Extending the Theory of Planned Behavior with Ego-Network Social Capital to Examine Chinese Women's Tampon Use Intentions

Yin Yang
Marquette University

EXTENDING THE THEORY OF PLANNED BEHAVIOR WITH EGO-NETWORK SOCIAL CAPITAL TO EXAMINE CHINESE WOMEN'S TAMPON USE INTENTIONS

by

Yin Yang

A Thesis Submitted to the Faculty of the Graduate School,
Marquette University,
in Partial Fulfillment of the Requirements for
the Degree of Master of Arts

Milwaukee, Wisconsin
May 2020

ABSTRACT
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Marquette University, 2020

Building on the theory of planned behavior and ego-network social capital, this study tested how different levels of network closure and brokerage influenced Chinese women's tampon use intentions. Results from an online survey (N = 766) showed that network density was associated with positive attitudes, and high levels of injunctive norms and descriptive norms of tampon usage. Furthermore, results of a path analysis demonstrated that network density had indirect impacts on tampon use intentions through attitudes, descriptive norms, and perceived behavior control. This study extends the theory of planned behavior by incorporating ego-network social capital. Practically, the findings shed light on tampon promotion, public education of feminine hygiene products, and improvement in women's gynaecological health.

ACKNOWLEDGMENTS

Yin Yang

I would like to express my gratitude to many people who have helped me and supported me during the past two years, without which I could not complete this thesis and my master's degree. First, I would like to thank Dr. Young Kim for chairing my thesis committee and for his guidance. He always knew what I needed at each stage of my thesis project, including patient instructions, prompt feedback, constructive suggestions, encouragement, and so forth. Dr. Young Kim took a lot of time to help improve my thesis. I owe him a huge debt of gratitude.

I am grateful to other two members of my thesis committee, Dr. Sumana Chattopadhyay and Dr. Joyce Wolburg, for their invaluable comments and advices. Their knowledge and intelligence greatly contributed to the completion of this thesis. My gratitude also goes to my supervisors of my research assistant work, Dr. Lynn Turner, Dr. Kevin Thomas, Dr. Yaguang Zhu, and Dr. Eric Waters. It's been such an honor and pleasure to work with them and learn from them. I have benefited enormously from working with these knowledgeable scholars.

Finally, I would like to thank my family. I feel blessed to have the best parents in the world, Shouwei Tang and Xiliang Yang. They have done everything they can to support me and love me. They are, and will forever be my role models. A particular thank-you goes to my boyfriend, Dongyu Liang, for making my life full of love and laughter, always having confidence in me, hugging me when I shed bitter tears, and cooking so much delicious food!

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I. INTRODUCTION

Background Context

Tampon, a popular feminine hygiene product, is commonly used in the United States and Europe (Global Industry Analysts, 2019). However, only 1% of Chinese females use tampons, while the rest of women in China choose sanitary pads during their menstruation (Weise, 2017). Previous literature has suggested the barriers hindering tampon usage among Chinese women, including lack of pertinent knowledge, concerns on health risks, habits (i.e. using pads instead of tampons) formed since adolescence, and a small number of tampon users in personal networks (Cotton Incorporated, 2015; Ren et al., 2018). Furthermore, traditional Confucian culture, which values virtue of chastity and virginity, still prevails in Chinese society (Gao et al., 2012; Yang, 2016). Feeling fearful that tampons may break hymen, young Chinese females stick with sanitary pads and avoid judgement from significant others caused by using tampons (Ren et al., 2018; Yang, 2016).

In the context of globalization, however, there is a growing interest in tampons among some Chinese women, leading to the growth of the tampon market (Mou, Yin, & Wang, 2018). In 2016, the first Chinese domestic tampon brand was established (Yang, 2016). While China's media regulation bans television advertisements of feminine hygiene products during lunchtime and prime time (Yang, 2016), the past few years have witnessed an increase in tampon promotion posts on social media (Mou, Yin, & Wang, 2018). By conducting a content analysis, Mou and her colleagues (2018) revealed that half of the promotion posts on Chinese We Media (i.e., digital technologies that all ordinary citizens can access and use) highlighted the health benefits of tampons, and around 25% of the posts portrayed tampon usage as a

trend. These posts have addressed some barriers to using tampons among Chinese women.

Nonetheless, there still exists a few issues to be considered. Since sex education in China has been inadequate for thousands of years, even young generations of Chinese women know little about their bodies, and view the topic of feminine hygiene products as a taboo (Yang, 2016). Thus, tampon remains a novel product in China. Although whether or not to use tampons is a personal choice, Chinese females deserve a basic knowledge about feminine hygiene products, so that they can choose what's best for their health and quality of life. In this sense, tampon promotion in China would bridge the education gap in menstruation-related health, break a taboo in Chinese society, and benefit Chinese women's health and the quality of their life.

Compared to traditional media, it might be more promising to promote tampons through information and communication technologies (ICTs). Mou, Atkin, et al. (2013) asserted that social media could disseminate less orthodox and authoritative voices than traditional media. In line with this argument, Mou, Yin and Wang (2018) revealed that ICTs not only provided alternative ways of advertising in addition to television advertisements, but also opened more efficient sites to promote products which could meet the needs of the Chinese middle class. Furthermore, ICTs were found to be effective as a tool to impact people's behaviors (e.g., Casaló et al., 2011; Oeldorf-Hirsch et al., 2019). Hampton et al. (2011) suggested the strengths of ICTs in terms of behavior change from a social network perspective. Due to the network diversity resulting from new media, ICTs would afford varied information and affluent knowledge of certain behaviors (Wright, 2016). Altogether, ICTs play a

facilitating role in communicating about tampons in China, and social network approach is a tool for a better understanding of tampon-related communication.

Statement of the Problem

According to Alice E. Walker's (1997) calculation, a healthy woman normally spends 1/7 to 1/5 of her lifetime with menstruation. Therefore, in order to improve health and life quality, it is important for females to choose appropriate feminine hygiene products. A great proportion of women from the western countries have used tampons and confirmed the convenience and comfort of tampons, especially when they do physical exercise with menstruation (Ren et al., 2018). Most Chinese women, however, have never heard about tampons (Cotton Incorporated, 2015), or have been unwilling to try it because of a variety of concerns (Ren et al., 2018).

