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Development of an Investigator-designed Questionnaire Concerning Childbirth Delivery Options based on the Theory of Planned Behavior

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Development of an Investigator-designed Questionnaire Concerning Childbirth Delivery Options
based on the Theory of Planned Behavior

by

Chun-Yi Tai

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
College of Nursing
University of South Florida

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Keywords: Elective Caesarean Section, Instrument Development, Confirmatory Factor Analyses,
and Criterion-irrelevant-variance-omitted Regression Method

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DEDICATION

I dedicate this work to all the participants of this study for their time and effort in taking the questionnaire, which made the findings of this study possible and worthy to both the practitioner and the scholar.

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There are many people who helped me carry out this study and pursue my Ph.D. degree at the University of South Florida. I sincerely thank all of them for their encouragement and endless help throughout this long journey.

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LIST OF ABBREVIATIONS

CBSEI	Childbirth Self-efficacy Inventory
CDOQ	Childbirth Delivery Options Questionnaire
CFA	Confirmatory Factor Analyses
CFI	Comparative Fit Index
CI	Confidence Interval
CIVO	Criterion-irrelevant-variance-omitted Regression Method
CSAS	Chinese Self-Rating Anxiety Scale
CSE	Chinese Self-efficacy Scale
ECS	Elective Caesarean Section
EE	Efficacy Expectancy
MIL	Mother-in-law
NNFI	Non-normed Fit Index
OE	Outcome Expectancy
RMSEA	Root Mean Square Error of Approximation
SRMR	Standardized Root Mean Square Residual
SVD	Spontaneous Vaginal Delivery
SE	Childbirth Self-efficacy
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action

ABSTRACT

This study responds to the globally increasing rate of caesarean section, and specifically to the very high rate of elective caesarean section among Taiwanese mothers as evidence suggests that such elective caesareans pose potential health risks for mothers and babies. The purpose of this study was to develop and evaluate a multi-component instrument based on the theory of planned behavior (TPB) to better understand Taiwanese pregnant women's decisions regarding their childbirth delivery options (spontaneous vaginal delivery or elective caesarean section). The study was a four-phased mixed method design. First, the TPB guided item development and instrument drafting. Second, pretesting and instrument refinement used cognitive interviewing with a small sample of Taiwanese pregnant women. Third, the instrument was administered to 310 such women to examine psychometric properties of the component scales. Fourth, the phase 3 instrument was re-administered to 30 women to estimate item stability. Confirmatory factor analyses (CFA) were used to assess construct validity of the multi-item, multi-component measurement model with LISREL 9.1. Based on the TPB, the 52-item self-administered Childbirth Delivery Options Questionnaire (CDOQ) was developed to measure three components: intention regarding delivery options, attitudes toward delivery options, and perceptions of significant others' (partner, mother, and mother-in-law) feelings about delivery options. Respondents from phase two thought that the items on the CDOQ were easy to read and comprehend; they reported favorably on the wording and formatting. Preliminary item analysis revealed that the items referring to dangerousness of delivery options did not function as intended and were dropped because they did not differentiate between the two delivery options,

leaving 36 items. Test-retest reliability indicated that responses to each item were positively correlated and those referring to spontaneous vaginal delivery were more stable than those referring to elective caesarean section. Corrected item-to-total correlations and expected change in Cronbach's alpha if item deleted revealed that four items might form a measure of general social norms associated with the Taiwanese culture. The Cronbach's alphas for the components of the CDOQ ranged from .55 to .89. The measurement model incorporating the design features of the CDOQ fitted the data well using the CFA. Because serious problems with multicollinearity and suppression were revealed, Beckstead's (2012) criterion-irrelevant-variance-omitted (CIVO) regression method was used to untangle the suppressor effects when predicting intention from the other components of the CDOQ. The results indicated that attitude and partner's feelings were significant and explained the bulk of the variance in intentions. The TPB-based instrument developed here will be of considerable use to maternal-child health researchers. The findings of this study suggest that decisions regarding delivery options may be modified by interventions geared toward pregnant women's attitudes within family- and cultural-centered prenatal programs.

CHAPTER ONE: INTRODUCTION

Historical Background

Based on the psychoanalytic theory, pregnancies and childbirth are developmental milestones in a women's lifecycle, often creating psychological crisis that prompt the development of the maternal instinct (Humenick, 2007; van de Pol et al., 2006; Wiklund, Edman, Larsson, & Andolf, 2006, 2009). Most experiences concerning pregnancies and childbirth are positive and joyful for women and their families. Nevertheless, as a Chinese proverb, "If the labor is success, the sesame oil spreads the fragrance, while the labor is failure, the coffin board turns up." indicates, it is also extremely dangerous for women and their babies. Fortunately, a medical procedure, caesarean section, has successfully increased the odds of survival for those women and their fetuses at the risk of losing their lives.

According to the Oxford English Dictionary, the etymology of caesarean derives from Latin *Cæsariān-us* pertaining to Cæsar, and caesarean section is defined as "the delivery of a child by cutting through the walls of the abdomen when delivery cannot take place in the natural way, as was done in the case of Julius Cæsar". The first published paper concerning caesarean section was "Concerning this Cæsarian section" by H. Crooke in 1615 (Simpson, Weiner, & Oxford University Press, 1989, para. 2). However, caesarean sections could be traced to its source from the Roman legal code, the *lexCaesare*, in the eighth century BC. The code prescribed that if a pregnant woman dies before labor, the baby should be extracted by incising her womb (Todman, 2007).

The story of Julius Caesar's birth originated from Pliny the Elder, who wrote comprehensive medical matters from the perspective of traditional folklore practice in an agrarian age. Scholars doubt the trustworthiness of this story based on Caesar's mother Aurelia who survived childbirth and outlived her son by 55 years (Boley, 1935; Todman, 2007). There are sporadic reports of historical figures of those born by caesarean section in ancient and medieval era, such as Raymond Nonnatus, Robert II of Scotland. Their mothers died in childbirth. Both a mother and her baby survived caesarean section that was the first record in 1500 in Siegersausen, Switzerland. The operation was performed by Jacob Nufer who attempted to relieve his wife from a prolonged labor. Again, historians question the accuracy of the record because Jacob Nufer's wife not only lived but also subsequently gave birth to five other children by vaginal deliveries including twins (Boley, 1935; Todman, 2007).

In the early modern era, the landmark work of Andreas Vesalius *De Corporis Humani Fabrica* published in 1543 depicted female anatomy and abdominal structures (Todman, 2007). In 1581, Francois Roussett's midwifery book was published. He was a physician to the Duke of Savoy who seems to have been the first writer to advise caesarean section on living women (Boley, 1935). Aforementioned achievements provided the theoretical and practical foundation for caesarean section. In addition, the development of anaesthesia ushered in a new era for caesarean section. In 1847, James Young Simpson successfully applied chloroform to the wife of a colleague during childbirth, which led to its widespread use in obstetrics (Todman, 2007). Nonetheless, because of the appalling complications and the high mortality, obstetricians generally opposed the operation at that time.

The techniques of caesarean section had not progressed until the 1870s because of a striking belief among obstetricians concerning that it was unnecessary to suture the uterine wall

after the procedure. Eduardo Porro, Professor of Obstetrics at Pavia and later Milan, Italy, advocated hysterectomy during the operation to control uterine hemorrhage and prevent peritonitis in 1876. After Porro's caesarean hysterectomy procedure, the radical caesarean section, was published, Richardson in 1881 in America, Godson in 1884 in England, and John Cooke in 1885 in Melbourne successfully applied this technique to save mothers and babies. Meanwhile, Max Sänger and Adolf Kehrer, German obstetricians, independently developed methods for suturing the uterine wound using silver wires which were invented by J. Marion Sims in 1882 in America. Sänger used the traditional longitudinal uterine incision whereas Kehrer advocated a lower-segment transverse incision, which became popular in the twentieth century. Semmelweis promoted hand-washing at the Vienna Maternity Hospital in 1847 while Joseph Lister introduced carbolic spray in operating rooms in 1867. The combination of improvements dropped the maternal and newborn mortality dramatically (Boley, 1935; Todman, 2007).

The most common incision of caesarean section is the procedure advocated by Pfannenstiel in 1900. The Pfannenstiel incision employed the transverse incision in the abdomen and fascia to improve healing and reduce postoperative pain. In 1907 in Bonn, Frank first introduced an extraperitoneal caesarean section to prevent peritonitis, but it had not been widespread until the introduction by James Munro Kerr, Professor of Obstetrics at Glasgow, in 1926 (Boley, 1935; Todman, 2007). Through the progress of this operation while the use of sulphonamides (1935) and penicillin (1947) for sepsis prevention, and ergot alkaloids (1800s) and oxytocin (1951) for postpartum hemorrhage reduction, caesarean section has been developed as a common operation in obstetrics (Boley, 1935; Todman, 2007). In particular, seminal work on addressing the issue of the optimal childbirth method for babies that present as a breech

position at term was carried out by Hannah et al. (2000) using a multinational randomized controlled trial. This trial was one of the largest international perinatal studies involving 121 centers in 26 countries. The researchers concluded that planned caesarean section is better than planned vaginal birth for babies who present as a breech position at term, which has contributed to a growing caesarean section rate worldwide (Chalmers, 2007).

Statement of Problem

It has become a concern that the rate of caesarean section is increasing worldwide (D'Souza, 2013; Huang, Yang, & Chen, 1997; Lavender, Hofmeyr, Neilson, Kingdon, & Gyte, 2012; Zhang et al., 2010). Gibbons et al. (2012) reported the number of caesarean sections performed in 137 countries in 2008, indicating that 50.4% of the countries had caesarean section rates > 15%. In Taiwan, the caesarean section rate was 37.56% in 2012. Compared with results from the World Health Organization's (WHO) global survey, which showed that the 2004-2008 overall rate of caesarean section in Asia was 27.3% and in the world was 25.7%, the rates of caesarean section in Taiwan are obviously higher. Of particular concern, the rate of elective caesarean section in Taiwan ranged from 1.7% to 2.1% in 2004-2008 which was among the highest in the world. In 2012, the rate of elective caesarean section in Taiwan was 2.81% (Bureau of National Health Insurance, Department of Health, Executive Yuan, R.O.C. (Taiwan), 2011, 2013; Lumbiganon et al., 2010; Souza et al., 2010).

The global escalation in elective caesarean section rates may be linked to a variety of factors, including: improved surgical and anesthetic techniques, reduced risk of short-term post-operative complications, delayed childbearing, increasing maternal body mass, more multifetal gestations, and low use of vaginal birth after previous cesarean (VBAC), and psychological factors such as the perceived safety of a planned caesarean section, women's previous birth

experience, fear of vaginal birth, need for choice and control, coupled with the cultural acceptability of caesarean section and the medical professions' attitudes. These psychological factors have a major influence in cases where mothers choose to deliver their babies by caesarean sections without medical indication, that is, in cases of elective caesarean section (D'Souza, 2013; Lavender et al., 2012; Zhang et al., 2010). Taiwanese pregnant women's preferences for elective caesarean sections have been linked to preferring an auspicious delivery time, arranging delivery time easily, avoiding delivery pain, worrying about the influence of spontaneous vaginal delivery on sex life, social pressure from significant others, and reimbursement of supplemental insurance (Hong & Linn, 2012; Huang et al., 1997; Lo, 2003).

The WHO conducted a global survey on Maternal and Perinatal Health between 2004 and 2008 which indicated that 1) the incidence rate for severe maternal complications associated with elective caesarean section was about seven times greater than that associated with spontaneous vaginal delivery (10.66% and 1.53%, respectively); 2) when elective caesarean section was performed before the onset of labor, the risk of short term adverse outcomes was nearly six fold compared with spontaneous vaginal delivery; 3) when elective caesarean section was performed after the onset of labor, the risk of short term adverse outcomes was 14 times above the level of risk resulting from spontaneous vaginal delivery (Souza et al., 2010). A prospective nationwide cohort study in the Netherlands compared the incidence of severe acute maternal morbidity (intensive care unit admission, uterine rupture, eclampsia, major obstetric hemorrhage and miscellaneous) among those who had elective caesarean section and those who attempted vaginal delivery. The incidence of severe acute maternal morbidity was 70% higher among the elective caesarean section group than those who attempted vaginal delivery (OR = 1.7, 95% CI: 1.4–2.0) (van Dillen, Zwart, Schutte, Bloemenkamp, & van Roosmalen, 2010). Research has shown that

newborns delivered by elective caesarean section have an increased risk of overall and serious respiratory morbidity. For example, the prospective survey that was conducted by the Medical Birth Registry of Norway in 1999 compared the effects of spontaneous vaginal delivery and elective caesarean section on newborn health outcomes. Results from this report indicated that elective caesarean section increased transfer rates to the neonatal intensive care unit from 5.2% to 9.8% and the risk for pulmonary disorders from 0.8% to 1.6%, when compared with spontaneous vaginal delivery (Kolas, Saugstad, Daltveit, Nilsen, & Oian, 2006). Data collected from the Aarhus birth cohort, Denmark from 1998 to 2006 showed that compared with newborns delivered by spontaneous vaginal delivery, newborns delivered by elective caesarean section had increased risk of respiratory morbidity (Hansen, Wisborg, Ulbjerg, & Henriksen, 2008). The increasing rates of caesarean section raise other concerns, such as increased the cost of such procedures for public service resources. It has been estimated that more than \$2.5 billion would have been saved if the rate of caesarean section in America in 2006 had been 15%, rather than the actual rate of 31.1% (Sakala & Corry, 2008). Gibbons et al. (2012) reported the global saving by reducing caesarean section rates to 15% was approximate \$2.32 billion (US dollars).

The Bureau of National Health Insurance in Taiwan adopted two policies to amend the high elective caesarean section rate. First, the payment to healthcare providers for spontaneous vaginal delivery was augmented in May 2005. Second, the insured's copayment for elective caesarean section was raised in May 2006. However, Hong and Linn (2012) indicated that the supply-side policy change in May 2005 reduced the number of caesarean section, but not significantly, and the demand-side policy change in May 2006 did not decrease the elective caesarean section rate. The results imply that the financial incentives were not the main concern for both healthcare providers and pregnant women. Hence, it is important to better understand

the psychological factors (beliefs and attitudes) that influence Taiwanese pregnant women's decisions to undergo elective caesarean section in order to propose evidence-based behavior change strategies to amend the significant maternal-child health problem in Taiwan.

Significance of Study

Maternal-child nursing has encountered a new challenge because of the worldwide tendency to have fewer children (Huang & Chen, 2010; Riche, 2004); however, expectations for quality maternal-child nursing have increased because women who only have one child want their pregnancy/childbirth experience to be ideal. Chen (2012) advocated the roles of maternal-child nurses, culturally targeted prenatal planning, education, and consultation, during maternal women's decision making processes to have a baby. Caesarean section was developed in clinical practice as a life-saving procedure both for mothers and babies. Excessive practice of this surgical procedure increases morbidity rates and provides no discernible benefits (Belizán, Althabe, & Cafferata, 2007; Hall & Bewley, 1999; Lumbiganon et al., 2010; Minkoff & Chervenak, 2003; Souza et al., 2010). From an economic perspective the excessive caesarean section rate, could function as a barrier to universal coverage providing necessary health services. As maternal-child nurses and researchers, we should make a concerted effort in advocating for lowering the rates of elective caesarean section.

The purpose of this study was to develop a multi-component instrument based on the theory of planned behavior to better understand Taiwanese pregnant women's decisions regarding their childbirth delivery options (spontaneous vaginal delivery or elective caesarean section). Specifically, items that measure mothers' attitudes toward the two delivery options, her beliefs regarding how significant others (her partner, her mother, and her mother-in-law) will react to her decision, and her self-efficacy regarding childbirth were developed and assessed for

their psychometric properties and their relation to intentions examined. This study responds to the globally increasing rate of caesarean section, and specifically to the very high rate of elective caesarean section among Taiwanese mothers as evidence suggests that such elective caesareans pose potential health risks for mothers and babies.

Research Questions

In this study, the following questions were answered:

Research question one: What are the psychometric properties (scale reliabilities and correlations among scales) of the investigator-designed instrument?

Research question two: To what extent do items in the investigator-designed instrument group together into distinct factors that correspond to intention, perceptions of significant others' beliefs and attitudes toward behavior in Ajzen's (1985) theory of planned behavior?

Specific Aims

The specific aims of this study were:

Aim 1: To develop a multi-item, self-report, instrument that measures individual differences in the relevant beliefs, attitudes, and intentions regarding childbirth delivery options held by Taiwanese mothers.

Aim 2: To show the extent to which mothers' responses on this instrument adhere to the theoretical framework provided by the theory of planned behavior using confirmatory factor analysis techniques.

