

**MEDICAL DECISION-MAKING BY CHINESE  
DESCENT CANCER PATIENTS IN PENANG AND  
YUNNAN**

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**MEDICAL DECISION-MAKING BY CHINESE  
DESCENT CANCER PATIENTS IN PENANG AND  
YUNNAN**

by

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Every cancer treatment and treatment choice is difficult, suffering, and painful for each cancer patient and the family. However, in decades of fighting cancer, my mother never backed down or gave up. She fought cancer again and again with her courage, tenacity and fortitude. It is these qualities of hers that give me the strength to go forward every time I encounter difficulties.

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## LIST OF ABBREVIATIONS

BSE	Breast Self-Examination
CLT	Construal Level Theory
CRC	Colorectal Cancer
FTT	Fuzzy Trace Theory
HPV	Human Papilloma-virus
PtDAs	Patient Decision Aids
PT	Prospect Theory
SDM	Shared Decision-Making
TCM	Traditional Chinese Medicine

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**PEMBUATAN KEPUTUSAN PERUBATAN OLEH PESAKIT KANSER  
KETURUNAN CINA DI PULAU PINANG DAN YUNNAN**

**ABSTRAK**

Kajian ini meneroka keutamaan keputusan perubatan yang berkaitan dengan rawatan kanser dalam kalangan individu keturunan Cina menggunakan empat tugas membuat keputusan perubatan yang berbeza. Di samping itu, kajian ini mengkaji bagaimana pemingkaian positif berbanding negatif mempengaruhi perubatan keutamaan keputusan dengan menggunakan sama ada istilah positif (cth., tumor telah mengecut, tumor boleh dibuang) atau istilah negatif (cth., tumor tidak mengecut, tumor tidak boleh dikeluarkan) untuk menerangkan hasil rawatan rawatan yang ada. Tambahan pula, kajian ini bertujuan untuk memahami keutamaan keputusan perubatan peserta berdasarkan jarak psikologi menggunakan Teori Tahap Konstrual (CLT) sebagai rangka kerja. Kajian kuantitatif ini menggunakan dua sampel individu berketurunan Cina, yang diambil masing-masing dari Pulau Pinang, Malaysia (Sampel 1) dan Kunming, Yunnan, China (Sampel 2), dan kedua-dua sampel menyelesaikan eksperimen yang sama. Setiap sampel terdiri daripada dua kumpulan peserta berketurunan Cina. Kumpulan kanser terdiri daripada peserta dengan diagnosis kanser dan kumpulan kawalan terdiri daripada peserta tanpa diagnosis kanser. Dalam Sampel 1, peserta dalam kumpulan kanser telah diambil daripada kumpulan sokongan kanser sukarela di Pulau Pinang, dan peserta dalam kumpulan kawalan telah diambil dari Universiti Sains Malaysia (USM) dan warganegara di Pulau Pinang. Dalam Sampel 2, peserta dalam kumpulan kanser dan kawalan, masing-masing, telah diambil dari Persatuan Pemulihan Kanser, Persatuan Palang Merah China Cawangan Yunnan dan warganegara di Kunming, Yunnan, China.

Sejumlah 133 respons dalam kumpulan kanser dan 142 respons dalam kumpulan kawalan dianalisa untuk Sampel 1 ( $N_1=287$ ). Sejumlah 143 respons dalam kumpulan kanser dan 144 respons dalam kumpulan kawalan dianalisa untuk Sampel 2 ( $N_2=300$ ). Ujian-T dan ANOVA dua hala digunakan untuk menentukan sebarang perbezaan yang ketara dalam keutamaan keputusan perubatan antara kedua-dua kumpulan peserta. Dalam kesemua empat tugas membuat keputusan perubatan, kesan pembingkaihan diperhatikan secara konsisten dalam kalangan peserta kumpulan kawalan dalam kedua-dua sampel. Mereka dalam kumpulan kawalan menunjukkan keutamaan yang berbeza dengan ketara dalam kesemua keadaan pembingkaihan. Tiada kesan pembingkaihan diperhatikan dalam kalangan peserta kumpulan kanser daripada kedua-dua sampel. Mereka dalam kumpulan kanser menunjukkan keutamaan yang sama dalam semua keadaan pembingkaihan, tanpa mengira tugas membuat keputusan perubatan. Di samping itu, penemuan daripada kedua-dua sampel mencadangkan bahawa apabila terdedah kepada senario keputusan rawatan kanser, pendekatan jarak psikologi peserta kumpulan kanser kelihatan diaktifkan, manakala penjarahan jarak psikologi peserta kumpulan kawalan kelihatan diaktifkan. Kajian ini menunjukkan bahawa pembingkaihan positif atau negatif tidak mempengaruhi keutamaan rawatan peserta kumpulan kanser, dan satu kemungkinan ialah persepsi jarak dekat psikologi boleh mendorong cara pemprosesan maklumat yang terperinci dan rumit, dan dengan itu boleh melemahkan pengaruh pembingkaihan terhadap keputusan. Selain itu, kajian ini mencadangkan bahawa peserta kumpulan kanser lebih berkemungkinan menumpu kepada ciri-ciri berkaitan rawatan bagi pertimbangan kemungkinan (feasibility) berbanding pertimbangan kemahuan (desirability) dalam proses membuat keputusan perubatan mereka. Akhir sekali, kajian ini juga mencadangkan implikasi praktikal berdasarkan dapatan ini.