Technically, a tampon is defined as soft material that can be inserted into vagina to absorb blood. Moreover, cultural contexts may have impacts on the understanding of tampons. For instance, using tampons is associated with sexual activity in Chinese culture (Ren et al., 2018), which makes it a sensitive topic, or a taboo.

Individuals may feel uncomfortable to have conversations about a taboo with certain people. Fortunately, due to technology, it has been more likely for people to find someone else with whom they are willing to talk about sensitive subjects (Wright, 2016). The ways people communicate and interact with others have also been more diverse, such as using online communities anonymously (Westerlund, 2013; Yeshua-Katz, 2018). One lens to understand the characteristics of varying communication or interaction is interpersonal ties, including weak ties and strong ties. Granovetter (1973) conceptualized *weak ties* as acquaintances with whom an

individual has infrequent contact. Playing a crucial role in social networks, weak ties network is favored on certain occasions because of its advantages, such as providing varied information (Adelman et al., 1987; Rains & Wright, 2016), offering emotional support (Colineau & Paris, 2010; Rains & Wright, 2016), greater likelihood to find an expert in a certain field (Wright, 2016), and reaching more people and longer distance (Greenberg, 2019). By contrast, *strong ties* refer to the ties existing among close members with frequent interaction, such as close friends and family (Hu et al., 2019). Existing research has studied both weak ties and strong ties in various contexts. Both types of ties can connect actors across social networks and significantly impact individuals and society, including individuals' health behaviors (Latkin & Knowlton, 2015), and public health promotion (Hunter et al., 2019).

Researchers have been interested in the mechanisms of networks, and how different mechanisms exert effects on people's health-related attitudes and behaviors (e.g., Walter et al., 2019). There are two types of network mechanisms. One is *brokerage*, or the mechanism in which an individual has connections with unconnected others (Burt, 2002). The other mechanism which is opposite to brokerage is *closure*, that is, the individuals who are connected to an individual are connected to each other as well (Coleman, 1988). Shen and her colleagues (2014) asserted that brokerage and closure exerted distinct effects on individuals' attitudes and behaviors. In their study, online game players with network brokerage were exposed to adequate resources needed for success in combat, and they completed the task better (Shen et al., 2014). In contrast, the game players with network closure were more likely to trust playmates (Shen et al., 2014). Informed by this line of research, the current study aims to reveal how different levels of brokerage and closure in personal networks influence Chinese females' tampon use intentions.

In this study, behavioral intentions will be carefully examined, since it's unusual that the rate of Chinese women who use tampons is that low. To demonstrate the factors that can explain and predict individuals' behavioral intentions, previous research has illustrated a number of models and theories (Niu & Willoughby, 2018). In addition, researchers have linked some of these theories to social network analysis, in order to better examine health-related attitudes and behaviors (e.g., Walter et al., 2019). However, such links have not been investigated thoroughly. This study aims to fill the void.

As one of the most important human behavior theories, the Theory of Planned Behavior (TPB) (Ajzen, 1985, 2012) will be employed for the current study. The TPB proposes that the attitudes toward behavior, subjective norms and perceived behavior control can predict and explain behavioral intention and ultimately the actual behavior (Ajzen, 1985). This theoretical framework has been frequently utilized to explain why people behave in a certain manner, as well as to predict people's intentions and behaviors (e.g., Britt et al., 2011; Mo & Mak, 2009).

Subjective norms, or an individual's perception of social pressure to perform or not to perform a behavior, is one of the three "building blocks" (i.e., attitude, subjective norms, and perceived behavior control) of the TPB. Prior research has explored the role of subjective norms in the relationship between network social capital and an individual's behavioral intention (e.g., Walter et al., 2019). However, more studies are needed to link the TPB to social network mechanisms in examining health-related attitudes and behaviors. Hence, the current study focuses on the mechanisms of social network structure that affect Chinese women's attitudes, subjective norms, and perceived behavior control about using tampons, as well as their intentions to use tampons. Moreover, the present study also tests the mediating

roles of attitudes, subjective norms and perceived behavior control in the relationship between network social capital and Chinese females' use tampon intentions.

Research Goals

Tampon usage among Chinese women is an interesting and meaningful context to examine the intersection between social network mechanisms and behavioral intentions. In China, behaviors related to menstruation are particularly relevant to social norms and complicated. Understanding whether and why Chinese females tend to use tampons can help health educators and practitioners popularize the knowledge of feminine hygiene products, so that Chinese women would regard tampon as an option for their menstruation. For instance, if social network brokerage, compared with social network closure, is more associated with Chinese women's intentions to try tampons, ICTs (e.g., social media platforms, online communities, etc.), which have been found to be related to bridging ties (Wright, 2016), may play a greater role in tampon promotion. In contrast, if social network closure is more associated with tampon use intention than brokerage, community-based events may be more effective to promote tampons.

Also, the topic involved in this study (i.e., a taboo or sensitive topic) will offer practical implications for the public education of feminine hygiene products and gynaecological health. Put differently, the findings can shed light on improving females' life quality during menstruation. Moreover, the results regarding the relationships among variables can be instructive for the marketing of tampons in China.

Theoretically, this study aims to extend the TPB by including network social capital as an additional variable. Although there are many articles that apply the TPB

to the contexts of health communication, this study will be the first attempt to link personal network analysis to the TPB, and then to people's behavioral intentions. In addition, this study will examine whether attitudes, subjective norms and perceived behavior control mediate the relationship between network social capital and behavioral intention. Therefore, the findings from the current study will make theoretical contributions to both the TPB and network social capital.

II. LITERATURE REVIEW

Sociocultural Context of China: What Hinders Women from Using Tampons?

Physiologically, menstruation refers to a monthly biological process in which women discharge blood. But researchers have argued that the understanding of women's menstrual experiences is inevitably linked to cultural beliefs, social environment, and even religion (Brooks-Gunn, 1982). For instance, menstruation is euphemistically mentioned as "not feeling fresh" or "that time of the month" in U.S. culture (Merskin, 1999, p. 947). In China, people influenced by Confucianism usually remain silent on menstruation-related topics, since Confucianism espouses a non-sexually explicit culture (Ren et al., 2018). As a result, when the Chinese swimmer Yuanhui Fu told the public that she was on her period during the 2016 Olympics, many people felt surprised about her straightforward words. Fu was therefore praised for breaking a taboo topic (Gharib, 2016). In addition, Fu's talk made Chinese audiences realize that females could swim during their menstruation, if they used tampons instead of sanitary pads (Guardian, 2016).