Summary

Throughout history, the indications and motives for caesarean section have changed dramatically. It began as a rescue approach for a fetus, and is now performed for the safety of

mother and baby with considerations of the mother's, families' and physicians' wishes and preferences. In Taiwan, maternal-child health care seems well-developed based on the acceptable neonatal and infant mortality rates. However, the elective caesarean section rates are still unsatisfactory over the past two decades. This is a major challenge to prenatal care in Taiwan. Hence, it is important to develop a multi-component instrument assimilating Chinese culture and contemporary research evidence to better understand Taiwanese pregnant women's decisions regarding their childbirth delivery options (spontaneous vaginal delivery or elective caesarean section). The development of this instrument will help to identify the relative influence of theory-based components on Taiwanese pregnant women's decisions regarding their childbirth delivery options. The identification of relative influence on such women's decisions could serve as a nursing assessment tool to enhance the quality of prenatal family-center care plan for nursing clinical care. The instrument itself could be applied in maternal-child nursing research to evaluate innovative interventions for amending the prevalence of elective caesarean section. The results from this study might not only reform the ecology of maternal-child nursing, but also advance the well-being among Taiwanese families.

CHAPTER TWO: REVIEW OF LITERATURE

In this section, a review of the relevant literature is presented in three segments. The first segment reviews maternal beliefs and preferences regarding childbirth delivery options, the influence of Chinese culture on such beliefs, and the quality of the resumption of sexual intercourse after childbirth. To further support the hypothesized relationship among variables in this study, the second segment is an introduction of the theory of planned behavior and its effectiveness in predicting and modifying individual health-related behaviors. The last segment is an overview of the role of self-efficacy in health promotion.

Maternal Concerns toward Childbirth Delivery Options

An elective caesarean section is one in which a pregnant woman chooses to deliver her baby by caesarean section without medical indication (D'Souza, 2013; Lavender et al., 2012; Zhang et al., 2010). In other words, it is performed in response to maternal requests. Studies conducted in high elective caesarean section rate populations found preferences regarding childbirth delivery options among the sample pregnant women were spontaneous vaginal delivery. For instance, a qualitative study was conducted using focus groups and in-depth interviews with 29 nulliparous pregnant women in Argentina (caesarean section rate > 35%; elective caesarean section rate > 2%). Most of the women preferred spontaneous vaginal delivery and depicted spontaneous vaginal delivery as normal, healthy, and a natural rite of passage from womanhood to motherhood. They also held positive perspectives on labor pain via spontaneous

vaginal delivery. In terms of caesarean section, they treated it as a medical decision and often deferred to recommendations from professionals when medical indications were present (Liu et al., 2013). Angeja et al. (2006) conducted an interviewer-administered cross-sectional survey in Chile (caesarean section rate > 60%; elective caesarean section rate > 0.6%) and found the majority of pregnant women (77.8%) preferred spontaneous vaginal delivery, 9.4% of pregnant women preferred caesarean section, and 12.8% of pregnant women had no preference. Regardless of their preferences, women believed that their choice was the less painful and the more safe for their baby. A survey carried out in Iran (caesarean section rate > 50%; elective caesarean section rate > 2%) showed 96.5% of pregnant women agreed with attitude statements favoring spontaneous vaginal delivery and 33.0% of pregnant women endorsed attitude statements favoring caesarean section. None of the participants had negative attitudes to spontaneous vaginal delivery whereas 40.5% of the participants had negative attitudes towards caesarean section (Aali & Motamedi, 2005). In Taiwan (caesarean section rate > 35%; elective caesarean section rate > 2%), a prospective study applied a longitudinal design was executed. The majority of pregnant women (71.5% during the second trimester and 78.4% during the third trimester) preferred spontaneous vaginal delivery. Preference for caesarean section was found to be 12.5% and 17.5% during the second and third trimester, respectively. The sample elective caesarean section rate was 19.9% in this study (Chu, Tai, Hsu, Yeh, & Chien, 2010). Maternal preferences regarding childbirth delivery options seem likely to explain the high elective caesarean section rate in some countries. Previous studies also suggested that maternal preferences regarding childbirth delivery options are complex consequences of attitudes and beliefs that pregnant women hold. Hence, there is a need for studies that examine maternal

preferences regarding childbirth delivery options using well-developed psychological theories (Liu et al., 2013; Mazzoni et al., 2011).

In Taiwan, cultural beliefs are also known to play an important role in the time of childbirth. Chinese believe that a person's fate is determined by the hour, the day, and the year when they are born, so they would prefer their children and grandchildren to be born at a certain time on a particular day. Following this thought, delivery rooms in Taiwan will be busier than usual on particular days corresponding to auspicious dates. Elective caesarean section used to be scheduled by maternal requests on the sixth and eighth day of the month, because six and eight are auspicious numbers signifying prosperity and wealth. A study utilizing 1998 birth certificate data showed caesarean section being performed is significantly higher on auspicious days and significantly lower on inauspicious days. The caesarean section rates for auspicious days (hospital: 37.35%; clinics: 37.62%) are higher than that for inauspicious days (hospital: 27.58%; clinics: 26.86%) (Lo, 2003). Lin, Xirasagar, and Tung (2006) examined a prevalent cultural belief that the Chinese Lunar month of July, "ghost month", is inauspicious for major life events such as hospitalization for elective caesarean section using seven year population based data (1997-2003) from the Taiwan initiated National Health Insurance database. Chinese believe the door of Hell is opened to free ghosts to revisit this world, which may cause death or needless suffering during Lunar July, so people will try to avoid being outdoors alone at night, travelling to visit a new place or for business, purchasing a new house, getting married, and even childbirth. The results supported the hypotheses of this study. Adjusted caesarean section rates during Lunar July were significantly lower than other months. Lunar June showed an increase in elective caesarean section suggesting the elective surgery was arranged before the ghost month to avoid misfortune. Based on aforementioned, the prevalence of elective caesarean section in Taiwan

seems deeply influenced by pregnant women and family members' cultural beliefs. A culturally appropriate instrument could further enhance the understanding of the influence of cultural beliefs on pregnant women's choice of childbirth delivery options.

Beliefs about the quality of intercourse after childbirth are a concern for pregnant women considering spontaneous vaginal delivery and elective caesarean section (Hong & Linn, 2012; McDonald & Brown, 2013). However, reported associations between delivery methods and the quality of intercourse after childbirth were inconsistent (Hicks, Goodall, Quattrone, & Lydon-Rochelle, 2004). A prospective study recruited 912 primiparae and their husbands to understand their sexual behavior, sexual satisfaction and quality of life in Iran. The participants were cataloged into five groups by delivery methods, including: spontaneous vaginal delivery without injuries (N=184), spontaneous vaginal delivery with episiotomy or perineal laceration (N=182), operative vaginal delivery (N=180), elective caesarean section (N=182), and emergency caesarean section (N=184). The authors reported that the overall sexual function, sexual satisfaction, and quality of life among women with elective caesarean section and their husbands were better than the other groups (Safarinejad, Kolahi, & Hosseini, 2009). Klein et al. (2009) studied a sample of 99 Caucasian primiparae with live born singletons at term in Austria and found that women who underwent spontaneous vaginal delivery without episiotomy, heavy perineal laceration, or secondary operative interventions (N=55) showed no significant differences in sexual function 12–18 months after childbirth compared to women who underwent elective caesarean section (N=44). McDonald and Brown (2013) carried out a prospective pregnancy cohort study of 1507 nulliparous women recruited in early pregnancy (≤ 24 weeks) in Australia and found that in contrast with the women who underwent spontaneous vaginal delivery, women who underwent caesarean section had decreased likelihoods of resuming

vaginal sex by 6 weeks postpartum, regardless of the timing of caesarean section (before or after commencing labor). There are no studies controlling for attitudes and beliefs held by pregnant women regarding the impact on sexuality and the quality of the relationship of a woman with her partner by delivery methods. This gap will be addressed by developing an appropriate instrument for obtaining data on attitudes and beliefs regarding childbirth delivery options and sexuality.

The Theory of Planned Behavior

Humenick (2007) suggested that a theoretical framework could assist the childbirth educator to organize maternal realities into sets of meaningful and related concepts and thus further the effort to increase expectant pregnant women's understanding, problem solving, and decision making regarding their unique maternal realities. The framework guiding the study is provided by a well-studied psychological theory, the theory of planned behavior (TPB). The TPB, proposed by Ajzen (1985), is a theory designed to predict and elucidate human behavior in specific circumstances, and has been successfully applied to a variety of topics (see Hardeman et al., 2002, for review). The TPB is an extension of the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975). The TPB differs from the TRA in its inclusion of perceived behavioral control as a predictor of behaviors (Ajzen, 1991). It is designed to predict behaviors not entirely under volitional control by including measures of perceived behavioral control, such as self-efficacy. In this study, perceived behavioral control was specifically defined in terms of childbirth self-efficacy. The rationale for this decision is based on Ajzen (2002) who stated that there is a need to incorporate self-efficacy within perceived behavioral control construct, and on the recommendation by Fishbein (2008) to treat self-efficacy as a form of perceived behavioral control in an integrative model of behavioral prediction that attempts to account for health promotion decision-making among health professionals and patients.

The TPB was proposed in 1985 by a psychologist, Icek Ajzen. Ajzen began research in this area in the late 1960s, when the attitude concept was under attack by contemporary social psychologists. Numerous studies had observed little, if any, correspondence between verbal expressions of attitude and overt (observable) behavior. Ajzen worked with Martin Fishbein to re-conceptualize the nature of the attitude-behavior relation, and developed the theory of reasoned action (TRA), later revised as the theory of planned behavior, which was added “perceived behavioral control” (Ajzen, 1985, 1988, 1991). Figure 1 illustrates the components of the TPB and their relationships.

The central concept of the TPB is the individual’s intention to perform a specific behavior. The individual’s behavioral intention is comprised of the motivational components—attitude towards the behavior, subjective norms, and perceived behavioral control—that affect a behavior. Intention is, in turn, determined by the person’s attitude toward the specific behavior, subjective norms (beliefs about how significant others feel about the behavior), and perceived behavioral control (sense of personal control) about being able to engage in the behavior (Spring, 2008). In other words, intention is an indication of an individual’s readiness to perform a given behavior. It is assumed to be an immediate antecedent of behavior in the TPB (Conner & Sparks, 1996).

Further, in the TPB, attitude towards the behavior is defined as an individual’s emotional appraisal of the behavior. For example, pregnant women may tend to eat healthy food because they think healthy food is good for themselves and their fetuses, even if they desire to eat unhealthy food during their pregnancies. Subjective norms focus on the individual’s beliefs regarding what significant others think about the behaviors.

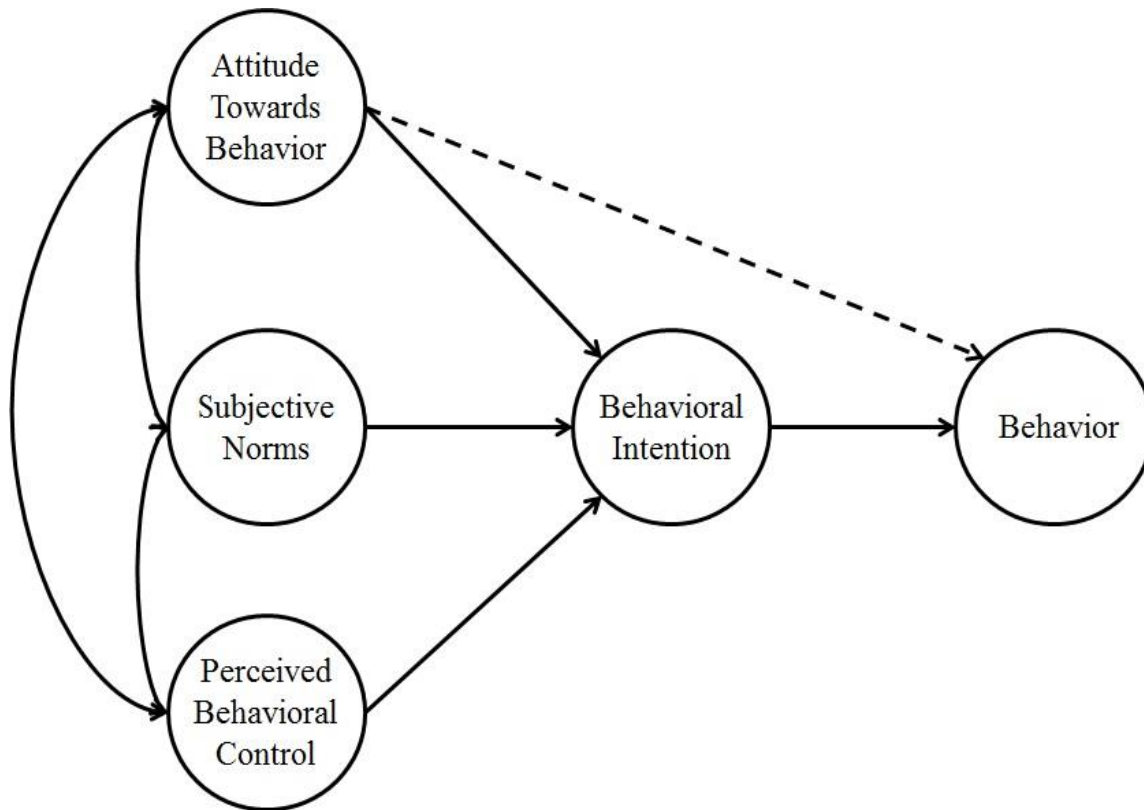


Figure1. Structural diagram of the theory of planned behavior (Ajzen, 1985)

It is assumed that the social pressure of significant others will influence the individual's intention to perform a specific behavior. For instance, a mother-in-law plays an important role during a woman's pregnancy in Taiwan, so her judgments or values are likely to influence the pregnant woman's choice of delivery options. Perceived behavioral control is the individual's beliefs about whether a specific behavior is easy or difficult for her to perform. For example, if a pregnant woman believes she has the capability of breastfeeding, she is more likely to prepare herself to breastfeed during her pregnancy (Conner & Sparks, 1996).

There are three assumptions in the TPB. First, perceived behavioral control, attitude toward the behavior, and subjective norms are determinants of the individual's intention. Second, holding intention constant, the probability that a behavior will be executed increases with increasing perceived behavioral control. Third, perceived behavioral control will influence

behavior directly to the degree that perceived behavioral control reflects actual control: availability of requisite opportunities and resources, such as time, money, and health status. Hence, positive attitudes, perceived social acquiescence, and perceived ease of behavioral performance can influence intention to engage in a particular behavior or choose a particular option (Ajzen, 1991; Armitage & Conner, 1999).

The TPB has proven successful for studying health-related behaviors such as physical activity in postmenopausal women (Vallance, Murray, Johnson, & Elavsky, 2011), men's cancer screening (Sieverding, Matteredne, & Ciccarello, 2010), suicide prevention (Aldrich & Cerel, 2009), childhood obesity (Andrews, Silk, & Eneli, 2010), smoking (Brann & Sutton, 2009; Murnaghan et al., 2009), condom use (Gu, et al., 2009), safer sex (Mausbach, Semple, Strathdee, & Patterson, 2009), and blood donation (Masser, White, Hyde, Terry, & Robinson, 2009; McMahon & Byrne, 2008). The TPB has also been successfully applied when studying grieving persons (Bath, 2009), use of mental health resources (Andrykowski & Burris, 2010), treatment seeking among veterans (Britt, et al., 2011), and people facing decisions with potential health risks (Yang et al., 2010).

The effectiveness of the TBP in predicting and modifying individual health-related behaviors has been demonstrated in several systematic reviews (Armitage & Conner, 2001; Godin & Kok, 1996; Hausenblas, Carron, & Mack, 1997). For example, a meta-analytic review was conducted regarding the efficacy of the TPB from a database of 185 independent studies published through of 1997. The results indicated that the TPB accounted for 27% and 39% of the variance in behavior and intention, respectively. In addition, the perceived behavioral control construct accounted for significant amounts of variance in intention and behavior, independent of attitude towards the behavior and subjective norms (Armitage & Conner, 2001). Thus, the TPB

was used as the framework for this study because 1) It is a well established and extensively tested theory; 2) It is parsimonious in contrast to other theories used to explain human behavior; and 3) The components in the TPB fit with the characteristics influencing this health-related decision.