**MEDICAL DECISION-MAKING BY CHINESE DESCENT CANCER  
PATIENTS IN PENANG AND YUNNAN**

**ABSTRACT**

This study aimed to explore medical decision preference associated with cancer treatment among Chinese descent individuals using four different medical decision-making tasks. Additionally, this study also aimed to examine the framing effect or how positively (e.g., tumors have shrunken, tumors can be removed) and negatively (e.g., tumors did not shrink, tumors cannot be removed) conveyed medical information to describe available treatment outcomes influence medical decision preference. Furthermore, this study aimed to understand medical decision preferences of participants based on psychological distance using the Construal Level Theory (CLT) as framework. This quantitative study used two samples of Chinese descent individuals, which were drawn from Penang, Malaysia (Sample 1) and Kunming, Yunnan, China (Sample 2), respectively, and both samples completed the same experiment. There were two groups in both samples. The cancer group consisted of participants with a cancer diagnosis and the control group consisted of participants without a cancer diagnosis. In Sample 1, participants in the cancer group were recruited from voluntary cancer support groups in Penang, and participants in the control group were recruited from Universiti Sains Malaysia (USM) and citizens in Penang. In Sample 2, participants in the cancer and control groups, respectively, were recruited from the Cancer Rehabilitation Association, the Red Cross Society of China Yunnan Branch and citizens in Kunming, Yunnan, China. In Sample 1 (N1=287), a total of 133 responses in the cancer group and 142 responses in the control group were included in the final analyses. In Sample 2 (N2=300), a total of

143 responses in the cancer group and 144 responses in the control group were included in the final analyses. T-tests and two-way ANOVAs were used to determine any significant differences in medical decision preference between the two groups of participants. Across four medical decision-making tasks, framing effect was consistently observed among control group participants in both samples. Those in the control group displayed significantly different preferences across framing conditions in the study's medical decision-making tasks. No framing effect was observed among cancer group participants in both samples. Those in the cancer group displayed similar preferences across framing conditions, regardless of the medical decision-making task. In addition, findings from both samples suggested that when exposed to a cancer treatment decision scenario, cancer group participants appeared to be activated near psychological distance, while control group participants appeared to be activated far psychological distance. This study suggested that neither positive nor negative framing significantly influenced treatment preferences of cancer group participants, and one possibility is that near psychological distance perception may induce a detailed and complicated way of information processing, and thus may weaken the influence of framing on decision. Additionally, this study suggested that cancer group participants were more likely to consider treatment-related characteristics of feasibility consideration rather than desirability consideration in their medical decision-making process. Lastly, this study also made several practical implications based on these findings.

## CHAPTER 1

### INTRODUCTION

#### 1.1 Introduction

Cancer is still one of the leading causes of death worldwide, although medical technology for cancer treatment has advanced by leaps and bounds in the past few decades. According to the Union for International Cancer Control (UICC, 2020), an estimated 18.1 million people were newly diagnosed with cancer in 2018 globally. This number is expected to rise to 21.6 million by 2030. According to the latest data provided by World Health Organization (WHO, 2022), about one in six deaths globally is due to cancer. In Malaysia, it is estimated that there is approximately 48 thousand of new cancer cases in 2020, and this number is estimated to increase to 86 thousand by 2040, according to the statistics from Global Cancer Observatory project (Cabasag et al., 2022; Ferlay et al., n.d.). In addition, according to two reports released by the Malaysia National Cancer Registry Department (2016, 2019), in Malaysia, the Chinese is reported to have the highest lifetime risk for cancer in the past ten years, followed by the Malays and the Indians. In China, on the other hand, WHO (2020) estimated approximately 4.3 million people were newly diagnosed with cancer in 2018. About 2.8 million deaths were due to cancer in the same year, which accounted for 36.2% of all deaths from chronic non-communicable diseases (NCDs). In 2022, it is estimated that there is approximately 4.8 million new cancer cases and 3.2 million cancer deaths in China (Xia et al., 2022).

