Determinants of Intentions to Seek Information Regarding Cervical Cancer among Taiwanese Women

Abstract

This study explores the determinants of intentions to seek information regarding cervical cancer among Taiwanese women. A nationwide sample of 1,001 female adults aged 35 years old and over completed the telephone-based survey questionnaire. The study results showed that subjective norms, attitude, and perceived behavioral control significantly predicted information-seeking intentions regarding cervical cancer. Additionally, those seeking information regarding cervical cancer were more concerned with risks to themselves rather than risks to others. The TPB-informed model used in this study attracted the attention of health communication and information-seeking scholars attempting to develop health prevention and promotion programs.

Key words: Theory of planned behavior, information-seeking intentions, cervical cancer

Introduction

Even though cervical cancer is now one of the most treatable cancers, it remains a major public health concern in Taiwan (Lin, 2008). A survey by the Taiwan Cancer Foundation (TCF) found that over 270,000 Taiwanese women were at high risk of cervical cancer (The China Post, 2009/10/28). Cervical cancer is one of the leading causes of cancer among Taiwanese women (Lin, 2008) and nearly 2,700 women develop the disease annually (Chen & Hsieh, 2004).

One critical way to prevent cervical cancer is for patients to undergo Pap tests to detect changes in cervical cells, so most investigations (*e.g.* Chen, Lee, Wang, Chang, & Yang, 2005; Hou, Fernandez, Baumler, Parcel, & Chen, 2003; Koong, Yen, & Chen, 2006; Leyva, Byrd, & Tarwater, 2006; Liao, Wang, Lin, Hsieh, & Sung, 2006) focus on the correlates of cervical cancer, cervical cancer screening rates, or factors related to screening rates. However, cervical cancer prevention relates to the desire of patients for information and their efforts to obtain that information. Communication and information are considered increasingly important in helping patients cope with cancer, but previous Taiwanese studies have not fully addressed the determinants of related information-seeking intentions. There thus exists a clear need to better understand the factors associated with information-seeking intentions concerning cervical cancer. Only then can appropriate interventions be developed.

The seeking of health-information is a widely researched and complex issue (Waters, Sullivan, & Finney Rutten, 2009). Only recently was TPB adopted as a theoretical framework for understanding the determinants of health-information-seeking intentions/behaviors (Yoo & Robbins, 2008). Starting from the rationalist assumption, the theory of planned behavior (TPB) stresses the influence of subjective norms, attitudes, and perceived behavioral control on individual intentions/behaviors. However, meta analysis has found that subjective norms, attitudes, and perceived behavioral control account for an average 39% of variance in diverse behavioral intentions (Armitage & Conner, 2001), meaning more significant determinant factors must be considered to better explain the most significant influences on behavioral intentions/outcomes.

The TPB, based on cognitive beliefs, is limited to consider the influence of risk perception on behaviors/intentions. Ajen (1991) once stressed that TPB can be modified by adding extra components. Other studies (Griva, Anagnostopoulos, & Madoglou, 2009; Hagger, Chatzisarantis, & Biddle, 2002; Tolma, Reininger, Evans, & Ureda, 2006) argued that TPB could improve its predictive ability to promote health-related interventions by identifying additional factors related to decision-making regarding health. Recently, the optimistic bias approach has emphasized the importance of risk perceptions (Rutter & Quine, 2002), indicating that

such perceptions are crucial in precautionary action-taking (Kahlor, 2007). Undoubtedly, perceived risks are an important addition to the TPE, and are useful for enhancing understanding of information-seeking intentions.

Olson & Zanna (1993) argued that one of the main approached in social psychology has been to develop integrated models of behavior. This study, drawing on the TPB and optimistic bias approaches, thus examines the influence of subjective norms, attitude, perceived behavioral control, and risk perceptions on information-seeking regarding cervical cancer among Taiwanese women after controlling for demographics (*e.g.* age, education, family income), number of sexual partners, and personal experience. While few studies have extended TPB to information-seeking as the behavior/dependent variable of interest (Kahlor, 2007), and few attempts have been made to develop a general model for understanding information-seeking (Case, 2002), this study, expanding the TPB, captures the attention of health communication and information-seeking scholars interested in the determinants of information-seeking intentions regarding cervical cancer.

Literature Review

1. Information-seeking

Information is used to reduce uncertainty or change individual perceptions of reality. Information-seeking thus involves the deliberate seeking of information to satisfy goals such as answer-seeking, risk management, and sense-making (Case, 2002). Studies conducted in various countries such as Korea (Noh, Lee, Yun, Park, Bae, Nam *et al.*, 2009), Hong Kong (Wong & Chan, 2006), England (Leydon, Boulton, Moynihan, Jones, Mossman, Boudioni, & McPherson, 2000), and the US (Eheman, Berkowitz, Lee, Mohile, Purnell, Rodriguez, Roscoe, Johnson, Kirshner, & Morrow, 2009), have found that most cancer patients (or their family members) desire information regarding their health and seek informational/emotional support for coping. Thus identifying information needs, effectively utilizing relevant information, and identifying the best sources, become vital issues.