Perceived Self-efficacy in Health Promotion

The concept of perceived self-efficacy in the framework of cognitive behavior modification was proposed by the psychologist Albert Bandura at Stanford University in 1977 (Bandura, 1977). Perceived self-efficacy is defined as an individual's evaluation of their own capabilities to organize and execute sequences of action required to attain specific achievements or goals (Bandura, 1986). Those with greater perceived self-efficacy are more likely to initiate behavior change compared to those who possess lower perceived self-efficacy. Perceived capabilities could be considered a predominant factor in determining whether individuals construe the specific behavior change as being within their volitional control. Likewise, according to Ajzen's (1985) TPB, individuals' perceived volitional control is a major determinant of behavior change (Rimal, 2000). Perceived self-efficacy consists of outcome expectancy and efficacy expectancy. Outcome expectancy is an individual's belief that a specific outcome is a consequence of a particular behavior (e.g., relaxation during childbirth will reduce labor pain). Efficacy expectancy is an individual's perception that she possesses adequate capabilities to successfully or regularly execute a series of behaviors to attain the anticipated outcome (e.g., a pregnant woman thinks that she will be able to relax during childbirth) (Bandura, 1986).

Perceived self-efficacy is dynamic and developed in response to information from four principal sources: performance attainment, vicarious experiences of observing the performances

of others, verbal persuasion and allied social support that one possesses certain capabilities, and physiological states from which people partly judge their capability, such as strength, and vulnerability to dysfunction (Bandura, 1986).

Performance attainment is the most significant influence on individuals' perceived self-efficacy. Individuals' repeated successes will reinforce their positive self-perception, while repeated failures will reinforce their negative self-perception. For individuals who possess strong self-efficacy, occasional failures are unlikely to have much effect on their evaluations of their own capabilities. In addition to performance attainment, individuals also evaluate their self-efficacy through vicarious experiences. If they witness other similar individuals performing successfully, their own self-efficacy improves. Verbal persuasion has been widely applied to strengthen individuals' beliefs that they have the capabilities to reach a specific level of performance. Individuals who are persuaded that they possess the capabilities are more inclined to make an effort to successfully execute specific activities than those who are not persuaded. Finally, physiological states influence individuals to have differential judgments of their capabilities to perform a given task. If individuals sense fear, fatigue, or pain, they usually perceive physical inefficacy, which undermines their performance (Bandura, 1986).

Greater perceived self-efficacy is responsible, in part, for better health status, higher achievement, and greater social integration. When individuals are aware of the importance of precautions, they are inclined to modify their behavior. Before forming a behavior intention, deliberating detailed action plans, and performing regular health behaviors, individuals develop beliefs regarding their capabilities to engage in behavior modification (Schwarzer & Fuchs, 1996).

A number of studies have measured perceived self-efficacy's influence on initiating healthy behavior change: physical activity (Dutton et al., 2009; Luszczynska, Schwarzer, Lippke, & Mazurkiewicz, 2011; Song, Peng, & Lee, 2011), smoking cessation (Ford, Diamond, Kelder, Sterling, & McAlister, 2009; Heale & Griffin, 2009; Siahpush, Borland, Yong, Kin, & Sirirassamee, 2008), healthy nutrition (Luszczynska, Tryburcy, & Schwarzer, 2007; Mosher et al., 2008; Tuuri et al., 2009), sexual health (Ip, Sin, & Chan, 2009; Pallonen, Timpson, Williams, & Ross, 2009; Rostosky, Dekhtyar, Cupp, & Anderman, 2008), colorectal cancer screening (von Wagner, Semmler, Good, & Wardle, 2009), cervical cancer screening (Fernandez et al., 2009), handwashing (Rosen, Zucker, Brody, Engelhard, & Manor, 2009), and neurological impairments (Block, Vanner, Keys, Rimmer, & Skeels, 2010).

In childbirth, self-efficacy was first used as a core concept by Manning and Wright (Manning & Wright, 1983). Manning and Wright (1983) stated that self-efficacy expectancies predicted persistence in pain control without medication better than other predictors in self-efficacy theory. However, there is only one dissertation abstract (Samuels, 1987) in psychology regarding self-efficacy in childbirth that could be found after Manning and Wright's work. The roots of the childbirth self-efficacy concept in the nursing literature can be traced back to Lowe's work (Lowe, 1991), which depicted maternal confidence during childbirth in the context of self-efficacy theory. After the term "childbirth self-efficacy" was introduced by Lowe in nursing (Lowe, 1991, 1993), a series of instrument development studies (Cunqueiro, Comeche, & Docampo, 2009; Drummond & Rickwood, 1997; Gao, Ip, & Sun, 2011; Ip, Chan, & Chien, 2005; Ip, Chung, & Tang, 2008; Khorsandi et al., 2008; Sinclair & O'Boyle, 1999; Stevens, Wallston, & Hamilton, 2012; Tanglakmankhong, Perrin, & Lowe, 2011), and empirical studies (Beebe, Lee, Carrieri-Kohlman, & Humphreys, 2007; Berentson-Shaw, Scott, & Jose, 2009; Dilks & Beal,

1997; Gau, Chang, Tian, & Lin, 2011; Ip, Tang, & Goggins, 2009; Sun, Hung, Chang, & Kuo, 2010; Volpe, Li, Caughey, & Darnall, 2011; Williams, Povey, & White, 2008) have been conducted.

In Chinese nursing research, the role regarding perceived self-efficacy in maternal-child care has been studied since 2005 by childbirth educators and researchers (Ip et al., 2005). For example, perceived self-efficacy was measured in a randomized controlled trial to assess the effect of individual counseling regarding diet and physical activity on weight retention among Taiwanese pregnant women. The results demonstrated that those from pregnancy to six months postpartum and those from birth to six months postpartum, have better self-efficacy scores for health behaviors and the subscales of nutrition and physical activity than the comparison group (Huang, Yeh, & Tsai, 2011). Moreover, a non-randomized controlled experimental study evaluated a prenatal yoga program provided to Taiwanese primigravidas in the third trimester of pregnancy with the aim of decreasing the pregnancy discomforts and increasing childbirth self-efficacy. The study showed that women who participated in the prenatal yoga program reported significantly fewer pregnancy discomforts than the control group at 38-40 weeks of gestation, along with higher outcome and self-efficacy expectancies during the active stage of labor and the second stage of labor compared with the control group (Sun et al., 2010). Furthermore, childbirth self-efficacy has been identified as a significant indicant of pregnant women's ability to cope with labor, and it influences their motivation for spontaneous vaginal delivery and the favorable perception of maternal experiences in Mainland China (Gao et al., 2011). Given the evidence relating childbirth self-efficacy to labor and delivery behaviors, I believe that this construct is a valid choice for operationalizing perceived behavior control with proposed application of the theory of planned behavior.

CHAPTER THREE:

METHOD

Chapter three describes the methods that were used in this study to develop a multi-component instrument based on the theory of planned behavior and establish the psychometric properties of this instrument, including research design, participants and setting, instruments, study procedures, and analysis plan. Ethical dimensions of the study are also discussed.

Research Design

This study used a multiphase mixed method design (qualitative and quantitative). A detailed description is provided in subsection Procedures, below.

Participants and Setting

Participants were Taiwanese pregnant women recruited from the prenatal clinic in a large urban hospital in northern Taiwan, a 1000-bed medical center with an annual birth rate of around 2000. Inclusion criteria for all phases of this study were the following: (1) first-time pregnancy (primigravida), (2) age ≥ 20 years, (3) singleton pregnancy, (4) ability to listen, speak, read and write in Chinese, (5) Taiwanese nationality, and (6) voluntary agreement to participate. The exclusion criteria were as follows: (1) women who have major obstetric or medical pregnancy complications, and (2) women who cannot read and write in Chinese.

Approximately 320 participants were sought for this study. This estimated sample size is consistent with recommendations made by Comrey and Lee (1992) for conducting factor analysis (100= poor, 200 = fair, 300 = good, 500 = very good, 1,000 or more = excellent). In addition, MacCallum, Widaman, Zhang, and Hong (1999) provided guidelines for sample size in

factor analysis. Sources of error influencing parameter estimates and model fit in factor analysis can be distinguished between “sampling error” and “model error” (MacCallum & Tucker, 1991). As sample size increases, sampling error decreases, sample factor analysis solutions tend to be more stable, and the population structure is more accurately represented. The effects on the estimates of model parameters and on model fit are also implicated by nonzero sample intercorrelations of unique factors with each other and with common factors, the magnitude of the unique factor loadings, and the degree of overdetermination of the common factors (MacCallum et al., 1999). The authors presented a theoretical and mathematical framework to illustrate that small samples under conditions of high communality and optimum overdetermination of factors could achieve optimal recovery of population factors. That is, the quality of factor analysis solutions will improve as communalities and overdetermination of factors increase, as well as may interact with sample size. This study was guided by a formal theoretical framework—the TPB. Consequently, the impact of sample size in this study could be estimated as small to moderate. According to MacCallum et al. (1999), under similar conditions to this study (N = 60, ratio of variables to factors=10:3, high communality) 100% of samples yielded convergent solutions with no Heywood cases (negative estimates of one or more unique variances). In other words, sample size bigger than 60 may be adequate for this study. However, due to the effect of a bigger sample size and the innovative nature of this study, a more fine-grained and conservative view of the sample size was taken. Therefore, the principal investigator (PI) decided to recruit around 320 participants for this study.

Pregnant women were recruited from the prenatal clinics located in the study site. Potential participants were approached at their prenatal visit prior to seeing their medical practitioner in the consulting room. The study was explained and the potential participant was

provided with the study information sheet for review. Individuals were allowed time to read and review the study information sheet while a research assistant left the consulting room. The research assistant re-entered the consulting room to ask if the potential participant had any questions or concerns. The participant then agreed to participate in the study, or chose to take the document home to review with their family members and enrolled at her next prenatal appointment. After obtaining participants' consent, the participants were asked to fill out the questionnaire which was expected to take approximately 15 minutes to complete.

Instruments

The aim of the study was to develop a multi-item instrument for assessing the various components of the TBP. The short-form Chinese Childbirth Self-Efficacy Inventory provided our operational definition of perceived behavioral control. Items to measure the other components were developed by the PI. The gist of the investigator-designed instrument (i.e., brief history and psychometric properties) is described in the following sections.

The investigator-designed instrument.

An investigator-designed instrument was developed to measure the constructs of the theory of planned behavior, except childbirth self-efficacy (A detailed development process is described in the next section). The instrument also measured the pregnant women's demographic (including age, education, religion and Taiwanese ethnicity) and obstetric characteristics (such as gestational age, gravidity and parity history). A copy of the items to be presented to the participants is provided in the Appendix.

The short-form Chinese Childbirth Self-Efficacy Inventory.

The Childbirth Self-Efficacy Inventory (CBSEI) (Lowe, 1993), based on Bandura's social cognitive theory (Bandura, 1977), measures pregnant women's efficacy and outcome

expectancies regarding coping with the childbirth experience. The CBSEI has 62 items, four subscales including two repetitive sets of items. A 10-point summated rating scale (Likert-type scale) is used in the CBSEI. A higher score indicates a higher level of efficacy or outcome expectancy. Data from the CBSEI scale have shown high internal consistency reliability across studies (i.e., 0.86–0.95), and an exploratory factor analysis suggests that each CBSEI subscale is unidimensional (Lowe, 1993). Likewise, the CBSEI has demonstrated adequate reliability and validity for measuring childbirth self-efficacy among pregnant women in the USA (Lowe, 1993), Northern Ireland (Sinclair & O’Boyle, 1999), and Australia (Drummond & Rickwood, 1997).

Ip et al. (2005) validated the Chinese version of the original CBSEI among 148 pregnant women in Hong Kong. Later, by deleting two repetitive subscales (OE-15 and EE-15) from the Chinese version of the original CBSEI (Ip et al., 2005), Ip et al. (2008) developed a short-form Chinese CBSEI comprised of two subscales. That is, the short-form Chinese CBSEI (CBSEI-C32) has 32 items, two parallel subscales: OE-16 and EE-16, using a 10-point response scale (1 = not at all helpful, 10 = very helpful for OE-16; 1 = not at all sure, 10 = very sure for EE-16). Each subscale yields a score between 16 and 160. A higher score indicates a higher level of efficacy or outcome expectancy for childbirth. The Cronbach’s alpha coefficients for both subscales were reported as 0.92. The convergent validity with the CBSEI-C32 was reflected by a moderate correlation for the two subscales. Hence, the validity and reliability of the CBSEI-C32 were preliminarily established in Hong Kong.

Recently, Gao et al. (2011) conducted an analogous study to probe the psychometric properties of the CBSEI-C32 in mainland China. The results demonstrated high internal consistency (the Cronbach’s alpha coefficients were .96 for the total scale and .91 and .94 for the OE and EE, respectively), test–retest reliability (the intraclass correlation coefficients were .88

for the total scale and .82 and .84 for the OE and EE, respectively), and construct validity was further supported by a significant negative relationship with the Chinese Self-Rating Anxiety Scale (CSAS) and a significant positive relationship with the Chinese Self-Efficacy Scale (CSE).

The high inter-correlations between the two subscales across studies may suggest that they are not fully separated and share most of the explained variance (Drummond & Rickwood, 1997; Gao et al., 2011; Ip et al., 2005; Ip et al., 2008; Lowe, 1993; Sinclair & O'Boyle, 1999). According to the self-efficacy theory (Bandura, 1986), outcome expectancies are related to efficacy beliefs because these beliefs partially determine the expectations. Consequently, the impact of this characteristic of self-efficacy was assessed carefully in the current study.

Procedures

The study had four phases. First, a multi-item instrument was developed to collect information from participating pregnant women using McKennell's three aspects of measurement: content, structure and context in the construction of measuring instruments in social science (McKennell, 1974). The item development and instrument drafting were guided by Ajzen's theory of planned behavior (Ajzen, 1985, 1991; Fishbein & Ajzen, 1975; Francis et al., 2004). The instrument consists of subscales that measure proper aspects of individual differences in attitudes toward delivery options, pregnant woman's perceptions of significant others' feelings about delivery options, and pregnant woman intentions regarding delivery options. Using a manual designed to guide the development of valid and reliable measures of key TPB constructs (Francis et al., 2004), approximately 10-20 items were constructed reflecting the content for each component. The 7-point Likert scale (-3 = strongly disagree, 3 = strongly agree) was used because studies concerning information processing theory suggests that seven is the number of items people can consider at one time and research assessing the effects of variety measurement

scales on a TPB based questionnaire recommended that it is the optimal measurement scale for constructing a questionnaire based on the TPB to understand health related behaviors (Courneya, Conner, & Rhodes, 2006; Kareev, 2000; Miller, 1956). In the second phase, pretesting and instrument refinement used a cognitive interviewing method. A small sample (N = 30) of Taiwanese pregnant women was asked to assess whether the items in the investigator-designed instrument were easy to read and comprehend. These respondents were asked to complete the instrument and comment on the items. The following questions were displayed on the comment sheet to facilitate their responses: 1) Are any of the questions or statements ambiguous or difficult to answer? 2) Are there any other features of the wording or formatting that you find annoying? Please provide alternative wording to help clarify the questions or statements. 3) If you think that there are important questions or statements missing from the instrument, please use the space at the end of this page to write them down. If necessary, item and/or instruction wording will be revised according to feedback obtained from these respondents. The third and fourth phases were conducted using 320 Taiwanese pregnant women to examine psychometric properties of the investigator-designed instrument. Phase Four involved re-administering the instrument to 30 Taiwanese pregnant women two weeks later to estimate item stability (test-retest correlation).

Training of research assistant.

Study protocol was developed for guiding a RA to perform data collection in phases 2-4. The RA was trained how to interact with participants, conduct cognitive interviewing, and collect data by the PI through a face to face internet communication technique (Skype software). The RA obtained human subject research certification prior to data collection (CITI certificate of completion and Taiwanese human subject research certification are provided in Appendix).

During the data collection period, the PI communicated with the RA daily to monitor progress and discuss any difficulties. Data were entered into Microsoft Excel software, and the completed instruments without participants' identifying information were scanned and converted into portable document format (PDF) by the RA, and then e-mailed to the PI each day.

All completed paper instruments (which did not have names or other identifying information) were shredded after being scanned into PDF documents. The digital PDF documents and data files were saved in a laptop and a portable hard disk, which have passwords and require the fingerprint of the PI. The information will be stored for five years.

Statistical Analysis Plan

Descriptive statistics were used to summarize demographic characteristics using IBM SPSS statistics 21. The best items measuring each concept were selected based on the results of factor analyses, and classical test theory analyses. Because the instrument was constructed on the basis of the TPB, confirmatory factor analyses were used to assess construct validity of the multi-item, multi-component measurement model. These analyses were conducted using LISREL 9.1. The overall fit of the model was examined by goodness-of-fit indices, including χ^2 (Chi-square), root mean square error of approximation (RMSEA), non-normed fit index (NNFI), comparative fit index (CFI), and standardized root mean square residual (SRMR). The multi-item, multi-component measurement model was restricted such that each item loads onto a single factor. If the model did not fit well, inspection of modification indices was used to identify any items violate the concept of simple structure (load on more than one factor). Item parameters were obtained using classical test theory. The item means, corrected item-total correlations, scale means and standard deviations, and Cronbach's alpha for each component were assessed using IBM SPSS statistics 21. Additionally, the resulting alphas for each component when each item is

removed from the subscale were examined for determining which items could be removed to improve the overall Cronbach's alpha.