Cancer treatment decision-making may have profound impacts not only on cancer patients, but also on their families (Evans-Webb et al., 2021). In the past, the “Paternalistic Model” dominated the doctor-patient relationship in the process of clinical treatment planning. In this model, doctors act as a parent, and patients receive selected information and instructions from doctors and are expected to follow them (Emanuel & Emanuel, 1992) . In this model of doctor-patient interaction, patients are in a subordinate position and doctors alone decide treatments for patients. Patients’ attitudes towards treatments are not fully considered. However, the ideas and practices in modern medical culture have changed dramatically in the past few decades. In the clinical practice of modern medicine, the importance of individualization and multidisciplinary coordination in each case is generally emphasized (Maes-Carballo et al., 2021) . Individuation has been neglected in the doctor-patient relationship dominated by the “Paternalistic Model”. Modern medicine suggests that the optimal treatment for each patient should be one that best meets the patient’s expectations and needs (Abt Sacks et al., 2016) . Under this principle, a new doctor-patient relationship model which is called Shared Decision-Making (SDM) has been proposed and gained a prominent position in modern medical policy (O’Connor et al., 2007) . Characterized by mutual participation, this new model of doctor-patient relationship encourages patients to be involved in the process of clinical treatment planning. In such a process, medical information is shared and clinical activities are based on patients’ preferences

(Elwyn et al., 2012) . This principle of medical practice emphasizes the need for medical providers to understand patients' preferences.

In Asia, there seems to be a common belief that patients prefer to passively follow the treatment plan chosen by their doctors (Ambigapathy et al., 2016) because Asians are perceived to be shy and obedient (Sharif, 2017; Sharif & Kyid Yeoh, 2016). As a consequence, patients' desire to express their preferences has been dismissed by medical providers in Asia. Studies have suggested that patients from Asian countries such as Malaysia and China desire that they could express their preferences and concerns, and these be considered and valued in the process of clinical treatment planning (Ambigapathy et al., 2016; Miao, 2015; Nies et al., 2017). Under the principle of SDM advocated by modern medical culture, the importance for medical providers to have a deeper understanding of patients' preferences and values are constantly emphasized.

SDM requires medical providers to address patients' preferences, concerns, priorities and personal values more than just expectations of outcomes related to treatment options. Medical providers are likely to prioritize and recommend treatments that afford the best expected treatment effect, taking patients' health status into full consideration. For example, radical cystectomy is recommended for localized muscle-invasive bladder cancer. Although it is one of the standard treatments and affords a higher survival rate (Froehner et al., 2009; Lawrentschuk et al., 2010), it may cause difficulties in life and reduce the life quality of patients, such

as the need for urinary diversion, which is unacceptable to many patients. In such a trade-off between an increased chance of survival and a deterioration of quality of life, cancer patients may have different priorities, perceptions and preferences compared to their medical providers when it comes to making a treatment decision regarding their medical condition (Bernhard et al., 1997; Lindley et al., 1998; Montgomery & Fahey, 2001).

Despite the availability of lifesaving treatment options that may afford improved survival, some patients are less likely to choose them. These clinical observations may be understood in terms of psychological distance. Psychological distance is “*a subjective experience and perception that something is close or far away from the self*” (Trope & Liberman, 2010, pp. 440). It is the core concept of Construal Level Theory (CLT) which is a social cognitive theory. Psychological distance is egocentric and changes with the perceived external (e.g., events, situations, others, objects) with *self* as the reference point. CLT systematically explains that when an issue or event is perceived as psychologically near, the feelings of closeness and proximity and greater emotional intensity towards the issue or event may affect the focus of one’s considerations and evaluations, and give more consideration to those more detailed aspects, such as the potential impact of a cancer treatment on patients’ daily living activity and their families, while relatively less attention to those superordinate aspects such as prolonging life.