Cancer patients generally have opportunities to obtain information regarding cancer prevention, clinical trails, and treatments from different sources, including medical professionals (*e.g.*, physicians and nurses), traditional media (*e.g.*, TV, newspapers, radios, or magazines) and new media (*e.g.*, the Internet) (Yang, McComas, Gay, Leonard, Dannenberg, & Dillon, 2010). However, whether information regarding cancer is a “friend” or “foe” remains debatable (Leydon *et al.*, 2000). Some argue that significant harm associated with health information exists (for example harm arising from inaccurate or biased information) (Cline & Haynes, 2001) while others stress that health-related information empowers individuals, and helps

them to reduce uncertainty and make appropriate decisions (Case, 2002). As mentioned, information-seeking is a complex process and thus the determinants of information-seeking intentions among cancer patients must be examined.

2. The Application of TPB to Information-Seeking Intentions

TPB posits that individual behavioral intentions are determined by cognitive variables, including subjective norms (the pressure an individual perceives to perform a behavior), attitude (the degree to which a person has a favorable or unfavorable appraisal of the behavior in question), and perceived behavioral control (individual perceptions of the ease or difficulty of performing a behavior) (Ajzen, 1991).

TPB has long attracted considerable attention across several different types of behaviors in various studies (Andrykowski, Beacham, Schmidt, & Harper, 2006; Armitage & Conner, 2001; Chang, Lin, Chen, & Chin, 2009; Chen, 2007; Griva *et al.*, 2009; Hevey, Pertl, Thomas, Maher, Ní Chuinneagáin, & Craig, 2009; Tolma *et al*., 2006). During the 1990s, Godin and Kok (1996), reviewing the literature on the application of TPB to health behaviors/intentions, found that the components of TPB (including subjective norms, attitude, and perceived behavioral control) explained an average 41% of the variance in intentions and 31% of the variance in behavior in prospective studies. Regarding the influence of TPB on intentions/behaviors, Armitage & Conner (2001) reviewed 185 independent studies and also found that TPB accounted for 27% and 39% of the variance in behaviors and intentions, respectively.

Recently, Andrykowski *et al.* (2006) found TPB constructs were significantly and positively associated with intentions to perform various physical and psychosocial behaviors, leading to positive physical and mental health outcomes. Additionally, current efforts in public health in the US have focused on moving women from having initial mammograms to adhering to regular mammography schedules. O'Neill, Bowling, Brewer, Lipkus, Skinner, Strigo, & Rimer (2008) found that the TPB constructs were potential predictors of intentions to maintain adherence to mammography. Regarding information-seeking among middle-aged women, Yoo & Robbins (2008) found that attitude towards health-related web use and perceived behavioral control were significantly associated with intentions to seek information online, respectively.

Knowledge of how women seek information regarding cervical cancer is lacking. In psychology, TPB, an extension of the theory of reasoned action (TRA), has been presented as a model for explaining the determinants of different behaviors (Leroy, Helmreich, & Cowie, 2010). Given that researchers have relied on TPB in their attempts to predict and understand intentions to perform various activities and claimed that TPB is superior to other health behavioral models (*e.g.*, Health Belief

Model) for explaining behavioral intentions (Duffett-Leger, Letourneau, & Croll, 2008), TPB may provide insights into information-seeking regarding cervical cancer among Taiwanese women. This study thus hypothesized the following:

H1: Subjective norms significantly influence information-seeking intentions regarding cervical cancer among Taiwanese women.

H2: Attitude significantly influences information-seeking intentions regarding cervical cancer among Taiwanese women.

H3: Perceived behavioral control significantly influences information-seeking intentions regarding cervical cancer among Taiwanese women.

3. The influence of perceived risks to the self and others on intentions to seek information

Perceived risks, identified as one of the components of psychological models such as TRA (Mullen, Allen, Glanz, Fernandez, Bowen, Pruitt, Glenn, & Pignone, 2006), refer to individual beliefs regarding the risk to themselves or others of experiencing undesirable events (Weinstein, 1980, 1989; Cho, Lee, & Chung, 2010). The most robust finding related to risk perceptions is "optimistic bias", also known as "unrealistic optimistic" (Weistein, 1980, 1989). Optimistic bias denotes the tendency to view oneself as invulnerable to (or less likely than others to experience) negative life events, and has been identified in relation to various health risk assessment scenarios, including bird flu (Wei, Lo, & Lu, 2007), cancer (Katapodi, Dodd, Facione, Humphreys, & Lee, 2010; Lu, Andrews, & Hou, 2009; Bränström, Kristjansson, & Ullén, 2005), Hepatitis B (Gonzales, Glik, Prelip, Bourque, Yuen, Ang, & Jones, 2006), smoking (Arnett, 2000), food safety (Miles & Scaife, 2003), and diabetes (Walker, Mertz, Kalten, & Flynn, 2003). Optimistic bias is also persistent across cultures (Helweg-Larsen & Nielsen, 2009), genders (Chang, Sanna, Kim, & Srivastava, 2010), education levels (Fournier, De Ridder, & Bensing, 2003), and age groups (Weinstein, 1987). All findings related to health risks mentioned above support the conclusion of Weinstein (1987) that people tend to believe "it won't happen to me."