Human Subjects or Animal Use

This is a minimal risk study using the instruments without identifying information. Before participants were recruited, the study was approved for human subject research by the institutional review board of the University of South Florida and the study site (Appendix E and F). All participants received standard obstetric care. Each participant was assured of confidentiality and had the opportunity to decline to participate or to withdraw from the study at any time.

Summary

This chapter summarized the methods which were employed in the study. This study used a multiphase mixed method approach to develop a culturally appropriate instrument based on the theory of planned behavior to better understand Taiwanese pregnant women's decisions toward delivery options. The rigorous design of this study could guide the development of the instrument which could be used to not only overcome the maternal-child health challenge, high elective caesarean section rate, in Taiwan but also worldwide.

CHAPTER FOUR:

RESULTS

Chapter Four presents the results of each phase of this study. First, the investigator-designed questionnaire concerning childbirth delivery options based on the theory of planned behavior (TPB) is described. Second, the results from the cognitive interviewing method for pretesting and refinement of the instrument are reported. Finally, item analysis and psychometric testing from the third and fourth phases of the study are detailed.

Instrument Development

A multi-item questionnaire was developed to collect information concerning childbirth delivery options from participating pregnant women based on the TPB. Because the multi-item questionnaire was developed to measure proper aspects of individual differences in attitudes toward delivery options, pregnant woman's perceptions of significant others' feelings about delivery options, pregnant woman's perceived self-efficacy and pregnant woman's intentions regarding delivery options, it was named "Childbirth Delivery Options Questionnaire (CDOQ)". The CDOQ is an 84-item self-administered questionnaire comprising four components that correspond to the constructs of the TPB: intention regarding delivery options, attitudes toward delivery options, significant others' feelings about delivery options, and childbirth self-efficacy. The intention regarding delivery options component contains four items assessing pregnant women's intention regarding spontaneous vaginal delivery and elective caesarean section. The fifteen items of the attitudes toward delivery options component describe attitudes toward spontaneous vaginal delivery and elective caesarean section that pregnant women hold. The

perceptions of significant others' feelings about delivery options component comprises eleven statements about spontaneous vaginal delivery and elective caesarean section as held by her partner, mother and mother-in-law (11 x 3 = 33 statements). The three components were presented using a 7-point response scale with the verbal anchors: *strongly disagree, disagree, slightly disagree, neither agree or disagree, slightly agree, agree, and strongly agree*, centered under the numerals -3 through 3. The 32 items of the childbirth self-efficacy component incorporated the two parallel subscales: Outcome Expectancy (OE) and Efficacy Expectancy (EE), using a 10-point response scale (1 = *not at all helpful*, 10 = *very helpful* for OE-16; 1 = *not at all sure*, 10 = *very sure* for EE-16) from the short-form Chinese version of the Childbirth Self-Efficacy Inventory (Ip et al., 2008). The items associated with the four components of the CDOQ are displayed in the following Table 1.

Pretesting and Instrument Refinement

In phase two, a convenience sample of 30 Taiwanese nulliparous pregnant women was asked to assess the CDOQ and to comment on the items regarding their clarity, ease of understanding and thoroughness of their content. The research assistant also recorded the length of the time to complete the questionnaire. The respondents ranged in age from 24 to 37 years ($M = 30.92$; $SD = 4.26$). Half of the respondents had a bachelor's degree, 26.7% had a vocational high school's degree, 16.7% had an associate's degree, and 6.7% had a master's degree at the time of the interviews. The distributions of age and educational level among the respondents were similar to Taiwanese women who gave birth in 2012 (Department of Statistics, Ministry of the Interior, R.O.C. (Taiwan), 2013). The comments on the CDOQ were generally positive. Respondents thought that the items on the CDOQ were easy to read and comprehend; they reported favorably on the wording and formatting. The average number of minutes to complete

the CDOQ was 10.33 minutes (range 6-16). Hence, the full 84-item CDOQ was used in subsequent phases that assessed its psychometric properties.

Psychometric Properties on the Investigator-designed Questionnaire

This section presents the findings from the third and fourth phases of the study examining the psychometric properties on the CDOQ, including preliminary analyses that examine accuracy of data entry, missing data, and multivariate outliers, descriptive statistics that summarize the demographic characteristics among the participants, preliminary validation assessments that provide information for item reduction, reliability analyses that examine internal consistency of the item parameters and stability of the CDOQ, and confirmatory factor analyses that assess the construct validity on the CDOQ.

Preliminary analyses.

Prior to quantitative analysis, proofreading was employed to ensure the accuracy of the computerized data files against the original paper-and-pencil data. The variables were examined through descriptive statistics for accuracy of data entry, missing values, and fit between the distributions. A total of 310 participants were recruited. There are no missing values in the data. However, three cases were not included in the analysis because the participants were born outside of Taiwan. Data, grouped by the TPB component, was examined for multivariate outliers using Mahalanobis distance scores. Any cases identified as multivariate outliers ($p < .001$) on majority factors were deleted. The criterion led two other cases which are multivariate outliers across four and five of seven factors to be removed, leaving 305 cases for analysis.

Table 1

The Components, Item Numbers, Abbreviations, and Item Contents of the CDOQ

Item Number	Label	Item Content
Intention regarding Delivery Options Component (Intention)		
1	I1	I would like to deliver my baby by the vaginal birth method.
2	I2	I plan to deliver my baby by the vaginal birth method.
3	I3*	I would like to deliver my baby by the scheduled cesarean section.
4	I4*	I plan to deliver my baby by the scheduled cesarean section.
Attitudes toward Delivery Options Component (Attitude)		
5	A1	It is important to me that I deliver my baby by the vaginal birth method.
6	A2*	It is important to me that I deliver my baby by the scheduled cesarean section.
7	A3	Delivering my baby by the vaginal birth method is convenient for me.
8	A4*	Delivering my baby by the scheduled cesarean section is convenient for me.
9	A5*	The vaginal birth method is dangerous for my baby.
10	A6	The scheduled cesarean section is dangerous for my baby.
11	A7*	The vaginal birth method is dangerous for me.
12	A8	The scheduled cesarean section is dangerous for me.
13	A9	Delivering my baby by the vaginal birth method is a meaningful experience for me.
14	A10*	Delivering my baby by the scheduled cesarean section is a meaningful experience for me.
19	A11*	I believe that delivering my baby at a particular time of day and at a particular time of the year can influence my baby's success in life.
15	A12	Delivering my baby by the vaginal birth method will help build a healthy relationship between my partner and me.
16	A13*	Delivering my baby by the scheduled cesarean section will help build a healthy relationship between my partner and me.
17	A14	A vaginal birth method will help me bond more with my baby.
18	A15*	A scheduled cesarean section will help me bond more with my baby.

Table 1 (Continued)

Item Number	Label	Item Content
Significant Others' Feelings about Delivery Options Component		
Partner's Feelings about Delivery Options (Partner)		
20	P1	I believe that it is important to my partner that I deliver my baby by the vaginal birth method.
21	P2*	I believe that it is important to my partner that I deliver my baby by the scheduled cesarean section.
22	P3	Delivering my baby by the vaginal birth method is convenient for my partner.
23	P4*	Delivering my baby by the scheduled cesarean section is convenient for my partner.
24	P5*	My partner believes that the vaginal birth method is dangerous for my baby.
25	P6	My partner believes that the scheduled cesarean section is dangerous for my baby.
26	P7*	My partner believes that the vaginal birth method is dangerous for me.
27	P8	My partner believes that the scheduled cesarean section is dangerous for me.
28	P9	Delivering my baby by the vaginal birth method is a meaningful experience for my partner.
29	P10*	Delivering my baby by the scheduled cesarean section is a meaningful experience for my partner.
30	P11*	To my partner, delivering my baby at a particular time of day and at a particular time of the year can influence my baby's success in life.
Mother-in-law's Feelings about Delivery Options (Mother-in-law)		
31	L1	I believe that it is important to my mother-in-law that I deliver my baby by the vaginal birth method.
32	L2*	I believe that it is important to my mother-in-law that I deliver my baby by the scheduled cesarean section.
33	L3	Delivering my baby by the vaginal birth method is convenient for my mother-in-law.
34	L4*	Delivering my baby by the scheduled cesarean section is convenient for my mother-in-law.
35	L5*	My mother-in-law believes that the vaginal birth method is dangerous for my baby.

Table 1 (Continued)

Item Number	Label	Item Content
36	L6	My mother-in-law believes that the scheduled cesarean section is dangerous for my baby.
37	L7*	My mother-in-law believes that the vaginal birth method is dangerous for me.
38	L8	My mother-in-law believes that the scheduled cesarean section is dangerous for me.
39	L9	Delivering my baby by the vaginal birth method is a meaningful experience for my mother-in-law.
40	L10*	Delivering my baby by the scheduled cesarean section is a meaningful experience for my mother-in-law.
41	L11*	To my mother-in-law, delivering my baby at a particular time of day and at a particular time of the year can influence my baby's success in life.
Mother's Feelings about Delivery Options (Mother)		
42	M1	I believe that it is important to my mother that I deliver my baby by the vaginal birth method.
43	M2*	I believe that it is important to my mother that I deliver my baby by the scheduled cesarean section.
44	M3	Delivering my baby by the vaginal birth method is convenient for my mother.
45	M4*	Delivering my baby by the scheduled cesarean section is convenient for my mother.
46	M5*	My mother believes that the vaginal birth method is dangerous for my baby.
47	M6	My mother believes that the scheduled cesarean section is dangerous for my baby.
48	M7*	My mother believes that the vaginal birth method is dangerous for me.
49	M8	My mother believes that the scheduled cesarean section is dangerous for me.
50	M9	Delivering my baby by the vaginal birth method is a meaningful experience for my mother.
51	M10*	Delivering my baby by the scheduled cesarean section is a meaningful experience for my mother.

Table 1 (Continued)

Item Number	Label	Item Content
52	M11*	To my mother, delivering my baby at a particular time of day and at a particular time of the year can influence my baby's success in life.

Childbirth Self-efficacy

Outcome Expectancy Subscale (OE)

- 1 H1 Relax my body.
- 2 H2 Get ready for each contraction.
- 3 H3 Use breathing during labor contractions.
- 4 H4 Keep myself in control.
- 5 H5 Think about relaxing.
- 6 H6 Concentrate on an object in the room to distract myself.
- 7 H7 Keep myself calm.
- 8 H8 Concentrate on thinking about the baby.
- 9 H9 Stay on top of each contraction.
- 10 H10 Think positively.
- 11 H11 Not think about the pain.
- 12 H12 Tell myself that I can do it.
- 13 H13 Think about others in my family.
- 14 H14 Concentrate on getting through one contraction at a time.
- 15 H15 Focus on the person helping me in labor.
- 16 H16 Listen to encouragement from the person helping me.

Efficacy Expectancy Subscale (EE)

- 1 C1 Relax my body.
- 2 C2 Get ready for each contraction.
- 3 C3 Use breathing during labor contractions.
- 4 C4 Keep myself in control.
- 5 C5 Think about relaxing.
- 6 C6 Concentrate on an object in the room to distract myself.
- 7 C7 Keep myself calm.
- 8 C8 Concentrate on thinking about the baby.
- 9 C9 Stay on top of each contraction.
- 10 C10 Think positively.
- 11 C11 Not think about the pain.
- 12 C12 Tell myself that I can do it.
- 13 C13 Think about others in my family.
- 14 C14 Concentrate on getting through one contraction at a time.
- 15 C15 Focus on the person helping me in labor.
- 16 C16 Listen to encouragement from the person helping me.

Note. *Items were reverse-scored.

Description of the sample.

A convenience sample of 305 primigravida women attending their prenatal visit in Taiwan participated in this study. The average age of the participants was 32.52 years (range 20-42). The estimated gestational age at the time of enrollment ranged from 6.43 weeks to 41.00 weeks with a mean gestational age of 27.27 weeks. The majority were Islanders (78.0%), 9.8% were Hakka, 7.5% were Mainlanders, and 4.6% were others. Half of the participants had a bachelor's degree, 20.0% had an associate's degree, 15.4% had a master's degree, and 11.1% had a vocational high school's degree. The distributions of age and educational level among the participants were similar to Taiwanese women who gave birth in 2012 (Department of Statistics, Ministry of the Interior, R.O.C. (Taiwan), 2013). Most of the participants were non-religious (61.4%) and the rest were distributed as Taoists (17.0%) and Buddhists (17.0%). The demographic characteristics of the participants are summarized in Table 2.

Preliminary item assessments.

Prior to psychometric testing, the correlations between the 4-item composite measuring intention toward spontaneous vaginal delivery option and all the other items (self-attitude, perceptions of partner, mother and mother-in-law attitudes) of the investigator-designed questionnaire were assessed. The results are displayed in Table 3. This allowed confirmation that complementary item-pairs functioned similarly. For example, item A1, "It is important to me that I deliver my baby by the vaginal birth method", correlated with intention toward spontaneous vaginal delivery option .66 and item A2, "It is important to me that I deliver my baby by the scheduled cesarean section", correlated .69 with intention toward spontaneous vaginal delivery option (after reverse scoring).

Table 2

Demographic Characteristics of the Participated Primigravida Women

Characteristic	Number	Percentage
Ethnicity		
Islanders	238	78.0
Hakka	30	9.8
Mainlanders	23	7.5
Others	14	4.6
Total	305	100
Educational level		
Lower than vocational high school's	6	2
Vocational high school's	34	11.1
Associate's	61	20.0
Bachelor's	155	50.8
Master's	47	15.4
Doctoral degree	2	0.7
Total	305	100
Religion		
Taoism	52	17.0
Buddhism	52	17.0
Christianity	14	4.6
Non-religious	187	61.4
Total	305	100

Inspection of Table 3 shows that certain item-pairs referring to danger did not function as intended. Specifically item-pair5-6, “The vaginal birth method (scheduled cesarean section) is dangerous for my baby” and item-pair7-8, “The vaginal birth method (scheduled cesarean section) is dangerous for me”. It appeared that women responded by considering the degree of danger inherent in pregnancy and delivery regardless of the option being referred to by each statement. Therefore, the two item-pairs referring to danger (to me and to my baby) as well as their parallel forms (for partner, mother, and mother-in-law) were excluded, leaving 36 items in the investigator-designed questionnaire for further analysis.

Reliability analyses.

Item stability was assessed using test-retest reliability with the assumption that these correlations should be positive. The CDOQ was re-administered to a subgroup of 30 Taiwanese pregnant women from the total sample two weeks later. As indicated in Table 4, the estimated test-retest reliability for each item of the investigator-designed questionnaire is positive. The average test-retest reliability of the items referring to elective caesarean section was .37; the average test-retest reliability of the items referring to spontaneous vaginal delivery was .46.

Table 3

The Pearson Product-moment Correlation Coefficient between Intention toward Spontaneous Vaginal Delivery Option and All the Other Items

Item	Intention	Item	Intention	Item	Intention	Item	Intention
A1	.66	P1	.33	L1	.15	M1	.24
A2*	.69	P2*	.23	L2*	.12	M2*	.22
A3	.61	P3	.23	L3	.12	M3	.21
A4*	.64	P4*	.20	L4*	.10	M4*	.17
A5*	.34	P5*	.27	L5*	.21	M5*	.26
A6	-.06	P6	-.13	L6	-.04	M6	-.14
A7*	.33	P7*	.30	L7*	.24	M7*	.30
A8	-.09	P8	.01	L8	-.04	M8	-.06
A9	.44	P9	.34	L9	.12	M9	.19
A10*	.34	P10*	.27	L10*	.13	M10*	.14
A11*	.22	P11*	.20	L11*	.17	M11*	.18
A12	.25						
A13*	.15						
A14	.43						
A15*	.12						

Note. N=305. *Items were reverse-scored. Correlations > .113 are significant at $p < .05$; Correlations > .15 are significant at $p < .01$.

Table 4

The Pearson Product-moment Correlation Coefficient for Test-retest Reliability on Items of the Investigator-designed Questionnaire

<u>Intention</u>		<u>Attitudes</u>		<u>Partner</u>		<u>MIL</u>		<u>Mother</u>	
Item	<i>r</i>	Item	<i>r</i>	Item	<i>r</i>	Item	<i>r</i>	Item	<i>r</i>
I1	.81	A1	.75	P1	.47	L1	.31	M1	.30
I2	.81	A2*	.42	P2*	.29	L2*	.43	M2*	.56
I3*	.17	A3	.58	P3	.07	L3	.41	M3	.23
I4*	.37	A4*	.16	P4*	.06	L4*	.36	M4*	.24
		A9	.69	P9	.51	L9	.31	M9	.54
		A10*	.60	P10*	.40	L10*	.36	M10*	.54
		A11*	.76	P11*	.48	L11*	.48	M11*	.39
		A12	.20						
		A13*	.35						
		A14	.81						
		A15*	.37						

Note. $N=30$. *Items were reverse-scored; MIL = mother-in-law.