Tampon was invented by a U.S. company in 1930s. Since then, tampons have been spread and accepted universally in Europe as well as the U.S. Using tampons has many advantages, such as freedom of movement during menstruation, and no wet sensation. However, Weise (2017) reported that as of 2017, only 1% of Chinese females used tampons. Cotton Incorporated's (2015) study showed a series of barriers hindering Chinese females' tampon usage: 1) 38% of the respondents did not know how to use tampons ; 2) 31% of the respondents had never heard about tampons; 3) 23% of the respondents thought that using tampons was bad for health; 4) 20% of the respondents felt it was strange to use tampons; 5) 19% of the respondents did not

think it was comfortable to insert a tampon into body; 6) 14% of the respondents reported that no one around them used tampons; and 7) 11% of the respondents were worried that blood might fall out when using tampons. Although Cotton Incorporated's (2015) findings were meaningful for understanding Chinese women's tampon usage, they did not provide deeper explanations for these barriers.

Considering the influence of social and cultural contexts on the understanding of menstruation-related attitudes and behaviors, Ren et al. (2018) provided a few explanations for Chinese women's decisions on whether or not to use tampons. The first and primary concern of young women who did not use tampons was the possibility to break hymen. In China, hymen is viewed as a sign of virginity. Some people assumed that breaking hymen meant losing chastity. Second, Ren et al. (2018) found that shame and fear were two words that appeared most frequently when Chinese women discussed about tampon usage on social websites. People regarded the act of inserting a tampon into body in the same way as sexual activity, and thought of using tampons as "like masturbation". Due to Chinese traditional non-sex culture, women are expected to be conservative about sex (Ren et al., 2018). Women are supposed to avoid talking about sexual activity and control their sexual desire. As such, in China, it's a violation of so-called "morality of females" if women proactively have sexual activity or other activities alike (Pan, 2017), such as using tampons.

Another reason mentioned by Chinese women who did not use tampons was that their mothers had taught them the traditional attitudes and habits regarding menstruation, usually not including using tampons (Ren et al., 2018). Extant studies have reported that parents play a crucial role in their children's attitudes regarding sexuality (e.g., Conger et al., 2000; Wang, 2016). Although the parent-adolescent

communication about sex is rare in China (Zhang et al., 2007), Chinese adolescent girls are usually told by their mothers that it's appropriate to use sanitary pads for their menstrual period (Ren et al., 2018). Some of them know little about tampons, or even never hear about such a product, because their mothers don't know about or use it either. Also, given that Chinese girls are subject to non-sexual culture, they rarely talk about feminine hygiene products with others except female family members. In this sense, Chinese women usually follow their mothers' habits during menstruation, namely using pads.

To date, there has been scant scholarly attention to why so few Chinese women use tampons. As such, this study aims to fill the gap by exploring this question from a social science perspective.

Absence of Tampons in China: A Social Science Perspective

In line with the absence of tampons in China, little social science research can be found related to tampon usage in Chinese society. Most of the existing literature has indicated the role of sociocultural context in Chinese women's intentions to use tampons. The most relevant study was conducted by Mou and her colleagues (2018), which analyzed the frames used in the tampon promotion posts on various Chinese We Media accounts. Mou and her colleagues (2018) identified the main generic frames in those posts, and suggested that tampon "symbolized a trendy, healthy, and independent lifestyle desired by young, well-educated, middle-class Chinese females" (p. 11). They also documented that the sexual value of tampons was rarely mentioned in tampon promotion posts (Mou, Yin, & Wang, 2018), which was echoed by another recent study. Concentrating on the absence of tampons in China, Ren et al. (2018) demonstrated the effects of Chinese traditional values on Chinese females'

perceptions and consumption of tampons. But there are not any other similar studies conducted in mainland China.

In Taiwan, scholars have examined female college students' intentions to use tampons using an online survey (Chang et al., 2015). This study found that attitudes and subjective norms about using tampons predicted tampon use intentions among female college students in Taiwan. In addition, sexual orientation and gender characteristic were reported as effect modifiers (Chang et al., 2015).

The current study has been informed by Chang and her colleagues who applied the Theory of Planned Behavior (TPB) to study women's tampon use intentions. In fact, the TPB can be frequently found in health communication research. For instance, scholars have used the TPB to predict new mothers' intentions to breastfeed (Johnson-Young, 2019), college students' anti-smoking intentions (Namkoong et al., 2017), and healthy food consumption (Yee et al., 2019). Furthermore, scholars have also applied this theory to examine health behaviors among Chinese, such as Chinese people's intentions to seek help for mental health (Niu & Willoughby, 2018), and Hong Kong adolescents' healthy eating intentions (Chan & Tsang, 2011). As such, the TPB is suitable for the context of this study.

Based on the sociocultural context of China, as discussed earlier, the present study links social capital to the TPB. Bourdieu (1986) defined social capital as the resources that are related to possession of a network with institutionalized relationship of mutual acquaintance and recognition. Past research has argued that social capital can influence one of the key variables of the TPB (i.e., subjective norms) (Walter et al., 2019). However, the relationships between social capital and other two variables

of the TPB (i.e., attitudes and perceived behavior control) have not been explored, which will be remedied by this study.

In recent years, a number of researchers have studied and theorized the effects of social capital on health and health-related behaviors. For example, Limbu et al. (2018) found that social capital was directly and positively associated with preventive health behavior. In a similar vein, Walter et al. (2019) suggested the effect of ego-network social capital on pap test intentions. In Walter et al. (2019)'s study, pap test was viewed as a sensitive topic among Latinos. Therefore, Walter and his colleagues (2019) showed the importance of investigating the relationship between ego-network social capital and behavior intention regarding a sensitive or taboo topic. Previous literature (Ren et al., 2018) has revealed that discussions about tampon might also be a taboo among Chinese. Hence, the following research question is proposed:

> ***RQ1:*** *Will ego-network social capital be directly related to Chinese women's tampon use intentions?*

To provide more information about the theoretical framework employed in this study, the TPB and social capital will be specified in next sections.