Because of self-esteem, egocentrism, illusion of control, or psychological distance, people tend to underestimate their personal risks of suffering a disease or an illness (Chapin, 2000). Optimistic bias is not only well-established in the literature on a wide array of risks, but also significantly influences behavioral intentions regarding health. For example, using the 2005 Health Information National Trend Survey data collected in the US, Zhao and Cai (2009) found that optimistic bias moderated the relationship between perceived risks and cancer information-seeking among smokers. Similarly, Yang, McComas, Gay, Leonard, Dannenberg, & Dillon (2010) applied the model of Risk Information-seeking and Processing (RISP) to health decision-making

and demonstrated a direct relationship between optimistic bias and information-seeking and processing.

Since individuals are particularly likely to consider themselves less vulnerable than others to disease or illness, and it appears that two levels of risk perceptions (self and others) must be distinguished to evaluate the influence of risk perceptions on intentions/behaviors. Recently, Wei *et al*. (2007) found that perceived risks to the self were a stronger predictor of health information-seeking than perceived risks to others when facing the threat of bird flu. Based on the finding regarding bird flu, individual perceptions of the risks to themselves may more significantly influence information-seeking intentions regarding cervical cancer than perceived risks to others. This study thus hypothesizes the following:

H4: Perceived risks to the self are a stronger predictor of information-seeking intentions concerning cervical cancer among Taiwanese women than are perceived risks to others.

Methods

Design

This study employed a cross-sectional survey to obtain data on subjective norms, attitude, perceived behavioral control, perceived risks to the self and others, and information-seeking intentions in relation to cervical cancer among Taiwanese women.

Participants and Data Collection

Epidemic statistics demonstrate that Taiwanese women aged 35 years old and over are more likely to be diagnosed with cervical cancer (Chiang, 2006). This study thus surveyed Taiwanese women aged 35 and over. Systematic sampling was adopted to draw samples from the telephone directory to address the research hypotheses. Of 7,034 telephone calls made between 6:00 and 10:00 pm from April 13 to 27, 2010, 3,428 respondents either did not answer or refused to participate in the survey, 2,593 responded that their household did not contain any qualified subjects, and 12 were initially willing to participate but then changed their minds. Ultimately, a national sample of 1,001 female adults aged 35 years old and over, with a mean age of 48.81 years old (*SD* = 8.61, range = 47; maximum = 82; minimum = 35), completed the telephone survey questionnaire. The valid response rates thus were 14.4%. All subjects participated voluntarily, and no personal identification information was linked with the data during analysis.

Instrumentation

1. Predictor variables

Subjective norms: A three-item scale, revised from that used by Ajzen and

Fishbein (1980), was used to assess subjective norms. Respondents indicated their agreement (1 = strongly disagree, and 7 = strongly agree) with the following three items: "My family members think I should seek information about cervical cancer," "My friends think I should seek information about cervical cancer," and "Others think I should seek information about cervical cancer." Exploratory factor analysis confirmed that the three items loaded on a single factor. The single-factor solution explained 60.32% of the total variance (Eigen value = 1.81). The three items were summed and divided by three to develop a composite measure of subjective norms (M = 3.70, SD = 2.01, α = .88).

Attitude: By modifying the attitude scale of Lu, Case, Lustria, Kwon, Andrews, Cavendish, & Floyd (2007), attitude toward seeking information about cervical cancer was measured using items such as "Overall, seeking information about cervical cancer is bad/good, helpless/helpful or ineffective/effective." A 7-point semantic differential-type scale was adopted to assess bi-polar items. Answers ranged from "1" to "7" ($M_{\text{bad/good}}$ = 6.17, $SD_{\text{bad /good}}$ = 1.21; $M_{\text{helpless/helpful}}$ = 6.07, $SD_{\text{helpless/helpful}}$ = 1.27; $M_{\text{ineffective/effective}}$ = 5.70, $SD_{\text{ineffective/effective}}$ = 1.41). Exploratory factor analysis confirmed that the three items loaded on a single factor. The single-factor solution explained 76.54% of the variance (Eigen value = 2.30). The three items were added and divided by 3 to create a composite measure of attitude (M = 5.97, SD = 1.14, α = .84).

Perceived behavioral control: The perceived behavioral control scale adopted from the study of Lu, Hou, Dzwo, Wu, Andrews *et al.* (2009) asked respondents to indicate their agreement with the following four statements: (1) I believe I can avoid getting cervical cancer; (2) I believe I can act to reduce the chance of getting cervical cancer; and (3) I believe that I can take precautionary measures to aviod getting cervical cancer. The 7-point Likert scale ranged from 1 (strongly disagree) to 7 (strongly agree). Exploratory factor analysis showed that the three items were grouped into a single factor (Eigen value = 2.26, accounting for 75.24% of the variance). The three items were added and divided by three to create a composite measure of perceived behavioral control (M = 4.94, SD = 1.54, α = .83).

Perceived risks to the self and others. Respondents were asked to estimate the risk of getting cervical cancer for themselves and others: "What is the likelihood that you will get cervical cancer?" (M = 2.87, SD = 1.69) and "What is the likelihood that others will get cervical cancer?" (M = 3.10, SD = 1.61). Responses to these two questions were provided using a 7-point scale, ranging from 1 "highly unlikely" to 7 "highly likely."