Internal consistency was assessed using SPSS RELIABILITY procedure that provides Cronbach's alpha, item-total correlations, and estimated alpha if specific items were to be removed. This analysis revealed that within each component the parallel items A11, P11, M11, and L11, "delivering my baby at a particular time of day and at a particular time of the year can influence my baby's success in life", showed negative impacts on the Cronbach's alphas for each component. Hence, these 4 items were removed from the initial components and composed a new component, Culture. In addition, item A12, "Delivering my baby by the vaginal birth method will help build a healthy relationship between my partner and me" and item A13, "Delivering my baby by the scheduled cesarean section will help build a healthy relationship between my partner and me" seemed to correlate more strongly with items assessing partner's

feelings about delivery options than attitude items. Therefore, items A12 and A13 were reallocated to partner's feelings about delivery options component.

Descriptive statistics for the components and the items were also computed. The means and standard deviations of the components of the CDOQ are as follows: Intention: $M = 1.53$, $SD = 1.24$; Attitude: $M = 1.22$, $SD = 0.86$; Partner: $M = 0.62$, $SD = 0.70$; Mother: $M = 0.75$, $SD = 0.84$; Mother-in-law: $M = 0.47$, $SD = 0.68$; Culture: $M = 0.27$, $SD = 1.30$; OE: $M = 6.81$, $SD = 1.74$; EE: $M = 6.15$, $SD = 1.82$. The Cronbach's alphas for the components of the CDOQ ranged from .55 to .95 (see Table 5). The intention regarding delivery options component consists of 4 items ($\alpha = .89$, 95% CI = .87--.91), the attitudes toward delivery options component consists of 8 items ($\alpha = .80$, 95% CI = .77--.83), the partner's feelings about delivery options consists of 8 items ($\alpha = .66$, 95% CI = .60--.72), the mother-in-law's feelings about delivery options consists of 6 items ($\alpha = .55$, 95% CI = .46--.62), the mother's feelings about delivery options consists of 6 items ($\alpha = .70$, 95% CI = .64--.75), the culture component consists of 4 items ($\alpha = .83$, 95% CI = .80--.86), the outcome expectancy subscale consists of 16 items ($\alpha = .94$, 95% CI = .93--.95), and the efficacy expectancy subscale consists of 16 items ($\alpha = .95$, 95% CI = .94--.96). In item descriptive statistics, I1 and I2 show lowest skewness and highest kurtosis that means these two items were strongly agreed with by this sample. In other words, the items referring to intention of spontaneous vaginal delivery were strongly endorsed among the participating pregnant women. The mean inter-item correlation for intention regarding delivery options, attitudes toward delivery options, partner's, mother-in-law's and mother's feelings about delivery options, and culture component are .77, .51, .35, .29, .43, and .66, respectively. The detailed item statistics for the components of the investigator-designed questionnaire are shown in tables 6 to 11.

Table 5

Cronbach's Alpha Internal Consistency Reliability Estimates for the Components of the CDOQ

Component	Number of Items	α	Alpha 95% CI	<i>M</i>	<i>SD</i>	Skewness	Kurtosis
Intention	4	.89	.87 to .91	1.53	1.24	-1.03	0.77
Attitude	8	.80	.77 to .83	1.22	0.86	-0.19	-0.38
Partner	8	.66	.60 to .72	0.62	0.70	0.69	0.39
MIL	6	.55	.46 to .62	0.47	0.68	1.58	2.13
Mother	6	.70	.64 to .75	0.75	0.84	0.62	-0.02
Culture	4	.83	.80 to .86	0.27	1.30	0.21	-0.24
OE	16	.94	.93 to .95	6.81	1.74	-0.44	0.64
EE	16	.95	.94 to .96	6.15	1.82	-0.26	0.33

Note. $N=305$. MIL = mother-in-law; OE = outcome expectancy; EE = efficacy expectancy; α = Cronbach's alpha. CI = confidence interval. Items were scaled from -3 (strongly disagree) to 3 (strongly agree) on the CDOQ. Items were scaled from 1 (not at all helpful or sure) to 10 (very helpful or sure) on the Childbirth Self-Efficacy Inventory.

Construct validity.

The construct validity on the CDOQ was assessed using confirmatory factor analyses (CFA) performed on the covariance matrix of the 36 items. A maximum-likelihood method was used to estimate parameters and the overall fit of the models was assessed using χ^2 (Chi-square), root mean square error of approximation (RMSEA), non-normed fit index (NNFI), comparative fit index (CFI), and standardized root mean square residual (SRMR). The χ^2 measures overall model fit and indicates the extent of inconsistency between the sample and fitted covariance matrices (Kline, 2010). Its limitation is that it depends on sample size.

Table 6

Item Statistics for the Intention Component

Label	Item	Corrected Item-to-Total Correlation	<i>M</i>	<i>SD</i>
I1	I would like to deliver my baby by the vaginal birth method.	.76	2.20	1.12
I2	I plan to deliver my baby by the vaginal birth method.	.75	2.03	1.34
I3*	I would like to deliver my baby by the scheduled cesarean section.	.77	0.81	1.64
I4*	I plan to deliver my baby by the scheduled cesarean section.	.81	1.07	1.58

Note. *N*=305. *Items were reverse-scored. Items were scaled from -3 (strongly disagree) to 3 (strongly agree).

As sample size increases χ^2 value increase which results in small discrepancies producing a statistically significant inconsistency between the sample and fitted covariance matrices. Even though it is an overly sensitive fit index, it is here reported because most other fit indices incorporate it as part of their formulations. Little (1997) suggests that researchers should not rely too heavily on χ^2 but rather on other practical fit indices to evaluate the overall adequacy of a fitted model. Hence, the practical fit indices-RMSEA, NNFI, CFI, and SRMR are also reported in this study because they tend to perform well with respect to detecting model misspecification and lack of dependence on sample size (Jackson, Gillaspay Jr, & Purc-Stephenson,2009). The NNFI and CFI have a range from 0 to 1 with values of .90 or greater indicating a good fitting model. The RMSEA and SRMR also range from 0 to 1 with values of .08 or less are desired (Jöreskog & Sörbom, 1996).

The first model tested (Model 1) was a generic measurement model in which each item loaded on only one of six components (latent variables). This six-component model did not fit

the data well; neither from a statistical ($\chi^2 = 3176.45$, $df = 579$, $p < .01$) nor a practical (RMSEA = .12, NNFI = .79, CFI = .80, and SRMR = .15) perspective. This model was therefore rejected.

Table 7

Item Statistics for the Attitude Component

Label	Item	Corrected Item-to-Total Correlation	<i>M</i>	<i>SD</i>
A1	It is important to me that I deliver my baby by the vaginal birth method.	.62	1.91	1.20
A2*	It is important to me that I deliver my baby by the scheduled cesarean section.	.64	0.84	1.53
A3	Delivering my baby by the vaginal birth method is convenient for me.	.55	1.58	1.38
A4*	Delivering my baby by the scheduled cesarean section is convenient for me.	.62	0.61	1.57
A9	Delivering my baby by the vaginal birth method is a meaningful experience for me.	.49	1.95	1.08
A10*	Delivering my baby by the scheduled cesarean section is a meaningful experience for me.	.45	0.66	1.31
A14	A vaginal birth method will help me bond more with my baby.	.48	1.70	1.27
A15*	A scheduled cesarean section will help me bond more with my baby.	.27	0.52	1.20

Note. $N=305$. *Items were reverse-scored. Items were scaled from -3 (strongly disagree) to 3 (strongly agree).

A review of the modification indices for Model 1 revealed some abnormally large values reflecting the design features of the CDOQ. Specifically, the complementary pairs of statements (one referring to spontaneous vaginal delivery and one referring to scheduled cesarean section).

For example, item A1, “It is important to me that I deliver my baby by the vaginal birth method”

and item A2, “It is important to me that I deliver my baby by the scheduled cesarean section”. In light of these, a second measurement model (Model 2) was tested that explicitly incorporated the design features of this questionnaire by adding two factors, one for each delivery option.

Table 8

Item Statistics for the Partner Components

Label	Item	Corrected Item-to-Total Correlation	<i>M</i>	<i>SD</i>
P1	I believe that it is important to my partner that I deliver my baby by the vaginal birth method.	.52	0.85	1.40
P2*	I believe that it is important to my partner that I deliver my baby by the scheduled cesarean section.	.32	0.51	1.17
P3	Delivering my baby by the vaginal birth method is convenient for my partner.	.37	0.67	1.46
P4*	Delivering my baby by the scheduled cesarean section is convenient for my partner.	.27	0.43	1.15
P9	Delivering my baby by the vaginal birth method is a meaningful experience for my partner.	.41	1.33	1.36
P10*	Delivering my baby by the scheduled cesarean section is a meaningful experience for my partner.	.26	0.50	1.25
A12	Delivering my baby by the vaginal birth method will help build a healthy relationship between my partner and me.	.45	0.45	1.32
A13*	Delivering my baby by the scheduled cesarean section will help build a healthy relationship between my partner and me.	.21	0.24	1.04

Note. *N*=305. *Items were reverse-scored. Items were scaled from -3 (strongly disagree) to 3 (strongly agree).

A schematic representation of Model 2 is displayed in Figure 2. Model fit statistics are shown in Table 12 for comparison. A comparative test of this model against the generic measurement model, achieved by contrasting the difference in their χ^2 values relative to the difference in their degrees of freedom, confirmed that incorporating the design features significantly improved the fit of the model to the data ($\chi^2 = 1482.28$, $df = 37$, $p < .01$).

Table 9

Item Statistics for the Mother-in-law Components

Label	Item	Corrected Item-to-Total Correlation	<i>M</i>	<i>SD</i>
L1	I believe that it is important to my mother-in-law that I deliver my baby by the vaginal birth method.	.22	0.21	1.37
L2*	I believe that it is important to my mother-in-law that I deliver my baby by the scheduled cesarean section.	.25	0.57	1.09
L3	Delivering my baby by the vaginal birth method is convenient for my mother-in-law.	.44	0.40	1.31
L4*	Delivering my baby by the scheduled cesarean section is convenient for my mother-in-law.	.28	0.52	1.08
L9	Delivering my baby by the vaginal birth method is a meaningful experience for my mother-in-law.	.36	0.72	1.35
L10*	Delivering my baby by the scheduled cesarean section is a meaningful experience for my mother-in-law.	.20	0.41	1.14

Note. $N=305$. *Items were reverse-scored. Items were scaled from -3 (strongly disagree) to 3 (strongly agree).

The standardized factor loadings (λ s) and factor correlations for this measurement model are summarized in Tables 13 and 14. In general the average standardized factor loadings of the items on the TPB component factors were larger than those on the design-feature factors: .78 versus .45 for intention items, .52 versus .42 for attitude items, .40 versus .41 for partner's feelings items, .40 versus .41 for mother-in-law's feelings items, .49 versus .44 for mother's feelings items, and .65 versus .35 for culture items. The correlation matrix of the 36 items on the CDOQ is provided in Appendix G-Table A1.

Table 10

Item Statistics for the Mother Components

Label	Item	Corrected Item-to-Total Correlation	<i>M</i>	<i>SD</i>
M1	I believe that it is important to my mother that I deliver my baby by the vaginal birth method.	.58	1.04	1.39
M2*	I believe that it is important to my mother that I deliver my baby by the scheduled cesarean section.	.36	0.50	1.29
M3	Delivering my baby by the vaginal birth method is convenient for my mother.	.51	0.87	1.40
M4*	Delivering my baby by the scheduled cesarean section is convenient for my mother.	.39	0.48	1.21
M9	Delivering my baby by the vaginal birth method is a meaningful experience for my mother.	.46	1.09	1.45
M10*	Delivering my baby by the scheduled cesarean section is a meaningful experience for my mother.	.25	0.53	1.25

Note. $N=305$. *Items were reverse-scored. Items were scaled from -3 (strongly disagree) to 3 (strongly agree).

The CFA model provides support for the construct validity of the CDOQ. Next step was to predict intention toward spontaneous vaginal delivery option from antecedents as suggested by the TPB. The correlations among scales and intention toward spontaneous vaginal delivery option are presented in Table 15. Inspection of this table shows that there is no relationship between childbirth self-efficacy component and intention toward spontaneous vaginal delivery option. Hence, childbirth self-efficacy was excluded for further analysis. Also, I intended to use multiple linear regression in SPSS to conduct this analysis but the correlation matrix suggests serious problems with multicollinearity and possibility of suppression were likely to distort such an analysis. Beckstead's (2012) criterion-irrelevant-variance-omitted (CIVO) regression method was used to untangle the suppressor effects when predicting intention from the other components of the CDOQ. Table 16 compares the results of the traditional multiple regression and CIVO regression method.

Table 11

Item Statistics for the Culture Components

Label	Item	Corrected Item-to-Total Correlation	<i>M</i>	<i>SD</i>
A11*	I believe that delivering my baby at a particular time of day and at a particular time of the year can influence my baby's success in life.	.66	0.41	1.63
P11*	To my partner, delivering my baby at a particular time of day and at a particular time of the year can influence my baby's success in life.	.67	0.55	1.63
L11*	To my mother-in-law, delivering my baby at a particular time of day and at a particular time of the year can influence my baby's success in life.	.60	-0.02	1.51

Table 11 (Continued)

Label	Item	Corrected Item-to-Total Correlation	<i>M</i>	<i>SD</i>
M11*	To my mother, delivering my baby at a particular time of day and at a particular time of the year can influence my baby's success in life.	.70	0.12	1.61

Note. *N* = 305. *Items were reverse-scored. Items were scaled from -3 (strongly disagree) to 3 (strongly agree).

Table 12

Summary of Model Fit Statistics

Model	χ^2	<i>df</i>	RMSEA	NNFI	CFI	SRMR
1. Measurement model-generic	3176.45*	579	.12	.79	.80	.15
2. Measurement model-with design features	1694.17*	542	.08	.90	.91	.09
Difference between Model 1 and Model 2	Δ 1482.28*	Δ 37				

Note. *N*=305. **p* < .01. RMSEA = root mean square error of approximation; NNFI = non-normed fit index; CFI = comparative fit index; SRMR = standardized root mean square residual.

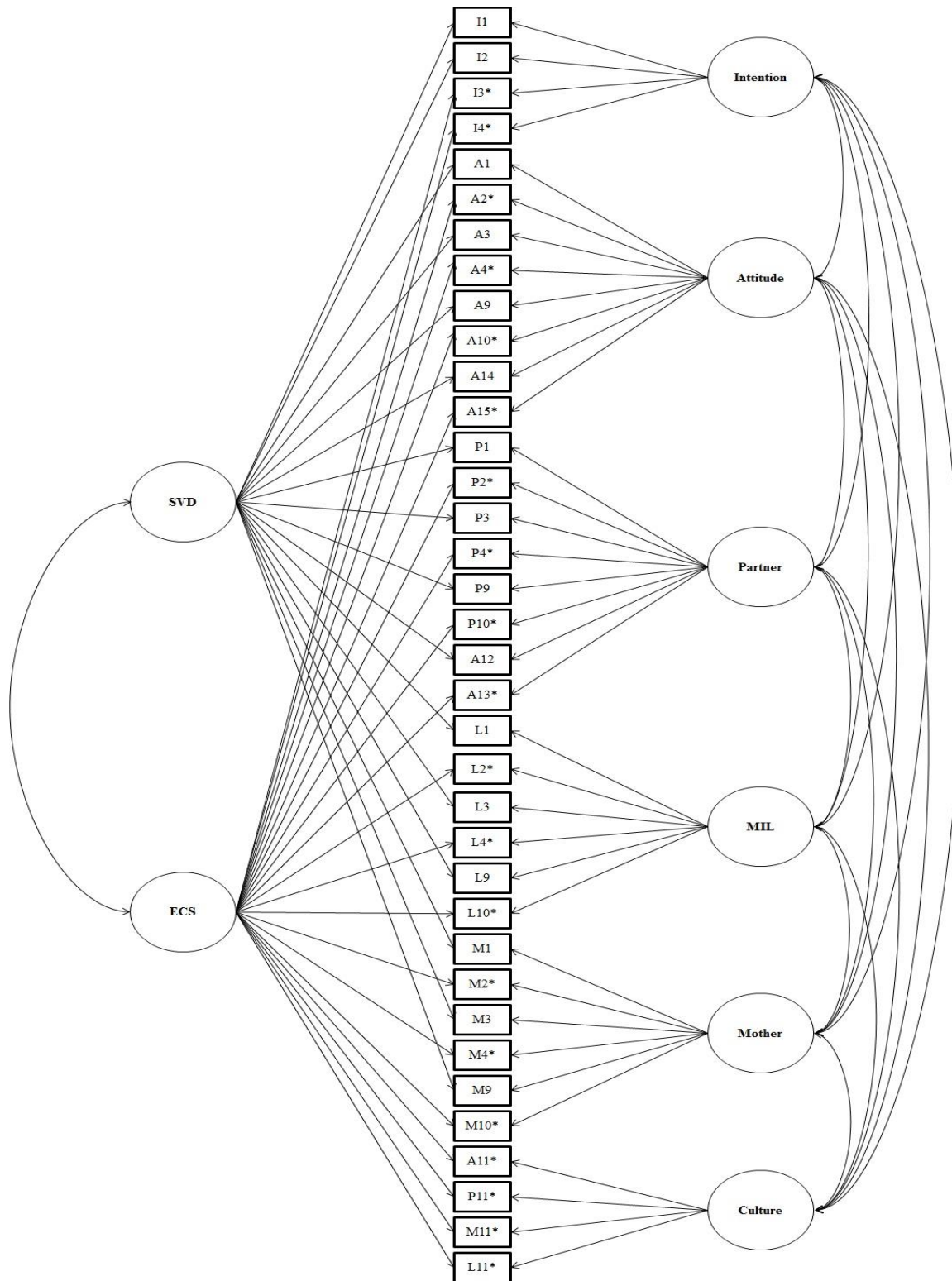


Figure 2. Schematic representation of measurement model with design features of the CDOQ. SVD = spontaneous vaginal delivery; ECS = elective caesarean section; *Items were reverse-scored; MIL = mother-in-law.