The Theory of Planned Behavior

The Theory of Planned Behavior was originally proposed by Ajzen (1985). Briefly, the TPB attempts to predict and explain how attitudes toward behavior, subjective norms and perceived behavioral control influence behavioral intentions and then actual behaviors (Ajzen & Madden, 1986). The theory was an extension and development of some previous literature in regard to the relationship between beliefs and behavior, such as the Theory of Reasoned Action (Fishbein, 1963; Fishbein & Ajzen, 1975). Based on the two constructs of the Theory of Reasoned Action (i.e., attitudes and subjective norms), the TPB incorporates an additional one, that is,

perceived behavior control. This extension overcomes the limitations of the Theory of Reasoned Action in explaining the behaviors of people who don't have complete volitional control (Ajzen, 1991), and permits more accurate prediction of intentions compared to the Theory of Reasoned Action (Ajzen et al., 1986). According to Ajzen and his colleagues (Ajzen & Fishbein, 1980; Ajzen et al., 1986; Ajzen, 1991; Ajzen, 2012), individuals' behavioral intentions are developed by the following mechanism: They use the information they receive to evaluate the behavior, to assume what significant others think of the behavior, and to predict whether they can overcome potential obstacles when performing the act. Generally speaking, the more positive the attitudes toward the behavior, the greater the social pressure that a person feels to perform that behavior, and the higher the perceived behavior control, the more likely the person will conduct the behavior.

The TPB was originated for sociology research (Ajzen, 1985), but it has been used by researchers from a variety of areas, including health communication. For example, existing studies have used the TPB to explain tobacco-free policy compliance behaviors among college students (Record, 2017), and predict breastfeed intentions of new mothers (Johnson-Young, 2019). In addition, researchers have also developed the TPB. For instance, Guan et al. (2016) incorporated communication-related variables to extend the TPB and investigated condom use intentions among African American women. Similarly, Yee et al. (2019) suggested that interpersonal constructs – the concepts of active and restrictive parental guidance, served as the antecedents to the TPB in predicting children's healthy food consumption. Since all these studies were conducted based on three core variables of the TPB, the following sections will discuss these variables and three corresponding beliefs associated with these variables (i.e., behavioral beliefs, normative beliefs, and control beliefs).

Attitudes

Attitudes toward behavior refers to an individual's evaluation and appraisal of an act, or the extent to which an individual is favorable or unfavorable to a behavior. Previous literature has demonstrated the importance of attitudes in predicting behavioral intentions, such as the intentions to seek mental health care (Niu & Willoughby, 2018), and the intentions to breastfeed (Johnson-Young, 2019). As such, it is reasonable to assume that females' attitudes toward using tampons will be positively associated with tampon use intentions, which will be examined in this study. Therefore, the following hypothesis is proposed:

> ***H1a:*** *Chinese women's attitudes toward using tampons will be positively related to their tampon use intentions.*

Attitudes can be measured by behavioral beliefs with respect to certain behavior and the evaluation that an individual puts on the beliefs (Ajzen, 2002; Ajzen & Fishbein, 1980). Based on Fishbein and Ajzen's (1975) expectancy-value model, behavioral belief is thought of as the belief that a given behavior would result in certain outcomes and attribute (Ajzen, 1991). Ajzen (1991) argued that individuals unconsciously hold attitudes toward a behavior because the outcomes and attribute of that behavior have been by convention viewed positively or negatively. People hold positive attitudes toward the behaviors associated with desirable consequences, whereas form unfavorable attitudes toward the behaviors that may cause undesirable consequences (Ajzen, 1991). This is how behavioral beliefs serve as the antecedents to attitudes toward behavior. To measure attitudes toward behavior, the strength of behavioral belief has been defined and incorporated as a key concept. The strength of a behavioral belief is the subjective likelihood that the act will cause certain outcomes or attribute (Ajzen, 1988, 1991). According to Ajzen's studies, each behavioral belief

has its strength, which is then multiplicatively combined with an individual's subjective evaluation of the belief's outcome. The results from all behavioral beliefs should be summed up to obtain a belief-based measure of attitudes, which is supposed to be directly proportional to the standard measure of attitudes (Ajzen, 1991).

In response to Ajzen, scholars have used both means of measurement (i.e., standard measure and measure with behavioral beliefs) to assess attitudes. A number of studies have adopted standard measure, which asks the questions that directly evaluate attitudes (e.g., Niu & Willoughby, 2018; Record, 2017). In contrast, some research (e.g., Johnson-Young, 2019) has measured attitudes by asking about behavioral beliefs and the evaluation associated with the beliefs. Both approaches have been reported as valid measurement. This study will adopt the former one (i.e., standard measure) due to its practicality.

Subjective Norms

Subjective norms, a social factor, is defined as the perceived social pressure an individual feels that s/he should or should not behave in a certain manner (Ajzen, 1988). Individuals are dependent on perceived important others' opinions to make their decisions on whether or not to perform a behavior. Similar to attitudes toward behavior, subjective norms are positively associated with behavioral intentions, such as green-buying (Ho et al., 2015). Nonetheless, some studies have demonstrated that subjective norms may not be able to predict behavioral intentions. For instance, Johnson-Young (2019) did not find the role of subjective norms as a predictor for women's intentions to breastfeed.

In terms of the effects of norms on behavioral outcomes, several researchers have posited that subjective norms may function differently in different contexts (Mo

& Mak, 2009). Within collectivist contexts, people are more likely to follow the way significant others think and act, since they regard shared values and interests as more important compared with their personal needs (Niu & Willoughby, 2018). Given that the participants of this study reside in China, a highly collectivist country, subjective norms will probably play a significant role in tampon use intentions. Furthermore, Mo and Mak (2009) argued that under traditional Chinese culture, subjective norms may be more influential than other variables in the TPB model. But this argument has not been proved by enough empirical evidence. So the current study aims to fill the void.