2. Outcome variable

Information- seeking intentions regarding cervical cancer. Respondents were

asked to indicate whether they would do the following: (1) seek information on the nature of cervical cancer; (2) seek information about how to avoid being getting cervical cancer; (3) seek preventive information related to cervical cancer; and (4) seek information about treatment for cervical cancer. The scale ranged from "1" (very unlikely) to "7" (very likely). Exploratory factor analysis demonstrated that the four items were grouped into a single factor. The solution explained 79.49% of the total variance (Eigen value = 3.18). A composite measure of information-seeking intentions in relation to cervical cancer was created by adding the four items and dividing the sum by four (M = 3.87, SD = 1.90, α = .91).

3. Control variables

Given their influence on information-seeking and screening of cervical cancer, demographics (*e.g.*, Hesse, Arora, Beckjord, & Rutten, 2008), number of sexual partners (*e.g.*, Grangé, Malvy, Lançon, Gaudin, & El Hasnaoui, 2008), experience of getting cervical cancer (*e.g.*, Orom, Coté, González, Underwood III, & Schwartz, 2008) were included as control variables.

Demographics: Demographic variables included age, educational level, marital status, area of residence, and family income. *Age* indicated self-reported respondent age (M = 48.81, SD = 8.61; range = 47, maximum = 82; minimum = 35). *Education level* included elementary school, junior high school, senior high school, college, and graduate school. *Marital status* indicated self-reported respondent marriage status (unmarried = 0; married = 1). Area of residence indicated either "rural area" (coded as "0") or "urban area" (coded as "1"). *Family income* ranged from "less than $10,000 NT (New Taiwan) dollars" to "more than $100,000 NT dollars."

Sexual partners: Respondents were asked to report the number of their sexual partners (M = .90; SD = 3.22).

Experience of cancer: Respondents were asked the following questions: "Have you ever had cervical cancer?" "Have your family members ever had cervical cancer? " and "Have your friends ever had cervical cancer?" For all of these questions, the responses were simple "yes" (coded as "0") or "no" (coded as "1") answers.

Data Analysis

The data were analyzed using SPSS for Windows version 15.0. Regression analyses were performed to test the research hypotheses. The level of statistical significance was set at p <.05.

Results

This study explored the influence of subjective norms, attitude, perceived behavioral control, and perceived risks (to the self and others) on information-seeking intentions. Hierarchical regression analysis was performed to test all hypotheses.

Demographics (*e.g.*, age, marital status, education, and area of residence, and family income), number of sexual partners, and experience of disease (whether personal or through family members and friends) were respectively entered in the first and second blocks as control variables. The third block included subjective norms, attitude, and perceived behavioral control, while the fourth block included perceived risks to the self and others.

In Table 1, the regression analysis showed that subjective norms (β = .36, p < .001), attitude (β = .13, p < .001), and perceived behavioral control (β = .25, p < .001) significantly influenced information-seeking intentions after controlling for the influence of other variables. Thus, H1, H2, and H3 were supported. Additionally, perceived risks to the self (β = .09, p < .01) significantly and positively predicted information-seeking intentions, while perceived risk of others (β = .01, p = .85) did not markedly predict such intentions. That is, perceived risks to the self were a stronger predictor of information-seeking intentions than perceived risks to others. Therefore, H4 was supported.

Overall, 34% of the variance in information-seeking intentions regarding cervical cancer among Taiwanese women could be explained by demographics (age, martial status, education, residence area, and family income), number of sexual partners, experience of cervical cancer (personal experience, experience of family members, and experience of friends), subjective norms, attitude, perceived behavioral control, perceived risks to the self, and perceived risks to others.

[Insert Table 1 about here]

Discussion

Neither health behavioral model can predict significant variance in intentions/behaviors (Bish, Sutton, & Golombok, 2000). Regarding TPB, Conner & Armitage (1998) suggested it could be modified to include additional variables. This study used an expanded theory of planned behavior, which included other variables (perceived risks to the self and others) besides the original ones (subjective norms, attitude, and perceived behavioral control) to help explain the variance in information-seeking intentions regarding cervical cancer among Taiwanese women.

The TPB holds that subjective norms, attitude, and perceived behavioral control guide individual behavioral intentions or actual behaviors (Ajzen, 1991). As expected, the TPB components (subjective norms, attitude, and perceived behavioral control) significantly determined information-seeking intentions regarding cervical cancer among Taiwanese women after controlling demographics, number of sexual partners and disease experience, and risk perceptions. That is, respondent intentions to seek information regarding cervical cancer were higher for respondents with stronger

subjective norms, positive attitudes toward information-seeking, and high perceived behavioral control in relation to getting cervical cancer.

Regression analysis showed that the theoretical construct of subjective norms contributed the most in explaining information-seeking intentions, followed by perceived behavioral control, and attitude. This study found that the subjective norms construct contributed significantly to intentions/behaviors, a contribution that is strongly supported by the literature, because this construct is operationalized through the TPB (Godin, Gagné, Maziade, Moreault, Beaulieu, & Morel, 2001; Rutter, 2000). Subjective norms relate to social considerations among individuals. Numerous social norms concern “should” and “must”, and then motivate knowledge gain (Kahlor, 2007). Thus, when respondents believe that those surrounding them feel they should seek information about cervical cancer they have higher intention of taking such action.