Table 13

The Factor Loadings (λ_s) for Measurement Model 2 of the CDOQ

Item	Option Factor		TPB Component Factor					
	SVD	ECS	Intention	Attitude	Partner	MIL	Mother	Culture
I1	0.69		0.67					
I2	0.64		0.66					
I3*		0.26	0.89					
I4*		0.22	0.89					
A1	0.58			0.60				
A2*		0.37		0.74				
A3	0.40			0.59				
A4*		0.34		0.74				
A9	0.36			0.50				
A10*		0.43		0.35				
A14	0.37			0.51				
A15*		0.49		0.14				
P1	0.30				0.74			
P2*		0.63			0.17			
P3	0.22				0.65			
P4*		0.57			0.14			
P9	0.30				0.60			
P10*		0.62			0.19			
A12	0.25				0.60			
A13*		0.38			0.12			
L1	0.12					0.64		
L2*		0.62				0.08 ns		
L3	0.19					0.78		
L4*		0.70				0.14		
L9	0.21					0.70		
L10*		0.64				0.07 ns		
M1	0.33						0.79	
M2*		0.63					0.24	
M3	0.27						0.76	
M4*		0.56					0.23	
M9	0.22						0.74	
M10*		0.60					0.15	
A11*		0.30						0.69
P11*		0.41						0.63
L11*		0.35						0.58
M11*		0.32						0.71

Note. *Items were reverse-scored; SVD = spontaneous vaginal delivery; ECS = elective caesarean section; MIL = mother-in-law; ns = not statistically significant.

Table 14

The Factor Correlations for Measurement Model 2 of the CDOQ

	Intention	Attitude	Partner	MIL	Mother	Culture	SVD	ECS
Intention	1.00							
Attitude	0.88	1.00						
Partner	0.40	0.64	1.00					
MIL	0.15	0.33	0.60	1.00				
Mother	0.23	0.37	0.64	0.73	1.00			
Culture	0.17	0.16	-0.01 <i>ns</i>	-0.15 <i>ns</i>	-0.16	1.00		
SVD	--	--	--	--	--	--	1.00	
ECS	--	--	--	--	--	--	0.14 <i>ns</i>	1.00

Note. MIL = mother-in-law; SVD = spontaneous vaginal delivery; ECS = elective caesarean section; *ns* = not statistically significant.

Table 15

The Correlation Matrix of the Scales on the CDOQ

Variable	Intention	Attitude	Partner	MIL	Mother	Culture	SE	<i>M</i>	<i>SD</i>
Intention	1.00	--	--	--	--	--	--	1.53	1.24
Attitude	.77	1.00	--	--	--	--	--	1.22	0.86
Partner	.46	.65	1.00	--	--	--	--	0.62	0.70
MIL	.22	.31	.44	1.00	--	--	--	0.47	0.68
Mother	.31	.38	.52	.53	1.00	--	--	0.75	0.84
Culture	.24	.24	.16	.09 <i>ns</i>	.05 <i>ns</i>	1.00	--	0.27	1.30
SE	.07 <i>ns</i>	.17	.18	.01 <i>ns</i>	.02 <i>ns</i>	.03 <i>ns</i>	1.00	6.48	1.67

Note. *N* = 305. MIL = mother-in-law; SE = childbirth self-efficacy; *ns* = not statistically significant.

Table 16

Comparison of Traditional and CIVO Regression Analyses Predicting Intention

Variable	<i>B</i>	<i>SE</i>	β	<i>B'</i>	<i>SE'</i>	β'
Constant	0.14	0.08		0.10	0.09	
Attitude	1.16	0.07	.80**	0.97	0.07	.67**
Partner	-0.17	0.09	-.09	0.22	0.09	.11*

Table 16 (Continued)

Variable	<i>B</i>	<i>SE</i>	β	<i>B'</i>	<i>SE'</i>	β'
MIL	- 0.05	0.08	- .03	0.07	0.09	.03
Mother	0.10	0.07	.07	0.08	0.08	.04
Culture	0.05	0.04	.06	0.03	0.04	.03
		$R^2 = .61$			$R^2 = .59$	
		Adjusted $R^2 = .60$			Adjusted $R^2 = .59$	

Note. *N* = 305. MIL= mother-in-law; **p* < .05. ***p* < .01; criterion-irrelevant variance omitted (CIVO) results are denoted with a prime (').

CHAPTER FIVE:

DISCUSSION

This chapter begins with the discussion of the study results. Then the limitations of the study are detailed. Finally, implications for nursing and future directions for research are outlined.

The purpose of this multiphase mixed method study was to develop a multi-component instrument based on the theory of planned behavior (TPB) to better understand Taiwanese pregnant women's decisions regarding their childbirth delivery options (spontaneous vaginal delivery or elective caesarean section). The following research questions were successfully addressed in this study: 1) What are the psychometric properties (scale reliabilities and correlations among scales) of the Childbirth Delivery Options Questionnaire (CDOQ)? 2) To what extent do items in the CDOQ group together into distinct factors that correspond to attitudes, perceptions of significant others' beliefs and attitudes, and intentions regarding childbirth delivery options?

Items on the CDOQ were created to be as comprehensive as possible based on the literature regarding childbirth delivery options and the TPB. Initially, the CDOQ was a 52-item self-administered questionnaire comprising three components that correspond to the constructs of the TPB. Preliminary item analysis revealed that the items referring to dangerousness of delivery options did not function as intended and were dropped because they did not differentiate between the two delivery options. The 16 items referring to dangerousness of delivery options were deleted, leaving 36 items.

Test-retest reliability was used to assess item stability over two weeks and indicated that

responses to each item were positively correlated and those referring to spontaneous vaginal delivery were more stable than those referring to elective caesarean section. This suggests that the relevant beliefs, attitudes, and intentions regarding elective caesarean section may be more dynamic (malleable) over the course of pregnancy than those associated with spontaneous vaginal delivery. This finding may be interpreted as encouraging by maternal-child health professionals, educators and researchers interested in reducing elective caesarean section rates in Taiwan.

Corrected item-to-total correlations and expected change in Cronbach's alpha if item deleted were examined and revealed that four items might form a separate, general measure of social norms, not associated with any particular significant other but with the Taiwanese culture. This decision to regroup these items into a new component is in line with the literature indicating that such culture beliefs have an influence on the time of childbirth in Chinese populations (Lin et al., 2006; Lo, 2003).

The current study reports on the initial development of a TPB-based, self-administered instrument for use by researchers wishing to study pregnant women's decisions regarding childbirth delivery options. While responses showed evidence of construct validity based on CFA modeling, the internal consistency of responses forming the various scales were mixed. Nunnally (1978) recommends reliability estimates of at least .70 and Loo (2001) suggested that generally accepted cutoff value for Cronbach's alphas should be .80 for general research purposes. In this study, the Cronbach's alphas for intentions regarding delivery options, attitudes toward delivery options and culture components are over .80 which indicate that internal consistency among responses to items on these components are good, whereas responses to items on the components regarding significant others' feelings about delivery options (her partner,

mother and mother-in-law) show low internal consistency ($> .55$ but $< .80$) suggesting that these items will need further improvement. I will expand on this a bit more in the following discussion.

Clark and Watson (1995) suggested mean inter-item correlations with the range of .40 to .50 for scales that measure narrow characteristics of a trait. In this study, the mean inter-item correlation for intention regarding delivery options, attitudes toward delivery options, mother's feelings about delivery options, and culture component meet Clark and Watson's recommendations. However, perceptions of partner's and mother-in-law's feelings about delivery options component fail to meet the recommendations. It raises a question regarding *who* are the "significant others" of these women on childbirth decision-making and the time of data collection. It is possible that a woman may have heard about the risks and benefits of these two delivery options but she had not discussed them with these two "significant others" at the time of data collection. Future studies might collect data at multiple time points during pregnancy to better understand the dynamic roles of various significant others on women's childbirth decision-making.

This study was designed to collect data on Taiwanese pregnant women and test the construct validity of the CDOQ using confirmatory factor analyses (CFA). The flexibility of CFA allowed for explicitly modeling the design features of the CDOQ and provided important information for item revision. The factor loadings on the TPB component factors tend to be larger than those on the option factors. However, inspection of the standardized factor loadings showed that the loadings were small for item L2, "I believe that it is important to my mother-in-law that I deliver my baby by the scheduled cesarean section", and item L10, "Delivering my baby by the scheduled cesarean section is a meaningful experience for my mother-in-law" compared to their loadings on the ECS option factor. It appears that pregnant women may have

been thinking more about the delivery option than about the feelings of their mothers-in-law when responding to these items.

A review of the factor correlations revealed that the culture component weakly and negatively correlated with significant others' feelings about delivery options (her partner, mother and mother-in-law). This unanticipated finding suggests that future studies applying the CDOQ may ask pregnant women to choose one person (e.g., partner, mother, or mother-in-law) who has the strongest influence on her decision regarding childbirth delivery options and then fill out a set of items regarding her perceptions of that particular person's feelings about delivery options.

When intention was to be regressed onto attitude and social norms (partner, mother-in-law, mother, and culture) the proportion of variance (R^2) in the dependent variable, intention, accounted for by five predictors was about 61%. However, the β coefficients for partner and mother were negative while their zero-order correlations were positive, which could be caused by the presence of suppressors. Applying the CIVO regression approach to the problem, the results revealed that the mother-in-law and mother variables were suppressors, both influencing the attitude variable (note that the coefficient for attitude is inflated in traditional analysis) and that the mother-in-law variable also suppressed the partner variable. Table 16 showed the difference in β coefficients estimated by traditional and CIVO regression analysis. The CIVO coefficients convey the relative importance of the predictors with the suppressor effects neutralized. The CIVO weights for the nonsuppressor variables were slightly smaller (with the exception of mother-in-law and mother) than their traditional counterparts because the traditional weights are influenced by the inclusion of the suppressor. Also, R^2 and adjusted R^2 for the CIVO regression analysis were slightly smaller than in the traditional regression analysis. The relative importance of five predictors for explaining intention regarding delivery options as indicated via

the CIVO regression method indicate that attitude, and partner's feelings were significant and explained the bulk of the variance in intentions; the other variables representing social norms had trivial influences.

The TPB proved a powerful model for predicting intentions regarding childbirth delivery options among these women. The percentage of variance accounted for is considerably higher than typical findings from studies based on the TPB. In Armitage and Conner's (2001) meta-analytic review regarding the efficacy of the TPB, the average squared multiple correlations (R^2) for predicting intention was .39 which may be attributed to the fact that most studies reviewed applied TPB to study behaviors that are difficult to perform such as quitting smoking, consistently using condoms, and exercising regularly. Another recent TPB study that examined young mothers' decisions to use marijuana similarly reported higher than average variance accounted for when predicting of intention (Morrison et al., 2010).

The correlations between intentions regarding childbirth delivery options and the measures of attitudes and social norms were all significant suggesting that decisions regarding delivery options may be modified by interventions geared toward pregnant women's attitudes within family- and cultural-centered prenatal programs. One component of the TPB, childbirth self-efficacy, was not significantly correlated with intentions regarding childbirth delivery options. This type of finding has been mentioned by Fishbein and Ajzen claiming that intentions may vary in the extent to which they are attitudinally or normatively controlled. Intentions to perform some behaviors are influenced more by individual attitude or perceived behavioral control; others are influenced more by social norms. For example, your intentions to purchase a purse are influenced more by your personal preference and your intentions to yield a seat to elders in a shuttle are more influenced by social norms. The failure of childbirth self-efficacy to

predict intentions regarding childbirth delivery options may imply this component is not considered when women form their intentions regarding childbirth delivery options. It is also possible that this finding is an artifact of measurement because the CBSEI-C32 was primarily designed to measure pregnant women's efficacy and outcome expectancies concerning coping with the childbirth experience and not her decision-making self-efficacy. Other studies using the TPB report that the role of self-efficacy is behavior specific and can be irrelevant when not operationally defined as such (Morrison et al., 2010; Sayeed, Fishbein, Hornik, Cappella, & Ahern, 2005). The distributions of age and educational level among the participants measured here were similar to Taiwanese women who gave birth in 2012 (Department of Statistics, Ministry of the Interior, R.O.C. (Taiwan), 2013) supporting the representativeness of this sample. Intention to choose spontaneous vaginal delivery was strongly endorsed in this sample. This finding corresponds to the previous studies on childbirth delivery in Taiwan (Chu et al., 2010).

Limitations

As with any study, there are some limitations. I recognize that I used a convenience sample of pregnant women recruited from only one regional hospital. Findings might not necessarily generalize to all pregnant women in Taiwan, but as no TBP-based instrument currently exists for this population, I feel that this work contributes an important resource for researchers studying childbirth delivery decisions in Taiwan. I am also aware that the nature of self-reported data and in-person interviews can introduce subject and interviewer biases, however I believe that the multiphase approach employed worked to minimize these biases. Because the aim of this study was to develop and evaluate an instrument, the results represent an important first step in the systematic study of the psychological antecedents influencing Taiwanese women's choice of delivery option.

Implications for Nursing

This study has several implications for nursing practice, education and research within the maternal-child health field which has been striving for over two decades to reduce the high elective caesarean section rate in Taiwan. This study can potentially help maternal-child health professionals, educators and researchers understand Taiwanese pregnant women's decisions regarding their childbirth delivery options. It is important for maternal-child health professionals, educators and researchers to be aware that these decisions are complex consequences of attitudes and beliefs that pregnant women hold. Using this culturally appropriate instrument to study the relative influence of theory-based components on Taiwanese pregnant women's decisions regarding their childbirth delivery options can inform guidelines for prenatal family-centered nursing care. In addition, the results from this study could be a framework for reforming prenatal education programs to provide accurate information on the risks and benefits of various delivery options, decision making skills and other resources regarding the childbirth for pregnant women and their families. For nursing education, the study provides information regarding the specific attitudes and beliefs that pregnant women hold that may be addressed as part of interpersonal communication between nurses, pregnant women and their families. The results from this study can serve as a foundation for further research studies in understanding Taiwanese pregnant women's decisions regarding their childbirth delivery options, and the instrument may offer insight into the psychological mechanisms underlying effective interventions for reducing the prevalence of elective caesarean section.

Future Directions

Based on the current findings, it is important to refine the CDOQ and reassess its performance. Specifically modifying the Significant Others' Feelings about Delivery Options Component to permit the respondent to self-identify relevant significant others and answer social norm items pertaining to the feelings of these people (only). As with many measurement instruments, developments are constantly proposed and reassessed; it will be beneficial to test the refined CDOQ with more diverse populations and geographic regions.

This study has examined criterion and construct validity however more studies are needed to probe other types of validity, including predictive validity. Estimating the extent to which the CDOQ predicts the target behavior, the actual choice of delivery method, could be a powerful characteristic of its psychometric properties. Measurement equivalence is also important for understanding the psychometric properties of the CDOQ. Future studies will be needed to examine the measurement equivalence among primigravida and non-primigravida women, multiple ethnic groups, and diverse cultural groups. Another important step will be to develop items that measure decision-making self-efficacy regarding childbirth in order to explore the influence of this variable within the TPB framework. Finally, the results of this study should be used as a framework to develop prenatal education programs regarding childbirth delivery options to reduce the prevalence of elective caesarean section in Taiwan.