Notably, researchers have conceptualized two types of subjective norms: injunctive norms (the perceptions of what should be done) and descriptive norms (the perceptions that a given act is actually done by most significant referents) (Lapinski & Rimal, 2005). Although some studies have only explored one of these two norms (e.g., Guan et al., 2016; Niu & Willoughby, 2018), Niu and Willoughby (2018) proposed a more thorough examination with both injunctive and descriptive norms when discussing the limitations of their research. Thus, the following hypotheses are proposed:

> ***H1b:*** *Injunctive norms of using tampons will be positively related to Chinese women's tampon use intentions.*
>
> ***H1c:*** *Descriptive norms of using tampons will be positively related to Chinese women's tampon use intentions.*

Ajzen (2011) proposed that subjective norms could be measured with the resulting products of normative beliefs and weighted significance placed on the beliefs of each source. Normative belief is an individual's belief that his/her significant others, or referent individuals, will approve or disapprove of a particular behavior (Ajzen, 1991). Put differently, normative belief which constitutes the underlying determinant of subjective norms, suggests a person's important others'

attitudes toward a behavior (Ajzen et al., 1986). The subjective probability that a significant referent individual will approve or disapprove of a certain behavior, is termed as the strength of a normative belief (Ajzen, 1991). The strength of each normative belief should be multiplicatively combined with the individual's motivation to comply (Ajzen, 1991). By summing up all resulting products, a belief-based measure of subjective norms is created. The final result is hypothesized to be directly proportional to the standard measure of subjective norms.

Scholars have used either standard measure or measure with normative beliefs to assess perceived norms. Similar to the measurement of attitudes, this study will adopt standard measure to examine Chinese women's injunctive norms and descriptive norms in terms of using tampons.

Perceived Behavior Control

Perceived behavior control is a person's perceived ability to conduct a given behavior, or perceived ease or obstacles of performing that behavior (Ajzen, 1988, 1991). Researchers have provided mixed results in terms of the relationship between perceived behavior control and behavioral intention. For instance, this association was supported when Johnson-Young (2019) tested mothers' intentions to breastfeed. However, Niu and her colleague (2018) found that respondents' perceived control over mental health seeking did not predict their intentions to seek mental health information. To explain such different results, Willoughby and Myrick (2016) argued that whether perceived behavior control could predict behavioral intentions depended on specific contexts. In this sense, more studies exploring this association in various contexts are needed. Thus, the present study tests the relationship between perceived

behavior control and women's tampon use intentions in China. Following previous studies, the following hypothesis is posited:

> ***H1d:*** *Chinese women's perceived behavior control of using tampons will be positively related to their tampon use intentions.*

Perceived behavior control is associated with control beliefs, or "presence or absence of factors that facilitate or impede performance of the behavior" (Ajzen, 1988, p.125). A control belief is a person's belief of the availability of the resources needed. This ought to be multiplied by the perception of the extent to which those resources will facilitate or impede the target behavior (Ajzen, 1991). A belief-based measure of perceived behavior control, which is supposed to be in direct proportion to the standard measure, can be obtained by summing up all resulting products (Ajzen, 1991). As researchers have recognized both standard measure and the measure using control beliefs, this study will employ the standard measure – same as the measurement for attitudes and subjective norms, to suggest Chinese women's perceived behavior control of using tampons.

Social Capital

Scholars have defined social capital at two levels: individual level and collective level (Ferlander, 2007; Verhaeghe, et al., 2012). Information, support and relationships can be found at the individual level, which pertains to the resources that people can access to use (Lin et al., 2001). At the collective level, social capital refers to the resources embedded in groups including communities, workplaces, and neighborhoods (Fukuyama, 1995). Yet, these two types of social capital both pertain to the influence brought by social networks.

Social Capital and Health-Related Behaviors

There is consistent evidence showing the effects of social capital on individuals' behaviors and behavioral intentions, such as parent-child communication about drugs (Lee & Kam, 2015), and intentions to start a business (Tatarko & Schmidt, 2016). In the age of Web 2.0, the impacts of social capital still hold, since social capital has been viewed as a cause and a consequence of ICT use (Hampton et al., 2011). Hampton et al. (2011) confirmed that ICTs can establish the platforms for creation and maintenance of social capital. Specifically, Phua and Jin (2011) observed that ICTs enabled people to connect with family and close friends, and also expand their networks when interacting with others from distant locations. With technology, people have many options to connect to network members, and access to diverse information, knowledge, and emotional support (Wright, 2016).

Social capital in both offline and online networks may alter or reinforce people's attitudes and behaviors, such as increasing parental knowledge and self-efficacy among low-income Hispanics (Ginossar & Nelson, 2010). More relevantly, social capital can be powerful in affecting health-related behaviors or behavioral intentions, such as Pap test intents (Walter et al., 2019), condom use among heterosexual men with casual partners (Lim et al., 2019), and weight lose success (Kim, Faw, & Michaelides, 2017).

Therefore, it is reasonable to assume that different forms of social capital might influence how Chinese women think about tampon usage, and their intentions to use tampons. In order to elucidate social capital and its function on people's attitudes, subjective norms, perceived behavior control and behavioral intention across online and offline settings, the role of network social capital and two pertinent network mechanisms – brokerage and closure, will be detailed.

The Role of Network Social Capital

Among the social capital literature, there is a considerable amount of work focusing on the role of networks in individuals' attitudes, beliefs and behaviors (Thomas, 2010). For example, Mohnen et al. (2012) found that individuals living in highly cohesive communities were more likely to work out and quit smoking. In those neighborhoods, there was a higher possibility to be sanctioned resulting from nonconformity, than in communities with lower cohesiveness. In a similar vein, Fehr et al. (2002) demonstrated that enhancing cooperation, as a means of maintaining social capital, increased the effect of social norms on food sharing. These findings show the necessity to incorporate what Lomas (1998) defined as "structural approach to social capital" into the understanding of individual's health-related behaviors or behavioral intentions. This structural approach that stipulates brokerage and closure as two distinct mechanisms provide a lens to explain the association between social capital and individual's behaviors, attitudes, or beliefs (Shen et al., 2014).