This study also found that perceived behavioral control significantly predicted information-seeking intentions in relation to cervical cancer, and its predictive power exceeded that of attitude but was smaller than that of subjective norms. Perceived behavioral control is important in TPB because this model differs from TRA in incorporating perceived behavioral control (Ajzen, 1991). Perceived behavioral control, which is most compatible with the concept of self-efficacy of Bandura, concerns the ease or difficulty of the behavior, based on the individual involved having the necessary skill (Ajzen, 1988). Thus, people may be more likely to engage in behaviors which they feel they are capable of performing, and it is unsurprising that perceived behavioral control considerably influences information-seeking intentions in relation to cervical cancer among Taiwanese women.

Regarding the influence of attitude on information-seeking intentions, this study found that attitude was the weakest predictor of information-seeking in relation to cervical cancer among the set of TPB components. This finding is consistent with those of some previous studies (Godin *et al.*, 2001; Michels, Taplin, Carter, & Kugler, 1995). This phenomenon raises the question of what causes the low contribution of attitude to the prediction of information-seeking intentions. The explanation may lie in the variability of attitude. In this study, the concept of attitude toward information-seeking captured instrumental (*e.g.*, the behavior is helpless/ helpful, bad/good) attitudes toward information-seeking, and the variability of responses pertaining to all measures of attitude was minimal (most respondents maintained a positive attitude toward information-seeking), possibly reducing the explanatory power of attitude toward information-seeking about cervical cancer.

Regarding risk perceptions, this study showed that perceived risks to the self were a stronger predictor of information-seeking intentions regarding cervical cancer

among Taiwanese women than were perceived risks to others. As researchers (Prentice, Gold, & Carpenter Jr, 2005) noted, risk perceptions influence how individuals make decisions in numerous contexts. For example, an optimistic bias (believing others are likely more vulnerable to negative events than oneself) leads people to make decisions based on troubling reasoning. In contrast, individuals who perceive their risks of suffering an adverse health event to be higher than others may be more likely to be influenced by information regarding disease prevention, or may be motivated to engage in behavioral changes.

Overall, this study specifically examines the determinants of information-seeking intentions in relation to cervical cancer. Theoretically, TPB components may be insufficient to explain information-seeking intentions related to cervical cancer among Taiwanese women. By employing an TPB-informed model, modified to include the additional construct of risk perceptions, it is possible to explain and more accurately predict why Taiwanese women seek information about cervical cancer.

This study indicates that intentions of Taiwanese women to seek information regarding cervical cancer can be accurately predicted using subjective norms, attitude towards information-seeking, perceived behavioral control, and risk perceptions. Regarding subjective norms, attitude, and perceived behavioral control, the findings of this study again indicate that TPB is appropriate for understanding information-seeking intentions regarding cervical cancer. Health educators or health campaign designers must consider the influence of the set of TPB components on intentions in developing health prevention and promotion programs. Additionally, perceived risks have been used to explain cancer screening behaviors and in interventions to promote cancer screenings. This study showed that increasing awareness among women of the risks to the self associated with cervical cancer is vital in terms of prevention and promotion. Altering personal risk estimates thus is vital from the perspective of risk communication. However, perceptions of the risk to the self are associated with personality, emotion, cognitions, culture, and social processes (Fischhoff, Bostrom, & Quadrel, 1993). Health educators and campaign designers may need to make efforts to learn more knowledge from various disciplines, including geography, sociology, political science, anthropology, and psychology (Slovic, 1987), to facilitate the effectiveness of risk communication in relation to cervical cancer.

Limitations and Suggestions to Future Studies

Meta-analytic reviews suggest that TPB is a useful model for predicting behavioral intentions and actual behaviors (Armitage & Conner, 2001). This

investigation not only contributes to the literature on TPB by documenting perceived risks to the self and others regarding the diagnosis of cervical cancer, but also helps explain within-individual variations in information-seeking intentions. However, this study explores the influence of the set of TPB components and perceived risks on information-seeking intentions rather than actual behaviors. Intentions are assumed to capture the motivational factors that affect behavior, and to indicate the degree to which people are willing to try, or the effort they are willing to exert, to engage in a behavior (Ajzen, 1991). Generally, the likelihood of a behavior being performed increases with the intention to engage in that behavior (Ajzen, 1991). Future studies can further assess the relationship between intentions and real behaviors.

Additionally, the method of conceptualizing and operationalizing subjective norms, attitude, and perceived behavioral control differs among studies (depending on the behaviors being investigated), and the reliability and validity of components of the TPB remains unclear. Further studies are required to understand, refine, and elaborate the constructs, such as subjective norms, attitude, and perceived behavior control.

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References

Ajzen, I. (1988). *Attitudes, personality, and behavior.* Chicago, IL: Dorsey Press.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior.* Englewood Cliffs, NJ: Prentice-Hall.

