using a set of GLMs that treat each dependent variable separately. Each model includes two categorical independent variables: *evidence type* [*statistical, narrative, and combined*] and *the numbers of cues* [*large versus small*], two continuous independent variables: *NFA approach* and *NFA avoidance*, and two interaction terms: *evidence type* $\times$ *NFA approach* and *evidence type* $\times$ *NFA avoidance*.

In terms of negative beliefs, the results showed only an significant direct effect of NFA approach, $F(1, 297) = 29.23$, $p < .001$, $\eta^2 = .09$. Similarly, in terms of positive beliefs, the results showed only an significant direct effect of NFA avoidance, $F(1, 297) = 10.43$, $p < .001$, $\eta^2 = .03$. Thus, when consider beliefs as a two-dimensional concept, neither the main effects (from evidence type and the number of cues) nor the interaction effects reach a significant level.

Footnotes

¹In this doctoral thesis, the term “organ donation” refers only to deceased organ and tissue donation and does not include organ donation from living donors.

²According to Pruitt, Graus, and Rosenfeld (2012), solid organ transplantation refers to “the receipt of an entire organ such as heart, lung, liver, pancreas, or kidney from tissue-matched deceased donors or to receipt of kidney or partial liver or intestinal tissue from a recipient-related or matched unrelated living donor” (p. 152).

³Some other state media have reported that the number of patients who need organ transplant per year is 300,000 in China (e.g., Li, 2013). Although there is a waiting list in China organ transplant response system (www.cot.org.cn) (which is the official computer system for organ allocation), the general public has no access to this system. As well, on the website of China organ donation administrative center (<http://www.china-organdonation.org>), there is no publicly available information on how many Chinese people are waiting for organ transplant either. Thus, the reported numbers of people who need organ transplants on Chinese media have not been confirmed by official resources.

⁴Robust maximum likelihood (MLM) estimation is capable of estimating “maximum likelihood parameter estimates with standard errors and a mean-adjusted chi-square test statistic that are robust to non-normality” (Muthén & Muthén, 1998-2015, p. 607). In addition, the robust versions of the CFI, TLI, and RMSEA are also computed, which means their values are valid despite violations of the normality assumption underling the estimation method (Byrne, 2012). In her book, Byrne (2012) recommends that “from a purely practical perspective, it seems clearly reasonable always to base model analyses on the robust estimator if and when it is appropriate to do so” (p. 100).