Brokerage. According to Shen et al. (2014), brokerage represents bridging social capital, or the extent to which a person is connected to multiple disconnected others. The concept of bridging social capital was originally drawn from Granovetter's (1973) Weak Ties Theory, which is associated with loose connections. Specifically, people connected by weak ties have less frequent contact. Wright (2016) documented a variety of advantages of weak ties based on previous studies. First, weak ties provide heterogeneity in information and points of views which strong ties are not able to offer (Adelman et al., 1987). With strong ties, the homogeneity of backgrounds and demographics is likely to make people with close relationships share common beliefs and attitudes on many topics. Second, in comparison to strong ties, weak ties can reach more people who live in different places, which is linked to greater possibilities of disseminating needed information and support (Granovetter,

1973). People also get more opportunities to find someone who understands them and benefit from the emotional distance afforded by weak ties networks (Colineau & Paris, 2010). Third, weak ties are in particular beneficial when people try to deal with difficult health issues but encounter the lack of information and relational problems in strong ties (Winefield, 2006; Wright & Miller, 2010). Overall, bridging social capital, which was constructed from Weak Tie Theory and operationalized as brokerage, is a power device to enhance a heterogeneous information flow and pluralistic worldviews. Thus, if diverse information and opinions are needed for tampon usage, brokerage may result in Chinese women's intentions to use tampons.

Closure. On the other hand, Shen et al. (2014) defined closure as the operationalization for bonding social capital, or the extent to which a person is tied to interconnected others. Bonding social capital stresses close and lasting relationships, so it fosters cooperation and solidarity within dense networks (Coleman, 1988). Such networks are usually homogeneous groups and reinforce existing social relationships (Harpham et al., 2002), attitudes and behaviors (Lin, 1999), and the normative environment (Coleman, 1988). As such, a cohesive group with bonding social capital is more likely to detect nonconformity and inconsistence, so group members tend to follow inside norms (Shen et al., 2014). For example, Huang et al. (2014) revealed that homogeneity among individuals related to intensification of several shared habits within closure-governed networks, such as substance abuse. Coleman (1988) suggested a similar finding that if high school students lived with dense networks of adults who felt responsible for taking care of children, it was less likely for these students to drop out of school. Furthermore, scholars have also manifested the role of closure in establishing trust within communities (e.g., Burt, 2005). Therefore, if

cooperation, trust and social support are needed for Chinese women to use tampons, closure may exert influence on their tampon use intentions.

Altogether, these two kinds of social capital exert strong, albeit different influences on people's beliefs, attitudes and behaviors. For instance, Hampton (2011) reported that bridging social capital was stronger in predicting democratic engagement than bonding social capital. In addition, Burt's (2011) study in the context of a large virtual world affirmed that people in closed networks were more likely to trust each other, whereas people who had more structural holes, or brokerage, would form more active groups. Therefore, Burt (2000) claimed that "closure is about stasis while brokerage is about change" (p. 355). As brokerage embraces innovation, novelty and heterogeneity, closure maintains what has existed and promotes cohesion. Although several studies have linked these two network mechanisms to normative behavior (e.g., Walter et al., 2019), there are few studies linking attitudes, subjective norms, perceived behavior control, and behavioral intentions to the level of brokerage and closure.

Linking Social Capital and Behavioral Intentions

Compared to the great amount of literature that simply applies the TPB to predict and explain behavior or behavioral intention, relatively few studies have linked social capital to the TPB and then do a prediction or explanation for people's behavior and/or behavioral intention. It's also hardly to find published articles that particularly explore how the level of brokerage and closure and the TPB are related, and how they influence individual's behavioral intention. However, several studies have bridged overall social capital and behavior or behavioral intention. Moreover, some scholars have paid specific attention to the relationship between social capital

and health-related behavioral outcomes (Limbu et al., 2018; Umberson et al., 2010). They lay the foundation for the current study. Additionally, there is another line of research that is crucial for this study – the examination of the roles of the TPB constructs in the relationship between social capital and behavioral intention.

The Role of Behavioral Attitudes

Researchers have revealed the mediating role of behavioral attitudes between social capital and individuals' behavior, or behavioral intention. Mediating effect refers to the effect of an indicator on a dependent variable that is transmitted through a third variable – mediator variable (Edwards & Lambert, 2007). For example, Lee and Kam (2015) found that parents' attitudes toward talking about drugs with their child mediated the effects of antidrug-specific social capital (i.e., antidrug-related community participation) and the parent-child communication about drugs. As discussed earlier, social capital can be examined at either individual level or collective level. Lee and Kam's study adopted the latter one, that is, treating social capital at community level.

At individual level, on the other hand, Tatarko and Schmidt also (2016) suggested a positive indirect impact of social capital on behavioral intention. They reported that people with greater social capital were more likely to have a positive attitudes toward running their own business, which in turn, were linked to higher possibility to start a business. In examining the indirect effects of social capital on preventive health behavior, Limbu et al. (2018) found that social capital influenced how people assessed the benefits of preventive health behavior. Given that attitudes can be linked to evaluation or appraisal of a behavior, Limbu et al.'s (2018) results also illustrated the associated between social capital and individuals' attitudes toward

preventive health behavior, which were then related to actual preventive health behavior.

Nevertheless, there is no more published research investigating the mediating role of attitudes in the relationship between social capital and behavioral intention. Therefore, some of this study's hypotheses will be also built upon other literature, which either explored the effects of social capital on attitudes, or the relationship between attitudes and behavioral intentions. Ware et al. (2009) found that in sub-Saharan Africa, bonding social capital, or network closure, could change sick people's negative attitudes toward needed care for health problems. However, Chi and Carpiano's (2013) research revealed a contradictory result. They found that adults in neighborhoods with higher levels of social capital were significantly less likely to use dental care. Informed by the mixed results from previous studies, the following research question is proposed:

> ***RQ2:*** *What relationship does the level of brokerage and closure have with Chinese women's attitudes toward using tampons?*

When discussing the direction for future research, Chi and Carpiano (2013) proposed more examination of the health-related attitudes that could mediate the relationship between social capital and behavior or behavioral intention. Although few studies have responded to this direction, a great deal of literature predicted or explained the effects of attitudes on behavioral intentions in multiple health communication contexts (e.g., Guan et al., 2016; Johnson-Young, 2019; Niu & Willoughby, 2018). Taking these studies with the aforementioned evidence regarding the relationship between social capital and attitudes, the following hypothesis is suggested:

> ***H2a:*** *Chinese women's attitudes toward using tampons will mediate the effects of ego-network social capital on their tampon use intentions.*

The Role of Subjective Norms

Both subjective norms and social capital were able to predict behaviors or/and behavioral intentions (Choi & Chung, 2013; Deng & Peng, 2018). Furthermore, researchers have explored the relationship between social capital and subjective norms. For instance, Strawbridge et al. (2001) found that the informal networks established through religious attendance might influence behavior by exposing people to messages about norms. In the context of condom use, Van Rossem and Meekers (2011) revealed that bonding social capital, or network closure, predicted behavior through individuals' perceptions of their social environment, in which using condom was socially approved. Put another way, subjective norms play a mediating role between social capital and the adoption of condom. However, Lee and Kam's (2015) study failed to prove the function of subjective norms as a mediator between social capital and behavior.