Andrykowski, M. A., Beacham, A. O., Schmidt, J. E., & Harper, F. W. K. (2006). Application of the theory of planned behavior to understand intentions to engage in physical and psychosocial health behaviors after cancer diagnosis. *Psycho-Oncology, 15*(9), 759-771.

Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology, 40*(4), 471-499.

Arnett, J. J. (2000). Optimistic bias in adolescent and adult smokers and nonsmokers. *Addictive Behaviors, 25*(4), 625-632.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *The American Psychologist, 37*(2), 122-147.

Bish, A., Sutton, S., & Golombok, S. (2000). Predicting uptake of a routine cervical smear test: A comparison of the health belief model and the theory of planned behaviour. *Psychology & Health, 15*(1), 35-50.

Bränström, R., Kristjansson, S., & Ullén, H. (2005). Risk perception, optimistic bias, and readiness to change sun related behaviour. *European Journal of Public Health, 16*(5), 492-497.

Case, D. O. (2002). *Looking for information: A survey of research on information-seeking, needs, and behavior.* San Diego, CA: Academic Press.

Chang, C. C., Lin, C. Y., Chen, Y. C., & Chin, Y. C. (2009). Predicting information-seeking intention in academic digital libraries. *The Electronic Library, 27*(3), 448-460.

Chang, E. C., Sanna, L. J., Kim, J. M., & Srivastava, K. (2010). Optimistic and pessimistic bias in European Americans and Asian Americans: A preliminary look at distinguishing between predictions for physical and psychological health outcomes. *Journal of Cross-Cultural Psychology, 41*(3), 465-470.

Chapin, J. R. (2000). Third-person perception and optimistic bias among urban minority at-risk youth. *Communication Research, 27*(1), 51-81.

Chen, C. A., & Hsieh, C. Y. (2004). Recent advances and problems in primary therapy for cervical cancer in Taiwan. *Journal of the Formosan Medical Association, 103*(7), 511-518.

Chen, T. C., Lee, J. Y., Wang, S. Y., Chang, C. L., & Yang, Y. C. (2005). Relevant factors for cervical cancer among young women in Taiwan. *Taiwanese Journal*

of Obstetrics and Gynecology, 44(2), 143-147.

Chen, I. J. (2007). Using the theory of planned behavior to understand in-service kindergarten teachers' behavior to enroll in a graduate level academic program. *Journal of College Teaching and Learning, 4*(11), 13-17.

Chiang, B. (2006). The study of medical consumption among females affected by cancers of breast, cervix, and ovary. Unpublished masters' thesis, Chang Gung University, Taiwan.

Cho, H., Lee, J. S., & Chung, S. (2010). Optimistic bias about online privacy risks: Testing the moderating effects of perceived controllability and prior experience. *Computers in Human Behavior, 26*(5), 987-995.

Cline, R. J. W., & Haynes, K. M. (2001). Consumer health information-seeking on the Internet: The state of the art. *Health Education Research, 16*(6), 671-692.

Conner, M., & Armitage, C. J. (1998). Extending the theory of planned behavior: A review and avenues for further research. *Journal of Applied Social Psychology, 28*(15), 1429-1464.

Duffett-Leger, L. A., Letourneau, N. L., & Croll, J. C. (2008). Cervical cancer screening practices among university women. *Journal of Obstetric Gynecologic, & Neonatal Nursing, 37*(5), 572-581.

Eheman, C. R., Berkowitz, Z., Lee, J., Mohile, S., Purnell, J., Rodriguez, E. M., Roscoe, J., Johnson, D., Kirshner, J., & Morrow, G. (2009). Information-seeking styles among cancer patients before and after treatment by demographics and use of information sources. *Journal of Health Communication, 14*(5), 487-502.

Fischhoff, B., Bostrom, A., & Quadrel, M. J. (1993). Risk perception and communication. *Annual Review of Public Health, 14*, 183-203.

Fournier, M., De Ridder, D., & Bensing, J. (2003). Is optimism sensitive to the stressors of chronic disease? The impact of type 1 diabetes mellitus and multiple sclerosis on optimistic beliefs. *Psychology and Health, 18*(3), 277-294.

Godin, G., & Kok, G. (1996). The theory of planned behavior: A review of its applications to health-related behaviors. *American Journal of Health Promotion, 11*(2), 87-98.

Godin, G., Gagné, C., Maziade, J., Moreault, L., Beaulieu, D., & Morel, S. (2001). Breast cancer: The intention to have a mammography and a clinical breast examination-application of the theory of planned behavior. *Psychology and Health, 16*(4), 423-441.

Gonzales, R. M., Glik, D. C., Prelip, M., Bourque, L., Yuen, J., Ang, A., & Jones, M. C. (2006). Risk perceptions and behavioral intentions for Hepatitis B: How do young adults fare? *Health Education Research, 21*(5), 654-661.

Grangé, G., Malvy, D., Lançon, F., Gaudin, A-F., & El Hasnaoui, A. E. (2008). Factors

associated with regular cervical cancer screening. *International Journal of Gynecology and Obstetrics, 102*(1), 28-33.