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APPENDIX A:

Chinese Version of the Childbirth Delivery Options Questionnaire (CCDOQ)

分娩選擇方式問卷

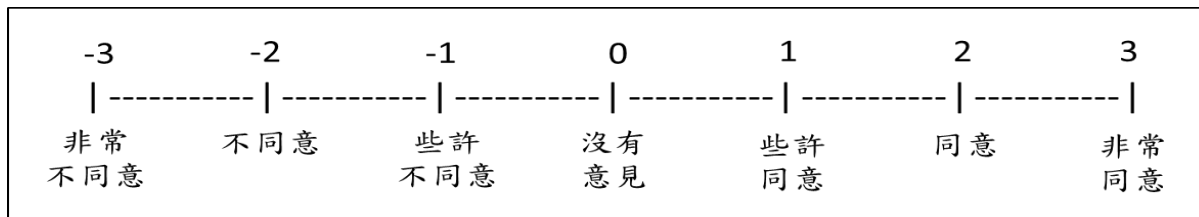
第一部分:

請您仔細閱讀每一個題目後並於該題目前的空格處填寫最符合您的想法的數字。問卷中的題目看起來很相似，所以請您仔細閱讀後用**正號加上數字**來代表您的**同意**程度或用**負號加上數字**來代表您的**不同意**程度。例如:您是非常同意該題目請您在該題目前的空格處填寫+3;若您是些許不同意該題目請您在該題目前的空格處填寫-1。

-3	-2	-1	0	1	2	3
-----	-----	-----	-----	-----	-----	
非常 不同意	不同意	些許 不同意	沒有 意見	些許 同意	同意	非常 同意

1. 我希望以自然產的方式來生產。
2. 我計畫以自然產的方式來生產。
3. 我希望以選擇性剖腹產的方式來生產。
4. 我計畫以選擇性剖腹產的方式來生產。
5. 對我而言以自然產的方式來生產是重要的。
6. 對我而言以選擇性剖腹產的方式來生產是重要的。
7. 對我而言以自然產的方式來生產是方便的。
8. 對我而言以選擇性剖腹產的方式來生產是方便的。
9. 以自然產的方式來生產對寶寶而言是危險的。
10. 以選擇性剖腹產的方式來生產對寶寶而言是危險的。
11. 對我而言以自然產的方式來生產是危險的。
12. 對我而言以選擇性剖腹產的方式來生產是危險的。
13. 對我而言以自然產的方式來生產是有意義的人生經驗。
14. 對我而言以選擇性剖腹產的方式來生產是有意義的人生經驗。
15. 以自然產的方式來生產有助於我跟我先生的關係。

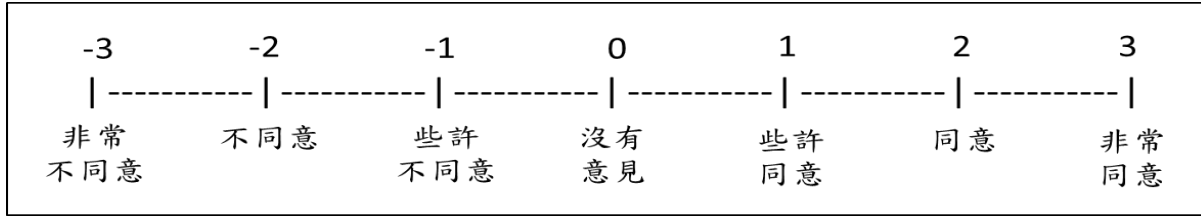
16. 以選擇性剖腹產的方式來生產有助於我跟我先生的關係。
17. 以自然產的方式來生產有助於我跟寶寶的親密連結。
18. 以選擇性剖腹產的方式來生產有助於我跟寶寶的親密連結。



請您仔細閱讀後用**正號加上數字**來代表您的**同意**程度或用**負號加上數字**來代表您的**不同意**程度。

19. 我相信在吉時誕生對於寶寶的未來會有幫助。
20. 我相信以自然產的方式來生產對我先生而言是重要的。
21. 我相信以選擇性剖腹產的方式來生產對我先生而言是重要的。
22. 以自然產的方式來生產對我先生而言是方便的。
23. 以選擇性剖腹產的方式來生產對我先生而言是方便的。
24. 我先生相信自然產對寶寶而言是危險的。
25. 我先生相信選擇性剖腹產對寶寶而言是危險的。
26. 我先生相信自然產對我而言是危險的。
27. 我先生相信選擇性剖腹產對我而言是危險的。
28. 對我先生而言以自然產的方式來生產是有意義的人生經驗。
29. 對我先生而言以選擇性剖腹產的方式來生產是有意義的人生經驗。
30. 我先生相信在吉時誕生對於寶寶的未來會有幫助。
31. 我相信以自然產的方式來生產對我婆婆而言是重要的。
32. 我相信以選擇性剖腹產的方式來生產對我婆婆而言是重要的。
33. 以自然產的方式來生產對我婆婆而言是方便的。
34. 以選擇性剖腹產的方式來生產對我婆婆而言是方便的。
35. 我婆婆相信自然產對寶寶而言是危險的。
36. 我婆婆相信選擇性剖腹產對寶寶而言是危險的。
37. 我婆婆相信自然產對我而言是危險的。
38. 我婆婆相信選擇性剖腹產對我而言是危險的。
39. 對我婆婆而言以自然產的方式來生產是有意義的人生經驗。
40. 對我婆婆而言以選擇性剖腹產的方式來生產是有意義的人生經驗。

41. 我婆婆相信在吉時誕生對於寶寶的未來會有幫助。
42. 我相信以自然產的方式來生產對我媽媽而言是重要的。
43. 我相信以選擇性剖腹產的方式來生產對我媽媽而言是重要的。



請您仔細閱讀後用**正號加上數字**來代表您的**同意**程度或用**負號加上數字**來代表您的**不同意**程度。

44. 以自然產的方式來生產對我媽媽而言是方便的。
45. 以選擇性剖腹產的方式來生產對我媽媽而言是方便的。
46. 我媽媽相信自然產對寶寶而言是危險的。
47. 我媽媽相信選擇性剖腹產對寶寶而言是危險的。
48. 我媽媽相信自然產對我而言是危險的。
49. 我媽媽相信選擇性剖腹產對我而言是危險的。
50. 對我媽媽而言以自然產的方式來生產是有意義的人生經驗。
51. 對我媽媽而言以選擇性剖腹產的方式來生產是有意義的人生經驗。
52. 我媽媽相信在吉時誕生對於寶寶的未來會有幫助。

第二部分：

以下是產婦在生產過程中常用的因應方法，請您想像您正感受到分娩前的強烈且規律的宮縮，就以下的每一個方法前的空格處填寫最符合您的想法的數字，來表示您覺得該方法對於您因應生產過程的**幫助**程度。例如：您相信該方法將會非常有幫助請您填寫 10 在該方法前的空格處；若您相信該方法將會稍有幫助請您填寫 5 在該方法前的空格處。

0	1	2	3	4	5	6	7	8	9	10
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
完全沒 有幫助										非常 有幫助

1. 放鬆自己的身體。
2. 作好心理準備。
3. 陣痛時作呼吸運動。
4. 保持自我控制。
5. 想著放鬆。
6. 集中精神於房間某物件上以分散注意力。
7. 保持冷靜。
8. 集中思想於嬰兒上。
9. 每次陣痛都能保持控制能力。
10. 正向思考。
11. 不要想著陣痛。
12. 告訴自己“我能做到”。
13. 想著家人。
14. 集中精神度過每一次陣痛。
15. 專注於幫助分娩的人員上。
16. 聆聽陪產者的鼓勵。

第三部分：

以下是產婦在生產過程中常用的因應方法，請您想像您正感受到分娩前的強烈且規律的宮縮，就以下的每一個方法前的空格處填寫最符合您的想法的數字，以表示您有幾分信心會使用該方法來因應生產過程。例如：您非常有信心會使用該方法來因應生產過程，請您填寫 10 在該方法前的空格處；若您完全沒有信心會使用該方法來因應生產過程，請您填寫 0 在該方法前的空格處。

0	1	2	3	4	5	6	7	8	9	10
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
完全沒 有信心										非常 有信心

1. 放鬆自己的身體。
2. 作好心理準備。
3. 陣痛時作呼吸運動。
4. 保持自我控制。
5. 想著放鬆。
6. 集中精神於房間某物件上以分散注意力。
7. 保持冷靜。
8. 集中思想於嬰兒上。
9. 每次陣痛都能保持控制能力。
10. 正向思考。
11. 不要想著陣痛。
12. 告訴自己“我能做到”。
13. 想著家人。
14. 集中精神度過每一次陣痛。
15. 專注於幫助分娩的人員上。
16. 聆聽陪產者的鼓勵。

APPENDIX B:

English Version of the Childbirth Delivery Options Questionnaire (ECDOQ)

Part I Childbirth Delivery Options

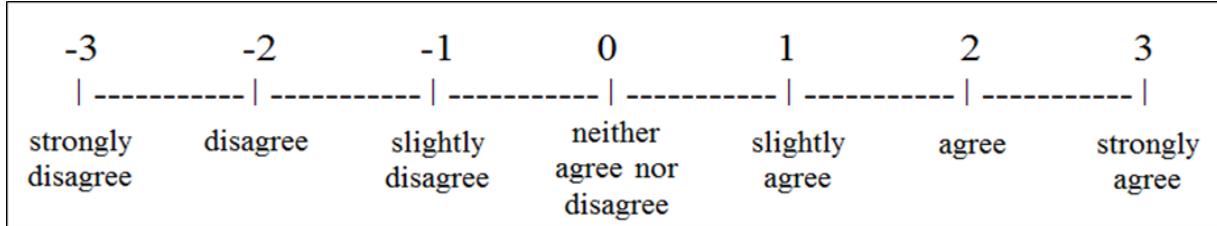
Please read each statement carefully and then select the numbered response that best describes your opinion. For example, if you strongly agreed with a particular statement you would indicate so by choosing the number +3. If you slightly disagreed with a particular statement you would indicate so by choosing the number -1. If you neither agree, nor disagree, with a particular statement you would indicate so by choosing 0.

-3	-2	-1	0	1	2	3
-----	-----	-----	-----	-----	-----	
strongly disagree	disagree	slightly disagree	neither agree nor disagree	slightly agree	agree	strongly agree

Please read each statement carefully and remember to use *positive numbers* to indicate that you *agree* with a statement and *negative numbers* to indicate that you *disagree*.

1. I would like to deliver my baby by the vaginal birth method.
2. I plan to deliver my baby by the vaginal birth method.
3. I would like to deliver my baby by the scheduled cesarean section.
4. I plan to deliver my baby by the scheduled cesarean section.
5. It is important to me that I deliver my baby by the vaginal birth method.
6. It is important to me that I deliver my baby by the scheduled cesarean section.
7. Delivering my baby by the vaginal birth method is convenient for me.
8. Delivering my baby by the scheduled cesarean section is convenient for me.

9. The vaginal birth method is dangerous for my baby.
10. The scheduled cesarean section is dangerous for my baby.
11. The vaginal birth method is dangerous for me.
12. The scheduled cesarean section is dangerous for me.



Please read each statement carefully and remember to use *positive numbers* to indicate that you *agree* with a statement and *negative numbers* to indicate that you *disagree*.

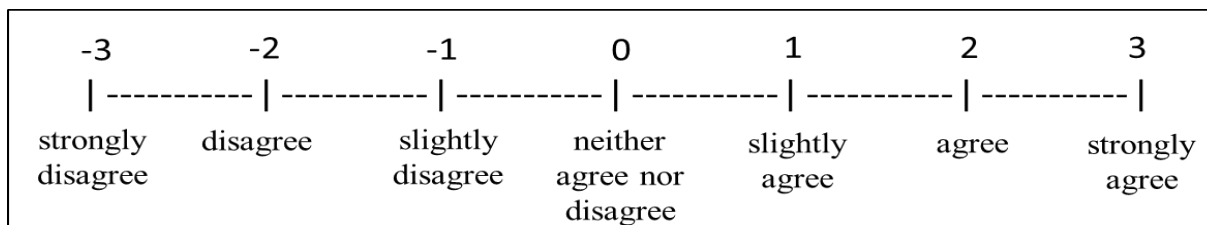
13. Delivering my baby by the vaginal birth method is a meaningful experience for me.
14. Delivering my baby by the scheduled cesarean section is a meaningful experience for me.
15. Delivering my baby by the vaginal birth method will help build a healthy relationship between my partner and me.
16. Delivering my baby by the scheduled cesarean section will help build a healthy relationship between my partner and me.
17. A vaginal birth method will help me bond more with my baby.
18. A scheduled cesarean section will help me bond more with my baby.
19. I believe that delivering my baby at a particular time of day and at a particular time of the year can influence my baby's success in life.
20. I believe that it is important to my partner that I deliver my baby by the vaginal birth method.
21. I believe that it is important to my partner that I deliver my baby by the scheduled cesarean section.
22. Delivering my baby by the vaginal birth method is convenient for my partner.
23. Delivering my baby by the scheduled cesarean section is convenient for my partner.
24. My partner believes that the vaginal birth method is dangerous for my baby.

25. My partner believes that the scheduled cesarean section is dangerous for my baby.
26. My partner believes that the vaginal birth method is dangerous for me.

-3	-2	-1	0	1	2	3
-----	-----	-----	-----	-----	-----	
strongly disagree	disagree	slightly disagree	neither agree nor disagree	slightly agree	agree	strongly agree

Please read each statement carefully and remember to use *positive numbers* to indicate that you *agree* with a statement and *negative numbers* to indicate that you *disagree*.

27. My partner believes that the scheduled cesarean section is dangerous for me.
28. Delivering my baby by the vaginal birth method is a meaningful experience for my partner.
29. Delivering my baby by the scheduled cesarean section is a meaningful experience for my partner.
30. To my partner, delivering my baby at a particular time of day and at a particular time of the year can influence my baby's success in life.
31. I believe that it is important to my mother-in-law that I deliver my baby by the vaginal birth method.
32. I believe that it is important to my mother-in-law that I deliver my baby by the scheduled cesarean section.
33. Delivering my baby by the vaginal birth method is convenient for my mother-in-law.
34. Delivering my baby by the scheduled cesarean section is convenient for my mother-in-law.
35. My mother-in-law believes that the vaginal birth method is dangerous for my baby.
36. My mother-in-law believes that the scheduled cesarean section is dangerous for my baby.
37. My mother-in-law believes that the vaginal birth method is dangerous for me.
38. My mother-in-law believes that the scheduled cesarean section is dangerous for me.
39. Delivering my baby by the vaginal birth method is a meaningful experience for my mother-in-law.



Please read each statement carefully and remember to use *positive numbers* to indicate that you *agree* with a statement and *negative numbers* to indicate that you *disagree*.

40. Delivering my baby by the scheduled cesarean section is a meaningful experience for my mother-in-law.
41. To my mother-in-law, delivering my baby at a particular time of day and at a particular time of the year can influence my baby's success in life.
42. I believe that it is important to my mother that I deliver my baby by the vaginal birth method.
43. I believe that it is important to my mother that I deliver my baby by the scheduled cesarean section.
44. Delivering my baby by the vaginal birth method is convenient for my mother.
45. Delivering my baby by the scheduled cesarean section is convenient for my mother.
46. My mother believes that the vaginal birth method is dangerous for my baby.
47. My mother believes that the scheduled cesarean section is dangerous for my baby.
48. My mother believes that the vaginal birth method is dangerous for me.
49. My mother believes that the scheduled cesarean section is dangerous for me.
50. Delivering my baby by the vaginal birth method is a meaningful experience for my mother.
51. Delivering my baby by the scheduled cesarean section is a meaningful experience for my mother.
52. To my mother, delivering my baby at a particular time of day and at a particular time of the year can influence my baby's success in life.

Part II Childbirth Behaviors

Below are several behaviors that some women practice during child birth. Think about how you imagine labor will be and feel when you are having frequent and strong contractions and when you are pushing your baby out to give birth. For each of the following behaviors, indicate *how helpful* you feel the behavior could be in helping you cope with the whole labor process by selecting the numbered response that best describes your opinion. For example, if you believe that a particular behavior would be extremely helpful you would indicate so by choosing the number 10, or if you felt that a particular behavior would be rather helpful you would indicate so by choosing a number around 5.