More recently, Walter et al. (2019) categorized subjective norms into two distinct concepts (i.e., descriptive norms and injunctive norms), because descriptive norms and injunctive norms have different levels of social approval regarding health-related behaviors (Park & Smith, 2007). Whereas injunctive norms failed to mediate the relationship between social capital and Pap test intents, descriptive norms were affirmed as a significant mediator (Walter et al., 2019). These mixed results of existing literature suggest the need for more relevant research. Thus, the current study aims to add more insights into this theoretical discussion by proposing following questions and hypothesis:

> ***RQ3:*** *What relationship does the level of brokerage and closure have with Chinese women's injunctive norms of using tampons?*
>
> ***RQ4:*** *What relationship does the level of brokerage and closure have with Chinese women's descriptive norms of using tampons?*

H2b: *Chinese women's descriptive norms about using tampons will mediate the effects of ego-network social capital on their tampon use intentions.*

Scholars did not conduct empirical studies to identify the differences between injunctive norms and descriptive norms until very recent years. Given the limited amount of published research for distinguishing injunctive norms and descriptive norms, Niu and Willoughby (2018) suggested that more investigation was needed to examine the effects of these two types of norms and their nuanced differences. While Walter et al. (2019) affirmed that descriptive norms mediated the relationship between social capital and Latino women's Pap test intentions, they could not find the same role for injunctive norms. In order to better understand people's health-related attitudes and behaviors, it is necessary to pay attention to different impacts of the two types of norms (Chi & Carpiano, 2013). Therefore, the following exploratory research question is posited:

RQ5: *Will Chinese women's injunctive norms about using tampons mediate the effects of ego-network social capital on their tampon use intentions?*

The Role of Perceived Behavior Control

Control from personal network is thought to be associated with more positive behaviors and fewer negative behaviors (Tucker, 2002). However, empirical research does not always support this argument. For instance, Lee and Kam (2015) did not find the support for perceived behavior control as a mediator between social capital and the parent-child communication about drugs. In contrast, Tatarko and Schimidt (2016) found that individual social capital had a positive indirect impact, through increased perceived behavior control, on individuals' intentions to start their own business. The inconsistency between the results of these studies is quite informative for the current

study, because this study focuses on the individual-level social capital, which is identical to Tatarko and Schimidt's (2016) research.

More relevantly, Amoah et al. (2018) reported that boding social capital were a crucial source of social support, which improved inpatients' sense of control. However, Walter et al. (2019) showed the relationship between social capital and behavioral control in a different way. They found that high levels of network closure predicted low self-efficacy, which was in turn associated with Pap test intentions. Since Ajzen (1991) conceptualized self-efficacy as a significant part of a person's perceived behavioral control, Walter and his colleagues' (2019) finding is also relevant to this study.

Given the lack of research that directly reveals the relationship between social capital and perceived behavior control, this study asks following questions:

> ***RQ6:*** *What relationship does the level of brokerage and closure have with Chinese women's perceived behavioral control of using tampons?*
>
> ***RQ7:*** *Will Chinese women's perceived behavior control about using tampons mediate the effects of ego-network social capital on their tampon use intentions?*

Figure 1 provides the theoretical model tested in this study.

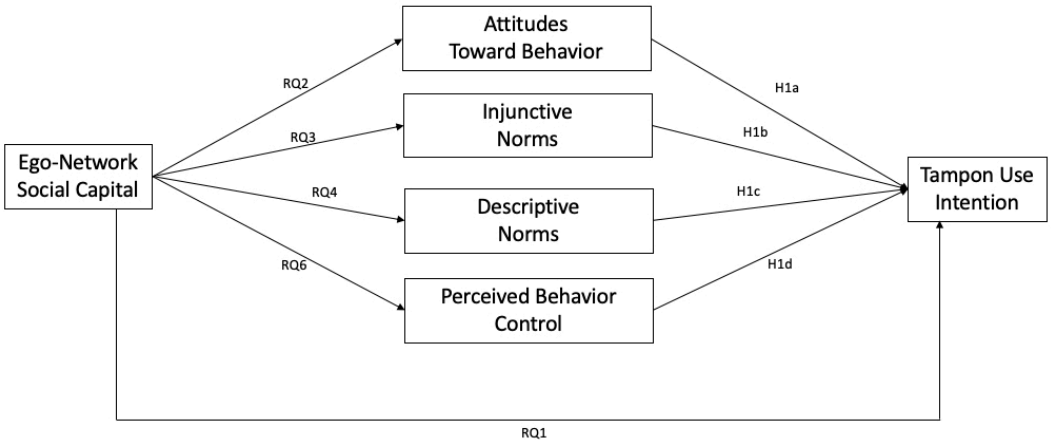

Figure 1. *Theoretical Model of Independent Variable, Mediators, and Dependent Variable*

III. METHODOLOGY

Participants and Sampling

Population for the current study are mainland Chinese females with the ages of 18 or above. A Chinese survey company – CreDaMo, collected data for this study. CreDaMo is a counterpart of MTurk or Qualtrics developed by a group of people from Peking University (Yao, 2019). It mainly provides research-related service (e.g., survey distribution) for academic and business sectors in China (Creator of Data and Model, 2019). With the help of CreDaMo, a nonprobability sample (N = 781) was recruited from four parts of China. Based on the geographical distribution of the population suggested by China's census data[1], 47.2% of the participants (n = 369) were recruited from the northeast of China; 42.0% of the respondents (n = 328) were residing in the southeast of China; And much less people were living in the southwestern region (n = 70, 9.0%) or northwestern area (n = 14, 1.8%).