Griva, F., Anagnostopoulos, F., & Madoglou, S. (2009). Mammography screening and the theory of planned behavior: Suggestions toward an extended model of prediction. *Women and Health, 49*(8), 662-681.

Hagger, M. S., Chatzisarantis, N. L. D., & Biddle, S. J. H. (2002). A meta-analytic review of the theory of reasoned action and planned behavior in physical activity: Predictive validity and the contribution of additional variables. *Journal of Sport and Exercise Psychology, 24*, 3-32.

Hesse, B. W., Arora, N. K., Beckjord, E. B., & Rutten, L. J. F. (2008). Information support for cancer survivors. *Cancer, 112*(11 supplement), 2529-2540.

Helweg-Larsen, M., & Nielsen, G. A. (2009). Smoking cross-culturally: Risk perceptions among young adults in Denmark and the United States. *Psychology and Health, 24*(1), 81-93.

Hevey, D., Pertl, M., Thomas, K., Maher, L., Chuinneagáin, S. N., & Craig, A. (2009). The relationship between prostate cancer knowledge and beliefs and intentions to attend PSA screening among at-risk men. *Patient Education and Counseling, 74*(2), 244-249.

Hou, S. I., Fernandez, M. E., Baumler, E., Parcel, G. S., & Chen, P. H. (2003). Correlates of cervical cancer screening among women in Taiwan. *Health Care for Women International, 24*(5), 384-398.

Kahlor, L. A. (2007). An augmented risk information-seeking model: The case of global warming. *Media Psychology, 10*(3), 414-435.

Katapodi, M. C., Dodd, M. J., Facione, N. C., Humphreys, J. C., & Lee, K. A. (2010). Why some women have an optimistic or a pessimistic bias about their breast cancer risk: Experiences, heuristics, and knowledge of risk factors. *Cancer Nursing, 33*(1), 64-73.

Koong, S. L., Yen, A. M. F., & Chen, T. H. H. (2006). Efficacy and cost-effectiveness of nationwide cervical cancer screening in Taiwan. *Journal of Medical Screening, 13* (supplement 1), S44-S47.

Leroy, G., Helmreich, S., & Cowie, J. R. (2010). The influence of text characteristics on perceived and actual difficulty of health information. *International Journal of Medical Informatics, 79*(6), 438-449.

Leydon, G. M., Boulton, M., Moynihan, C., Jones, A., Mossman, J., Boudioni, M., & McPherson, K. (2000). Cancer patients' information needs and information-seeking behaviour: In depth interview study. *British Medical Journal, 320*(7239), 909-913.

Leyva, M., Byrd, T., & Tarwater, P. (2006). Attitudes towards cervical cancer

screening: A study of beliefs among women in Mexico. *Californian Journal of Health Promotion, 4*(2), 13-24.

Liao, C. C., Wang, H. Y., Lin, R. S., Hsieh, C. Y., & Sung, F. C. (2006). Addressing Taiwan's high incidence of cervical cancer: Factors associated with the Nation's low compliance with Papanicolaou screening in Taiwan. *Public Health, 120,* 1170-1176.

Lin, S. J. (2008). Factors influencing the uptake of screening services for breast and cervical cancer in Taiwan. *Perspectives in Public Health, 128*(6), 327-334.

Lu, H. Y., Andrews, J. E., & Hou, H. Y. (2009). Optimistic bias, information-seeking and intention to undergo prostate cancer screening: A Taiwan study on male adults. *Journal of Men's Health, 6*(3), 183-190.

Lu, H. Y., Case, D. O., Lustria, M. L. A., Kwon, N., Andrews, J. E., Cavendish, S. E., & Floyd, B. R. (2007). Predictors of online information-seeking by international students when disaster strikes their countries. *CyberPsychology and Behavior, 10(*5), 709-712.

Lu, H. Y., Hou, H. Y., Dzwo, T. H., Wu, Y. C., Andrews, J. E., Weng, S. T., Lin, M. C., & Lu, J. Y. (2009, November, 12-15). *Factor influencing intention to take precautionary behavior regarding the consumption of dairy products: Expanding the theory of planned behavior.* Paper presented at the National Communication Association's (NCA) 95th annual convention, Chicago, U.S.A.

Michels, T. C., Taplin, S. M., Carter, W. B., & Kugler, J. P. (1995). Barriers to screening: The theory of reasoned action applied to mammography use in military beneficiary population. *Military Medicine, 160*(9), 431-437.

Miles, S., & Scaife, V. (2003). Optimistic bias and food. *Nutrition Research Reviews, 16*(1), 3-19.

Mullen, P. D., Allen, J. D., Glanz, K., Fernandez, M. E., Bowen, D. J., Pruitt, S. L., Glenn, B. A., & Pignone, M. (2006). Measures used in studies of informed decision making about cancer screening: A systematic review. *Annals Behavioral Medicine: A Publication of the Society of Behavioral Medicine, 32*(3), 188-201.

Noh, H. I., Lee, J. M., Yun, Y. H., Park, S. Y., Bae, D. S., Nam, J. H., Park, C. T., Cho, C. H., Kye, S. Y., & Chang, Y. J. (2009). Cervical cancer patient information-seeking behaviors, information needs, and information sources in South Korea. *Supportive Care in Cancer, 17*(10), 1277-1283.