This study was interested in understanding considerations and tendencies of individuals with a cancer diagnosis in choosing more acceptable and preferred cancer treatments on the basis of psychological distance. To better understand medical decision preferences, this study examined different factors – risk and time – associated with medical decisions in a medical decision-making. In the current study, *medical decision-making* refers to a strategy and process in which one selects the most acceptable option from two or more treatment options in a medial context. In addition, *medical decision preference* refers to one’s attitude towards choosing a treatment among different treatment options. Based on the framework of CLT, this study developed two simple (single type) medical decision-making tasks and investigated medical decision preferences when participants needed to consider a risk factor or a time factor, respectively, in a medical decision-making task. The former was called “*medical risk decision-making*”, in which participants needed to consider a risk factor associated with treatment outcome in the task (i.e., medical risk, uncertain outcome vs. certain outcome); while the latter, termed “*medical intertemporal decision-making*” which required consideration of a time factor related to the point in time of treatment implementation (i.e., treatment delay, immediate treatment vs. delayed treatment) in the task. Meanwhile, two complex (compound type) medical decision-making tasks were developed to investigate preferences when both risk and time factors were considered in a medical decision-making task. The two complex (compound type) tasks were referred to as “*medical risk-intertemporal decision-making*” and “*medical intertemporal-risk*”

*decision-making*”, respectively. The former is a medical risk decision-making under an intertemporal condition, and the latter is a medical intertemporal decision-making under a risky condition. Furthermore, this study also examined whether different ways of representations of medical information (known as framing) affected participants’ medical decision preferences when different terms (positive terms vs. negative terms) were used to describe the same medical decision-making scenario and available treatment options.

This study may be one of the first few studies looking specifically at medical decision preferences of individuals with cancer based on psychological distance. This is a preliminary exploration, therefore, this study used two samples drawn from Malaysia and China to test the validity of study materials developed. Meanwhile, it is necessary to consider that cultural background is an important multilevel contextual factor that may directly or indirectly influence patients’ preferences in a medical context (Yeary et al., 2018) . Malaysia is a multicultural country. Given the significant and complex influence of cultural and religious beliefs in a medical decision-making, to control for the possible influence of these factors on treatment preferences of a multi-ethnic sample, the current study chose to only focus on medical decision preferences of Malaysian-Chinese who have been diagnosed with cancer (Sample 1) and attempt to replicate findings among a similar group of participants in China (Sample 2).

Despite coming from two different countries, these Chinese descent individuals share the same cultural background and similar beliefs as well as attitudes towards health (Vivien et al., 2013; Vivien & Noor, 2012). Traditional Chinese culture, ancient Chinese philosophy, and thoughts and practices of traditional Chinese medicine still play an important role in medical decision-making and health-seeking among those Chinese descent individuals from both countries (Lee & Li, 2021; Maskarinec et al., 2000; Ng et al., 2019; Tan et al., 2018). Based on these observations, this study suggested that Chinese descent individuals with cancer from the two countries, Malaysia and China, would display similar preferences and considerations when faced with a cancer treatment decision-making problem. Therefore, this study was conducted using two samples of participants to validate the experimental tasks and sought replicability of findings. The first sample (Sample 1) was drawn from Penang, Malaysia and the second sample (Sample 2) from Yunnan, China. Both samples completed the same experiment. This study explored medical decision preferences of Chinese descent individuals with a cancer diagnosis in Malaysia and examined if these findings replicated in China.

## **1.2 Problem Statement**

As preferences of cancer patients are increasingly given the primary consideration in clinical treatment and care planning, the factors in the process of conveying medical information need special attention, such as how medical information is represented or described (known as framing or information framing).

Patients' medical decision preferences may be affected by the way of representations of treatment information, known as framing effect. Unlike treatment providers who can rationally analyse different treatments based on professional knowledge, patients are more likely influenced by statements of treatment information because that may be the only professional or expert information they could rely on when making decisions. This may lead to decision bias of patients in the medical decision-making process, which may increase the possibility of patients' regret for medical decisions in the future, and reduce patients' satisfaction with treatment, thus affecting the quality of treatment and detrimental to the rehabilitation of patients after treatment.