0	1	2	3	4	5	6	7	8	9	10
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
not at all					rather					extremely
helpful					helpful					helpful

1. Relax my body.
2. Get ready for each contraction.
3. Use breathing during labor contractions.
4. Keep myself in control.
5. Think about relaxing.
6. Concentrate on an object in the room to distract myself.
7. Keep myself calm.
8. Concentrate on thinking about the baby.
9. Stay on top of each contraction.
10. Think positively.
11. Not think about the pain.
12. Tell myself that I can do it.
13. Think about others in my family.
14. Concentrate on getting through one contraction at a time.
15. Focus on the person helping me in labor.
16. Listen to encouragement from the person helping me.

Below are the same behaviors that some women practice during child birth. Now for each of the behaviors, indicate *how certain you are of your ability* to use the behavior to help you cope with the whole labor process.

0	1	2	3	4	5	6	7	8	9	10
----- ----- ----- ----- ----- ----- ----- ----- ----- -----										
not at all				rather				extremely		
certain of				certain of				certain of		
my ability				my ability				my ability		

1. Relax my body.
2. Get ready for each contraction.
3. Use breathing during labor contractions.
4. Keep myself in control.
5. Think about relaxing.
6. Concentrate on an object in the room to distract myself.
7. Keep myself calm.
8. Concentrate on thinking about the baby.
9. Stay on top of each contraction.
10. Think positively.
11. Not think about the pain.
12. Tell myself that I can do it.
13. Think about others in my family.
14. Concentrate on getting through one contraction at a time.
15. Focus on the person helping me in labor.
16. Listen to encouragement from the person helping me.

***** THANK YOU *****

APPENDIX C:

Taiwanese Human Subject Research Certification of the Research Assistant



課程參加證明書

受委專(102)字第 04-098 號

茲證明

張雅麗

(身份證字號： M2224*****)

於 2013 年 4 月 22 日參加本會於台北榮民總醫院辦理之 IRB 專業訓練班(二)-台北場，共計接受 6 小時之研究倫理訓練。

課程單元	講師
研究相關法規	林綠紅
IRB 之審查基準-赫爾辛基宣言	陳張培倫
核准高風險研究-DSMP & DSMB	鮑力恆
到底是研究機構、PI 還是 IRB 會被告? 一談研究執行時之法律責任	郭英調
GCP 與 GCP 查核	李安榮
教育訓練之設計與執行	張芳維



中華民國一〇二年四月二十二日

Human Subject Protection Association in Taiwan
Tel: +886-2-7735-3634 Fax: +886-2-7735-3633 www.huspat.org
P.O.BOX, 16-53, Beitou, Taipei City, 11299, Taiwan, Taiwan (R.O.C.)

APPENDIX D:

The Certificate of CITI Completion of the Research Assistant

Certificate of Completion

Ya-Li Zhang

Has Successfully Completed the Course in

CITI Social & Behavioral Investigators and Key Personnel

On


Tuesday, December 04, 2012

1/1/2013 7:45:32 PM

APPENDIX E:

The Approved Letter for Human Subject Research from the Institutional Review Board of the Shin Kong Wu Ho-Su Memorial Hospital

版本：第六版 修訂日期：101.02.28

 新光醫療財團法人
新光吳火獅紀念醫院
SHIN KONG WU HO-SU MEMORIAL HOSPITAL

台北市士林區文昌路95號
TEL: 886-2-28332211

E-mail: IRB@ms.skh.org.tw
Fax: 886-2-28389428

人體試驗審查委員會
同意臨床試驗證明書

試驗計畫名稱：以計畫行為理論為基礎之分娩選擇方式問卷的研發
計畫書版本/日期：Version 2，2013-03-14
計畫書編號/本會審查編號：20130202R
試驗總主持人：臺北護理健康大學/鍾幸琳
受試者同意書版本/日期：Version 2，2013-03-14
主持人手冊/日期：NA
通過會期：No.4/ 2013-04-11
試驗有效期限：2013-04-11 至 2014-04-10
期中報告繳交期限：2013-10-10、2014-04-10
期末報告繳交期限：2014-06-10
其他：分娩選擇方式問卷 Version 1，2013-01-15、生產方式記錄表 Version 2，2013-03-14

Institutional Review Board
Approval of Clinical Trial

Protocol Title: Development of an Investigator-designed Questionnaire Concerning Childbirth
Delivery Options based on the Theory of Planned Behavior

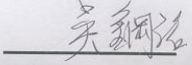
Protocol Version/Date: Version 2, 2013-03-14
Protocol No./IRB No.: 20130202R
Chief Principal Investigator: Ue-Lin Chung
Informed Consent Form/Date: Version 2, 2013-03-14
Investigator's Brochure/Date: NA
Board Meeting/Approval Dated: No.4/ 2013-04-11
Study Approval Expires Dated: 2014-04-10
Mid-Term Report Submission Deadline: 2013-10-10、2014-04-10
Final Report Submission Deadline: 2014-06-10
Others: 分娩選擇方式問卷 Version 1, 2013-01-15、生產方式記錄表 Version 2, 2013-03-14

The above study is approved by the Institutional Review Board on 2013/04/11.
在有效期屆滿之前，計畫主持人應向本委員會規定時間提出期中報告，並於計畫完成時繳交
結案報告，若屆時尚未完成，應重新申請，該計畫任何部分若欲更改，需向本委員會重新提
出申請。計畫主持人對受試者任何係具有危險而且未能預期之問題，例如：對藥物、放射性
元素或對醫療器材產生嚴重或非預期不良反應等，需立即向本委員會提出書面報告。

本院人體試驗委員會之組織與執行皆符合 ICH-GCP
The Institutional Review Board of Shin Kong Wu Ho-Su
Memorial Hospital performs its functions according to
written operating procedures and complies with GCP and
with the applicable regulatory requirements.

Yours sincerely,
Gong-Jhe Wu, M.D., Ph.D.
IRB Chairman
Shin Kong Wu Ho-Su
Memorial Hospital
Taiwan R.O.C.

審查案號 20130202R_B
製發日期：2013-04-23



Appendix F:
**The Approved Letter for Human Subject Research from the Institutional Review Board of
the University of South Florida**



RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4799
(813)974-5638 • FAX (813)974-7091

June 26, 2013

Chun-Yi Tai
College of Nursing
Tampa, FL 33612

RE: **Exempt Certification**

IRB#: Pro00012881

Title: Development of an Investigator-designed Questionnaire Concerning Childbirth Delivery
Options based on the Theory of Planned Behavior

Study Approval Period: 6/25/2013 to 6/25/2018

Dear Chun-Yi Tai:

On 6/25/2013, the Institutional Review Board (IRB) determined that your research meets USF requirements and Federal Exemption criteria as outlined in the federal regulations at 45CFR46.101(b):

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:
(i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Approved Documents

[Dissertation Proposal_CCDOO.pdf](#)

[Chinese Version of Study Information Sheet, Ver #1, 6.19.13](#)

[English Version of Study Information Sheet, Ver #1, 6.19.13](#)

Both consent form granted a waiver of informed consent documentation as outlined in the federal regulations at **45CFR46.117(c)** which states that an IRB may waive the requirement for the investigator to obtain a signed consent form for some or all subjects

APPENDIX G:

Table A1. The Correlation Matrix of the Items on the CDOQ.

	I1	I2	I3*	I4*	A1	A2*	A3	A4*	A9	A10*
I1	1.00									
I2	0.88	1.00								
I3*	0.58	0.58	1.00							
I4*	0.62	0.62	0.86	1.00						
A1	0.76	0.67	0.48	0.47	1.00					
A2*	0.49	0.47	0.72	0.67	0.42	1.00				
A3	0.59	0.60	0.51	0.46	0.60	0.39	1.00			
A4*	0.44	0.45	0.67	0.63	0.39	0.75	0.49	1.00		
A9	0.46	0.45	0.32	0.35	0.48	0.25	0.39	0.24	1.00	
A10*	0.22	0.23	0.36	0.35	0.28	0.41	0.19	0.32	0.23	1.00
A11*	0.21	0.18	0.21	0.19	0.15	0.25	0.18	0.22	0.07	0.23
A12	0.25	0.30	0.17	0.17	0.33	0.15	0.34	0.20	0.41	0.05
A13*	0.08	0.05	0.18	0.17	0.12	0.16	0.09	0.20	0.06	0.35
A14	0.45	0.46	0.32	0.31	0.51	0.30	0.37	0.28	0.59	0.18
A15*	0.02	0.02	0.19	0.16	0.10	0.24	0.04	0.23	0.11	0.48
P1	0.34	0.39	0.23	0.24	0.42	0.19	0.31	0.22	0.48	0.14
P2*	0.13	0.14	0.28	0.22	0.12	0.33	0.11	0.32	0.06	0.39
P3	0.24	0.29	0.14	0.15	0.32	0.12	0.41	0.26	0.38	-0.03
P4*	0.11	0.14	0.23	0.20	0.07	0.23	0.18	0.34	-0.03	0.23
P9	0.35	0.36	0.26	0.23	0.36	0.16	0.36	0.20	0.55	0.12
P10*	0.16	0.17	0.31	0.28	0.15	0.28	0.09	0.25	0.01	0.43
P11*	0.18	0.13	0.22	0.18	0.08	0.24	0.08	0.16	0.04	0.23
L1	0.18	0.20	0.07	0.11	0.23	0.08	0.15	0.11	0.17	-0.01
L2*	0.01	0.05	0.16	0.17	-0.08	0.14	0.02	0.10	-0.01	0.21
L3	0.17	0.18	0.03	0.07	0.26	0.02	0.22	0.12	0.25	-0.01
L4*	0.01	0.06	0.12	0.11	-0.06	0.19	0.06	0.17	-0.06	0.16
L9	0.19	0.16	0.04	0.06	0.26	0.06	0.13	0.12	0.38	0.05
L10*	0.08	0.07	0.13	0.15	0.01	0.19	0.07	0.15	-0.06	0.26
L11*	0.12	0.12	0.18	0.15	0.05	0.16	0.11	0.15	-0.02	0.14
M1	0.31	0.33	0.12	0.14	0.32	0.02	0.37	0.14	0.35	-0.02
M2*	0.13	0.13	0.28	0.20	0.05	0.26	0.14	0.23	0.01	0.14
M3	0.26	0.27	0.11	0.12	0.31	0.03	0.39	0.13	0.35	-0.05
M4*	0.15	0.17	0.18	0.11	0.06	0.19	0.14	0.21	0.01	0.08

M9	0.24	0.22	0.11	0.13	0.26	0.09	0.21	0.11	0.46	0.01
M10*	0.11	0.11	0.14	0.13	0.04	0.10	0.08	0.14	0.03	0.27
M11*	0.13	0.14	0.19	0.16	0.07	0.19	0.14	0.19	0.00	0.10
OE	0.15	0.11	0.07	0.07	0.17	0.09	0.17	0.10	0.14	0.07
EE	0.08	0.03	0.01	0.01	0.17	0.01	0.11	0.05	0.13	0.01

Note. N=305. *Items were reverse-scored. Correlations > .113 are significant at $p < .05$; Correlations > .15 are significant at $p < .01$.

	A11*	A12	A13*	A14	A15*	P1	P2*	P3	P4*	P9
I1										
I2										
I3*										
I4*										
A1										
A2*										
A3										
A4*										
A9										
A10*										
A11*	1.00									
A12	-0.01	1.00								
A13*	0.20	0.01	1.00							
A14	0.04	0.46	0.05	1.00						
A15*	0.22	0.03	0.41	0.07	1.00					
P1	-0.02	0.58	0.06	0.53	0.03	1.00				
P2*	0.35	0.12	0.44	0.07	0.49	0.01	1.00			
P3	-0.09	0.38	-0.06	0.42	-0.05	0.56	-0.08	1.00		
P4*	0.14	0.02	0.26	0.05	0.31	-0.02	0.50	0.05	1.00	
P9	0.04	0.37	0.02	0.59	0.01	0.52	0.06	0.44	0.01	1.00
P10*	0.16	0.10	0.20	0.06	0.35	0.08	0.37	-0.01	0.36	0.03
P11*	0.62	-0.05	0.09	-0.01	0.19	-0.03	0.30	-0.11	0.23	-0.02
L1	-0.13	0.19	-0.09	0.15	-0.07	0.27	-0.05	0.23	-0.10	0.19
L2*	0.19	-0.02	0.14	-0.01	0.18	-0.03	0.28	-0.11	0.23	-0.03
L3	-0.10	0.29	-0.05	0.28	-0.08	0.39	-0.06	0.42	-0.02	0.29
L4*	0.21	0.04	0.23	0.02	0.24	-0.05	0.37	-0.04	0.41	0.02
L9	-0.10	0.28	-0.06	0.36	-0.05	0.36	-0.01	0.32	-0.08	0.47
L10*	0.07	0.01	0.17	-0.02	0.25	-0.03	0.26	-0.09	0.25	-0.06
L11*	0.44	0.01	0.07	0.00	0.14	-0.01	0.21	-0.04	0.13	0.00
M1	-0.07	0.37	0.00	0.42	-0.11	0.37	-0.06	0.32	0.01	0.42
M2*	0.16	0.07	0.11	0.00	0.20	-0.05	0.35	-0.08	0.27	0.03
M3	-0.13	0.41	-0.06	0.41	-0.14	0.44	-0.14	0.53	-0.03	0.43
M4*	0.18	0.11	0.08	0.13	0.14	0.01	0.24	0.02	0.44	0.08

	A11*	A12	A13*	A14	A15*	P1	P2*	P3	P4*	P9
M9	-0.10	0.34	-0.01	0.44	-0.10	0.43	-0.04	0.33	-0.09	0.47
M10*	0.14	0.10	0.22	0.03	0.35	0.07	0.35	-0.10	0.27	0.07
M11*	0.58	0.04	0.09	0.02	0.13	-0.03	0.24	-0.09	0.13	0.03
OE	0.08	0.14	0.09	0.13	0.11	0.13	0.04	0.09	0.04	0.10
EE	0.00	0.19	0.09	0.19	0.06	0.18	-0.02	0.17	0.01	0.14

	P10*	P11*	L1	L2*	L3	L4*	L9	L10*	L11*	M1
I1										
I2										
I3*										
I4*										
A1										
A2*										
A3										
A4*										
A9										
A10*										
A11*										
A12										
A13*										
A14										
A15*										
P1										
P2*										
P3										
P4*										
P9										
P10*	1.00									
P11*	0.31	1.00								
L1	-0.05	-0.22	1.00							
L2*	0.25	0.28	-0.24	1.00						
L3	0.02	-0.15	0.60	-0.05	1.00					
L4*	0.32	0.30	-0.19	0.71	0.01	1.00				
L9	0.01	-0.07	0.44	-0.02	0.54	0.01	1.00			
L10*	0.53	0.19	-0.11	0.50	-0.03	0.44	-0.07	1.00		
L11*	0.21	0.49	-0.22	0.35	-0.08	0.30	-0.02	0.25	1.00	
M1	0.00	-0.15	0.40	-0.01	0.48	-0.03	0.51	-0.06	-0.13	1.00
M2*	0.37	0.23	-0.12	0.37	-0.06	0.42	0.08	0.40	0.26	0.11
M3	0.02	-0.18	0.28	-0.05	0.50	0.01	0.44	-0.05	-0.11	0.70
M4*	0.31	0.28	-0.18	0.28	-0.03	0.42	0.04	0.23	0.17	0.14
M9	-0.02	-0.13	0.36	0.01	0.41	-0.02	0.66	-0.08	-0.10	0.66
M10*	0.45	0.13	-0.13	0.33	-0.05	0.31	-0.04	0.48	0.13	0.11
M11*	0.13	0.55	-0.18	0.35	-0.14	0.26	-0.13	0.19	0.61	-0.09
OE	0.02	0.08	0.03	-0.06	-0.01	-0.08	0.00	0.03	0.01	-0.03
EE	0.00	-0.02	0.11	-0.08	0.07	-0.06	0.07	-0.02	-0.04	0.06

	M2*	M3	M4*	M9	M10*	M11*	OE	EE
I1								
I2								
I3*								
I4*								
A1								
A2*								
A3								
A4*								
A9								
A10*								
A11*								
A12								
A13*								
A14								
A15*								
P1								
P2*								
P3								
P4*								
P9								
P10*								
P11*								
L1								
L2*								
L3								
L4*								
L9								
L10*								
L11*								
M1								
M2*	1.00							
M3	0.06	1.00						
M4*	0.57	0.17	1.00					
M9	0.12	0.58	0.07	1.00				
M10*	0.40	0.04	0.37	-0.01	1.00			
M11*	0.21	-0.12	0.18	-0.13	0.22	1.00		
OE	-0.08	-0.04	0.07	-0.06	0.07	0.06	1.00	
EE	-0.06	0.07	0.07	0.02	0.06	0.03	0.76	1.00