Olson, J. M., & Zanna, M. P. (1993). Attitudes and attitude change. *Annual Review of Psychology, 44*, 117-154.

O'Neill, S. C., Bowling, J. M., Brewer, N. T., Lipkus, I. M., Skinner, C. S., Strigo, T. S., & Rimer, B. K. (2008). Intentions to maintain adherence to mammography.

Journal of Women's Health, 17(7), 1133-1141.

Orom, H., Coté, M. L., González, H. M., Underwood III, W., & Schwartz, A. G. (2008). Family history of cancer: Is it an accurate indicator of cancer risk in the immigrant population? *Cancer, 112*(2), 399-406.

Prentice, K. J., Gold, J. M., & Carpenter Jr, W. T. (2005). Optimistic bias in the perception of personal risk: Patterns in Schizophrenia. *The American Journal of Psychiatry, 162*(3), 507-512.

Rutter, D. R. (2000). Attendance and reattendance for breast cancer screening: A prospective 3-year test of the theory of planned behavior. *Bristish Journal of Health Psychology, 5,* 1-13.

Rutter, D., & Quine, L. (Eds). (2002). *Changing health behaviour: Intervention and research with social cognition models.* Open University Press, Buckingham, Philadelphia.

Slovic, P. (1987). Perception of risk. *Science, 236*(4799), 280-285.

The China Post (2009/10/28). 270,000 women at risk of cervical cancer: Survey. Retrieved from http://www.chinapost.com.tw/health/cancer/2009/10/28/230379/270000-women.htm

Tolma, E. L., Reininger, B. M., Evans, A., & Ureda, J. (2006). Examining the theory of planned behavior and the construct of self-efficacy to predict mammography intention. *Health Education and Behavior, 33*(2), 233-251.

Walker, E. A., Mertz, C. K., Kalten, M. R., & Flynn, J. (2003). Risk perception for developing diabetes: Comparative risk judgments of physicians. *Diabetes Care, 26*(9), 2543-2548.

Waters, E. A., Sullivan, H. W., & Finney Rutten, L. J. (2009). Cancer prevention information-seeking among Hispanic and non-Hispanic users of the National Cancer Institute's cancer information service: Trends in telephone and LiveHelp use. *Journal of Health Communication, 14*(5), 476-486.

Wei, R., Lo, V. H., & Lu, H. Y. (2007). Reconsidering the relationship between the third-person perception and optimistic bias. *Communication Research, 34*(6), 665-684.

Weinstein, N. D. (1980). Unrealistic optimism about future life events. *Journal of Personality and Social Psychology, 39*(5), 806-820.

Weinstein, N. D. (1987). Unrealistic optimism about susceptibility to health problems: Conclusions from a community-wide sample. *Journal of Behavioral Medicine, 10*(5), 481-500.

Weinstein, N. D. (1989). Optimistic biases about personal risks. *Science, 246*(4935), 1232-1233.

Wong, M. Y. F., & Chan, S. W. C. (2006). The qualitative experience of Chinese parents with children diagnosed of cancer. *Journal of Clinical Nursing, 15*(6), 710-717.

Yang, Z. J., McComas, K., Gay, G., Leonard, J. P., Dannenberg, A. J., & Dillon, H. (2010). Motivation for health information-seeking and processing about clinical trial enrollment. *Health Communication, 25*(5), 423-436.

Yang, Z. J., McComas, K., Gay, G., Leonard, J. P., Dannenberg, A. J., & Dillon, H. (2010). From information processing to behavioral intentions: Exploring cancer patients' motivations for clinical trial enrollment. *Patient Education and Counseling, 79*(2), 231-238.

Yoo, E. Y., & Robbins, L. S. (2008). Understanding middle-aged women's health information-seeking on the web: A theoretical approach. *Journal of the American Society for Information Science and Technology, 59*(4), 577-590.

Zhao, X., & Cai, X. (2009). The role of risk, efficacy, and anxiety in smokers' cancer information-seeking. *Health Communication, 24*(3), 259-269.

Table 1: Hierarchical Regression Analysis Predicting Intention to Seek Information about Cervical Cancer.

IV	***DV***
	Intentions to seek information
Block 1: Demographics	
Age	-.05
Marital status (unmarried = 0; married = 1)	-.01
Education	.02
Residence area (rural = 0; urban =1)	-.06*
Family income	.05
Adjusted R^2	.02
Block 2:Number of sexual partners and disease experience	
Number of sexual partner	.06
Personal experience (yes = 0; no = 1)	-.01
Family members' experience (yes = 0; no = 1)	.01
Friends' experience (yes = 0; no = 1)	-.06
Incremental adjusted R^2	.02
Block 3: TPB components	
Subjective norms	.36***
Attitude	.13***
Perceived behavioral control	.25***
Incremental adjusted R^2	.30
Block 4: Risk perceptions	
Perceived risk of self	.09**
Perceived risk of others	.01
Incremental adjusted R^2	.00
Total adjusted R^2	.34

Notes: Beta weights are from the final regression equation with all blocks of variables in the model.

*** $p < .001$; ** $p < .01$; * $p < .05$.