Secondly, possible mismatch of priorities and concerns between patients and medical providers may cause conflicts during an already stressful period of living with a cancer diagnosis. In both Malaysia and China, these problems are likely to be exacerbated by the increasing number of cancer cases and limited medical resources, especially in less developed regions. In the process of clinical diagnosis and consultation, medical providers need to face a large number of patients every day. Limitations in time and energy become an obstacle to effective communication between doctors and patients. Poor quality doctor-patient communication and discrepancies in treatment considerations between them may lead to more serious problems, such as lack of trust in doctors or low satisfaction with medical services, which may lead patients to withdraw from or even refuse treatment, and consequently, further worsen their condition. Therefore, more research and understanding of medical decision preferences of cancer patients is not only

consistent with the principles and ideas of modern medical care practice, but may also provide valuable references for clinicians to push forward clinical conversations with patients in the limited time they have, without compromising patients' sense of autonomy in the clinical treatment planning process.

### **1.3 Research Questions**

The current study attempted to answer the following four questions:

Question 1: How does framing (positive vs. negative) affect medical decision preference of participants in the cancer group and the control group in *medical risk decision-making*?

Question 2: How does framing (positive vs. negative) affect medical decision preference of participants in the cancer group and the control group in *medical intertemporal decision-making*?

Question 3: How does framing (positive vs. negative) affect medical decision preference of participants in the cancer group and the control group in *medical risk-intertemporal decision-making*?

Question 4: How does framing (positive vs. negative) affect medical decision preference of participants in the cancer group and the control group in *medical intertemporal-risk decision-making*?

## 1.4 Research Objectives

The current study focused on decision-making in a medical context. It aimed to investigate medical decision preference using four medical decision-making tasks – medical risk decision-making, medical intertemporal decision-making, medical risk-intertemporal decision-making and medical intertemporal-risk decision-making – between two groups of participants (cancer group and control group). Participants who have received a cancer diagnosis were assigned to the cancer group and individuals who have never received a cancer diagnosis were assigned to the control group. This study examined how positive versus negative framing (e.g., tumors have shrunk significantly vs. tumors did not shrink significantly) influence medical decision preferences in the four medical decision-making tasks.

Additionally, how patients perceive, understand and compare different cancer treatment options in the medical decision-making process can be understood and explained by the constructs psychological distance. Using Construal Level Theory (CLT) as framework, this study explained the findings or participants' medical decision preferences based on their psychological distance in the medical decision-making scenario (task).

Specifically, the current study aimed to achieve the following four objectives:

Objective 1: To examine medical decision preference of participants in the cancer group and the control group in *medical risk decision-making* in the positive and negative framing conditions.

Objective 2: To examine medical decision preference of participants in the cancer group and the control group in *medical intertemporal decision-making* in the positive and negative framing conditions.

Objective 3: To examine medical decision preference of participants in the cancer group and the control group in *medical risk-intertemporal decision-making* in the positive and negative framing conditions.

Objective 4: To examine medical decision preference of participants in the cancer group and the control group in *medical intertemporal-risk decision-making* in the positive and negative framing conditions.

## **1.5 Hypotheses**

The current study proposed four hypotheses corresponding to the four research objectives:

Hypothesis 1: In a *medical risk decision-making*, there is a significant difference in medical decision preference between the control group and the cancer group in the positive framing condition, in contrast to the negative framing condition.

Hypothesis 2: In a *medical intertemporal decision-making*, there is a significant difference in medical decision preference between the control group and the cancer group in the positive framing condition, in contrast to the negative framing condition.

Hypothesis 3: In a *medical risk-intertemporal decision-making*, there is a significant difference in medical decision preference between the control group and the cancer

group in the positive framing condition, in contrast to the negative framing condition.

Hypothesis 4: In a *medical intertemporal-risk decision-making*, there is a significant difference in medical decision preference between the control group and the cancer group in the positive framing condition, in contrast to the negative framing condition.

## **1.6 Significance of Study**

Today, the incidence of cancer among ethnic Chinese is increasing both in China and Malaysia. An understanding of preferences and priorities among these Chinese descent individuals with cancer from small cities in both Malaysia and China may be helpful for treatment providers to better address their concerns and may be valuable in improving the practice of SDM locally.

This study sought to understand how these Chinese descent individuals with cancer may mentally process certain information (e.g., treatment options) by studying their medical decision preferences from the perspective of psychological distance. Currently, there are limited studies focusing on medical decision preferences from this perspective. This understanding can help healthcare providers in both countries shift their perspective when evaluating decisions during the clinical process to better predict preferences of cancer patients from Chinese community. This not only promotes a deeper understanding and empathy of patients, but also helps physicians improve the quality of their clinical conversations with patients in the limited time they have. In addition, these findings may provide important

references for training and improving the skills of medical students in doctor-patient interaction with related ethnic group in clinical practice.

Additionally, for chronic diseases such as cancer, the long and complex course of treatment requires a long period of interaction between medical providers and patients. In many cases, cancer treatment regimens are complex and varied, which may include different sessions and stages, and time is a factor that cannot be ignored in the process. Cancer patients hence often find themselves having to make decisions while considering various factors in reality. Patients often must consider not only the risks about one treatment but also when they could receive or start the treatment. For example, an advanced medical equipment might reduce the risks of treatment; however, limited medical resources often lead to long waiting lists for patients who hope to receive the treatment. This may be more common in those less developed countries and areas. In such cases, patients would have to decide whether to wait to receive this new treatment. Exploring preferences of cancer patients regarding different time points of treatment received can help treatment providers understand the priorities and concerns of cancer patients in the medical decision-making process from multiple dimensions.

## **1.7 Scope of Study**

This study investigated how (positive vs. negative) framing influences medical decision-making while considering psychological distance. The population of this study is urban Chinese descent individuals with a cancer diagnosis (cancer

group) or without a cancer diagnosis (control group) from both Malaysia and China. This study was conducted in Penang, Malaysia and Kunming, Yunnan, China.

In terms of population composition, Chinese make up about 40% of the total population of Penang, and in particular, George Town remains a Chinese-majority city (Department of Statistics Malaysia, 2019). In addition, the Chinese community in Penang is considered to still retain a certain degree of the characteristics of the Chinese nation. For example, the local Chinese show a relatively high Chinese identity and little westernization (Carstens, 2003; Ma, 2005). This study therefore drew the first Chinese sample in Penang to control for some confounding variables such as westernization of participants. The second Chinese sample was drawn in Yunnan. In terms of urban characteristics and economic structure, Penang and Yunnan have certain similarities, such as the services sector as the largest economic sector, and both are famous for tourism. This study drew the two samples from these two locations to recruit participants with presumably similar living environments to control for some possible confounding variables such as personal life style.

## **1.8 Key Operational Definitions**

### **1.8.1 Medical Decision Preference**

Decision preference is defined as an individual's attitude towards making a choice among a set of options (Lichtenstein & Slovic, 2006, p. 96) . This study defined medical decision preference as an individuals' attitude towards choosing a

treatment among different medical treatment options. It was measured by using four medical decision-making tasks and operationalized as participants' scores of preference in decision-making tasks (Chen & He, 2011).

### **1.8.2 Framing and Framing Effect**

In decision-making research, framing (or information framing) refers to the representation of information in a certain context (Pan & Kosicki, 1993). This study used positive and negative framing (i.e., classical framing, see Gong et al., 2013; also known as equivalency framing, see Laker et al., 2018) and described treatment information in either positive terms such as “tumors have shrunken” and “tumors can be removed” (i.e., positive framing) or negative terms such as “tumors did not shrink” and “tumors cannot be removed” (i.e., negative framing) for each medical decision-making task.

Framing effect refers to the phenomenon that a change in decision preference when the same decision-making scenario is represented differently (de Martino et al., 2006) . The current study measured framing effect by comparing participants' medical decision preferences when choosing between two treatment options (Therapy A and Therapy B) across positive and negative framing conditions. A change in medical decision preference across framing conditions indicated the occurrence of framing effect.

### **1.8.3 Psychological Distance**

Psychological distance is defined as an individual's direct experience of the here and now (Trope et al., 2007; Trope & Liberman, 2010). This study measured psychological distance by identifying whether the decision-making scenarios were relevant or irrelevant (binary options) to the participants themselves currently. A response of "relevant" indicated near psychological distance and a response of "irrelevant" indicated far psychological distance.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

This chapter focuses on the literature review of previous studies that are relevant to the current study. This chapter first reviews framing effect in medical decision-making. In addition, framing effects explained by two related theories – Prospect Theory (PT) and Fuzzy Trace Theory (FTT) are also discussed. This chapter also introduces Construal Level Theory (CLT), which includes the concept of psychological distance, the concept of construal level, and the bi-directional relationship between them. Additionally, using Construal Level Theory, this chapter describes how psychological distance could affect cancer patients in medical decision-making. Furthermore, this chapter also introduces cancer patients' decision role preferences in medical decision-making. The influence of cultural factors in medical decision-making is also discussed. The novelty of this study is then introduced. The conceptual framework and predictions of this study are presented at the end of this chapter.

#### 2.2 Medical Decision-Making

Medical decision-making research has been an active field for many years. However, in different disciplines, the definition, research scope, research content, and research methods of medical decision-making are different. Even in the same research field, different scholars have given different definitions.

### **2.2.1 Medical Decision-Making in The Field of Medicine**

In the medical research field, the terms “medical decision-making” and “clinical decision-making” are interchangeable. They are understood and interpreted primarily from the perspective of healthcare providers. The definition given by Western scholars is: medical decision-making or clinical decision-making is a contextual, continuous, and evolving process, during which data needs to be collected, interpreted and evaluated in order to choose an evidence-based choice of action (Tiffen et al., 2014) . Chinese scholars define it as an entire process of choosing the best treatment plan from two or more feasible treatments and organizing implementation so as to provide effective diagnosis and treatment for a patient’s disease, based on advanced medical technology and authoritative medical knowledge system (Wang, 2011).

In general, this field includes two sets of interdependent objectives: (1) understanding how physicians and other healthcare providers make medical decisions, and (2) developing methods to facilitate the medical decision-making process (Patel et al., 2002) . In the past, its core research content focused on the preparation, assessment and application of clinical guidelines manual. Nowadays, digitization is revolutionizing healthcare services, both in hospitals and at home. Multi-disciplinary integration is the current research trend that develops a variety of medical decision-making support tools, which are to provide more efficient and better medical decision references for healthcare providers by using modern information technology and advanced computer technology. For example, the

integration of Artificial Intelligence into clinical practice and the construction of a medical decision support system. Specifically, treatment plans can be optimized by matching clinical information of patients with available knowledge base to assist in the diagnosis of diseases and medical decision-making (Lynn, 2019) . The application of digital technologies as assistants during complex surgical procedures has effectively improved the accuracy of treatment (Abdel-Basset et al., 2019) . Additionally, through the prompt intervention of the diagnosis and treatment process, medical errors can be reduced and the quality of medical care improved (Cai et al., 2019).

Meanwhile, in recent years, the research focus is turned to patients. There is much research effort that focus on the development of Patient Decision Aids (PtDAs), with the ultimate goal of applying them in the clinic, especially in clinical decision conflict scenarios (Stacey et al., 2008). PtDAs are tools that help patients to make the best decision based on their personal values, by displaying available treatment and nursing options and clarifying information about the value of different options and their outcomes (Waitzkin, 1985). PtDAs come in many forms, such as patient letters, videotapes, leaflets, and computer programs in the early days (O'Connor et al., 2003). With the rapid development of modern media technology, the increasing utilization of the internet provides an easier and faster opportunity for patients to search for medical information online. Recent research has focused on the design of PtDAs-based websites and mobile applications. Through collaboration between medical experts and IT personnel, professional, reliable and convincing medical

information can be provided to patients, especially older patients, through a more comprehensible and intuitive way (e.g., pictures, cartoons, figures) on PtDAs websites (Hawley et al., 2018; Scalia et al., 2018; Spronk et al., 2019). Moreover, with the introduction of a Decision Coach, who is a professionally trained medical personnel, patients can now receive objective, neutral and personalized decision guidance through face-to-face or remote clinical counseling. This together with individualized PtDAs containing standard educational materials have facilitated patients in learning medical knowledge pertinent to their condition, reduce clinical decision conflicts, and improve their satisfaction during treatments (Col et al., 2007). Such assistance has freed patients from becoming overwhelmed with conflicting and extraneous medical information online (Chen et al., 2018).

### **2.2.2 Medical Decision-Making in The Field of Psychology**

In the field of psychology, medical decision-making research aims to explore the overall characteristics of individuals' decisions in a medical scenario. Therefore, medical decision-making research is regarded as an extension of decision-making research and an application of decision-making in a medical context.

Decision-making, a strategy or method of making a decision, is the process in which individuals provide ideas and make decisions for various events. It is a common behavior in daily life. Conceptually, decision-making is a management science term that refers to an entire process of selecting the best of two or more alternatives and organizing its implementation to achieve a specific goal, with the help of appropriate tools and the adoption of certain skills and methods. In the field

of psychology, the term “decision-making” refers to selecting an acceptable choice from two or more options (Che, 2001, p. 519). It is a complex cognitive process, involving information gathering, processing, thinking, making final judgments and drawing conclusions (Patel et al., 2002). Therefore, ***medical decision-making*** refers to a strategy and process in which individuals select the most acceptable option from two or more treatment options in a medical context. In decision-making research, decision preference is used to describe individual decision characteristics. Preference refers to one’s relatively stable evaluative judgments in the sense of liking or disliking a certain object (Scherer, 2005), and decision preference refers to an individual’s attitude towards making a choice among a set of options (Lichtenstein & Slovic, 2006, p. 96). By the previous definition, a patient’s attitude towards choosing a medical treatment option among different medical treatment options with different treatment outcomes is referred to as ***medical decision preference***.

In medical decision-making research, scholars are most interested in individual medical decision preference. Under different experimental settings, the study of individual medical decision preference is of practical significance in a realistic medical situation. Medical information itself is highly professional. In clinical practice, it is often presented to patients in forms of “survival” or “death”, and medical outcomes are often described in terms of “survival rate”, “mortality rate” or “survival time”. This specific language description that is different from how a non-medical expert (layman) communicate may significantly affect patients’ medical decision preferences, resulting in sub-optimal decisions that may

subsequently lead to later regret among patients. The increasing number of medical disputes in China, information asymmetry and poor communication between doctors and patients are considered as a significant reason in the current tensed doctor-patient relationship (Zhou et al., 2019) . Therefore, the study of appropriate medical information expression is crucial to improve the quality of communication between doctors and patients in medical decision-making and to reduce the occurrence of medical disputes.

### **2.3 Framing Effect in Medical Decision-Making**

Preference is considered as an individual's relatively stable judgment and attitude towards an object (Scherer, 2005) . In the history of decision-making research, what has long been the authority in this field is the Expected Utility Theory (EUT). Its core concept is "invariance principle", which means a rational decision-maker's decision preference between options would not change following the changes of descriptions or expressions of the same information but should keep the same preference order (von Neumann & Morgenstern, 2007) . For example, according to EUT' invariance principle, there will be no significant difference in one's decision preferences when choosing between "*A. a sure gain of \$240 or B. 25% chance to gain \$1000*" and "*A. a sure loss of \$750 or B. 75% chance to lose \$1000.*" (Tversky & Kahneman, 1985). EUT has been dominant in decision-making research until the Prospect Theory (PT, 1979) proposed by Daniel Kahneman and Amos Tversky was introduced. PT questioned the key assumption of EUT, which

was humans were rational decision-makers, and suggested that individual decision preference varied with the expressions of the option because of imperfections in human decision-making and perception (Tversky & Kahneman, 1985).

### 2.3.1 Framing and Framing Effect

In decision-making research, framing is an important research approach that focuses on the representation of information in a certain context (Pan & Kosicki, 1993) and how different representations of information influence individuals' judgments or decision-making (Kahneman & Tversky, 2013). Tversky and Kahneman (1985) investigated individual decision preference by using the Asian disease scenario and found that individuals were influenced by different representations (i.e., different information framing) of options in decision-making, showing the phenomenon of decision preference reversal. The following is the Asian disease scenario in Tversky & Kahneman (1985):

*Scenario 1: "Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are as follows:*

*A. If Program A is adopted, 200 people will be saved.*

*B. If Program B is adopted, there is 1/3 probability that 600 people will be saved, and 2/3 probability that no people will be saved.*

*Which of the two programs would you favor?"*

In scenario 1, 72% of 152 participants chose A, and only 28% chose B. In the participants' view, the expected prospect of saving 200 people was significantly

better than the risky expectation of the same outcome (1/3 probability of saving 600 people).

***Scenario 2:** “Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are as follows:*

*C. If Program C is adopted, 400 people will die.*

*D. If Program D is adopted, there is 1/3 probability that no one will die and 2/3 probability that all 600 will die*

*Which of the two programs would you favor?”*

In scenario 2, 22% of 155 participants chose C, and 78% chose D. From the participants’ perspective, 400 definite deaths was less acceptable than the 2/3 probability that all 600 will die.

Obviously, scenario 1 and scenario 2 are logically the same but are represented in different framing. In scenario 1, which is in positive framing, the information is represented as “the number of people saved”; whereas in scenario 2, which is in negative framing, the information is represented as “the number of deaths”. It led decision-makers who had positive framing information to focus on saving lives, while those with negative framing information to focus more on the number of deaths, resulting in the shift of decision preference. A change in decision preference caused by a change in information representation is referred to as “*framing effect.*”