After screening the data, the average age of participants in sample was 28.25 (SD = 6.16), ranging from 18 to 55 years old. 22.8% of them (n = 175) had the experience of living abroad, such as the United States, Germany, Japan, UK, etc. In terms of current living areas, most participants were living in urban areas (n = 628, 82.0%), whereas 81 participants (10.6%) were residing in rural areas and 57 respondents (7.4%) were from suburban areas.

In regard to their highest education levels, participants could be categorized into seven groups. 2.7% (n = 21) did not attend high school. 1.0% (n = 8) obtained

[1] According to China's 2010 national population census, around 40% of Chinese people lived in northeast of China, more than 40% resided in southeastern part of China, 10% or so were from southwestern provinces, and less than 5% of Chinese people lived in northwest. Since there are provinces that are divided into different parts (e.g., Inner Mongolia, Shaanxi), the proportions were approximate.

some high school education but did not complete it. 9.3% (*n* = 71) were high school graduates. 9.1% (*n* = 70) had some yet incomplete college education. 62.8% (*n* = 481) earned four-year college degree. 5.0% (*n* = 38) obtained some postgraduate education but had not completed it. 10.1% (*n* = 77) earned postgraduate degree.

With respect to employment status, more than half participants were full-time employees (*n* = 469, 61.2%). Students also accounted for a significant proportion (*n* = 154, 20.1%). Moreover, 74 participants (9.7%) were self-employed and 37 respondents (4.8%) were working part time. There were also 25 homemakers among the people (3.3%) who participated in the survey.

Annual household income (unit: Chinese yuan, or CNY) among participants ranged widely from less than 10k (*n* = 34, 4.4%) to more than 5 million (*n* = 2, 0.3%). The majority was those respondents who reported 100,000 to less than 200,000 (*n* = 198, 25.8%), while the number of participants who reported 50,000 to less than100,00 was a bit smaller (*n* = 155, 20.2%). Furthermore, participants whose annual household income were between 200,000 and less than 300,000 (*n* = 103, 13.4%), between 300,000 and less than 500,000 (*n* = 85, 11.1%), and between 20,000 and less than 50,000 (*n* = 85, 11.1%) also accounted for more than 10% of total participants. Other groups only included less than 7% of participants: 10,000 to less than 20,000: *n* = 53, 6.9%; Less than 10,000: *n* = 34, 4.4%; 500,000 to less than 1 million: *n* = 33, 4.3%; 1 million to less than 2 million: *n* = 13, 1.7%; 2 million to less than 5 million: *n* = 5, 0.7%; More than 5 million: *n* = 2, 0.3%.

In addition, sexual orientation and marital status were included in the survey. Most participants regarded themselves as heterosexual (*n* = 699, 91.3%), whereas others reported their sexual orientation as asexual (*n* = 29, 3.8%), bisexual (*n* = 28, 3.7%), homosexual (*n* = 6, 0.8%), pansexual (*n* = 2, 0.3%) or other sexual orientation

(n = 2, 0.3%). In terms of marital status, more than half respondents (n = 412, 53.8%) were married. Other participants might be single (n = 189, 24.7%), in a relationship but not living with partner (n = 88, 11.5%), in a relationship and living with partner (n = 73, 9.5%), divorced (n = 3, 0.4%) or widowed (n = 1, 0.1%). Table 1 presents the descriptive statistics of participants.

Table 1. *Sample Descriptive Statistics (N=766)*

Variables	*n*	%	*M*	*SD*
Age			28.25	6.16
Region				
Northeast	364	47.5%		
Southeast	319	41.6%		
Southwest	70	9.0%		
Northwest	13	1.7%		
Experience of Living Abroad				
No	591	77.2%		
Yes	175	22.8%		
Living Area				
Urban	628	82.0%		
Rural	81	10.6%		
Suburban	57	7.4%		
Education				
Less than high school	21	2.7%		
High school incomplete	8	1.0%		
High school graduate or equivalent	71	9.3%		
Some college but no degree	70	9.1%		
Four year college/university degree	481	62.8%		
Some postgraduate education but no degree	38	5.0%		
Postgraduate degree	77	10.1%		
Employment				
Full-time	469	61.2%		
Part-time	37	4.8%		
Self-employed	74	9.7%		
Student	154	20.1%		
Homemaker	25	3.3%		
Others	7	0.9%		
Annual Household Income (Unit: CNY)				
Less than 10k	34	4.4%		
10k to less than 20k	53	6.9%		
20k to less than 50k	85	11.1%		
50k to less than 100k	155	20.2%		
100k to less than 200k	198	25.8%		
200k to less than 300k	103	13.4%		
300k to less than 500k	85	11.1%		

Table 1 (continued).

Variables	*n*	%	*M*	*SD*
Annual Household Income (Unit: CNY)				
500k to less than 1 million	33	4.3%		
1 million to less than 2 million	13	1.7%		
2 million to less than 5 million	5	0.7%		
More than 5 million	2	0.3%		
Sexual Orientation				
Asexual	29	3.8%		
Bisexual	28	3.7%		
Heterosexual	699	91.3%		
Homosexual	6	0.8%		
Pansexual	2	0.3%		
Others	2	0.3%		
Marital Status				
Married	412	53.8%		
Single	193	25.2%		
In a relationship but not living together	88	11.5%		
Living with a partner	73	9.5%		
Religion				
Atheist	477	62.3%		
Buddhist	142	18.5%		
Agnostic	62	8.1%		
Protestant	31	4.0%		
Muslim	9	1.2%		
Catholic	6	0.8%		
Hindu	1	0.1%		
Others	38	5.0%		

Procedure

After receiving IRB approval (IRB#HR-3536) from the University Institutional Review Board, an online survey link was constructed through CreDaMo. The survey was created in English because it was built upon English literature in terms of the theories and measurement used in this study. However, in order to make participants better understand this survey, the questionnaire was translated and reviewed rigorously by bilingual graduate and undergraduate students – two Chinese graduate students and three Chinese undergraduate students. They are majoring in communication at a large university in the Midwestern United States. Moreover, a Chinese female who did not receive higher education (i.e., college education) also

reviewed the questionnaire and offered her feedback, in order to ensure the understandability and clarity of the survey for people with different levels of education.

The survey was sent to CreDaMo in January 2020, when 100 qualified participants were recruited for pre-test through the platform administrated by CreDaMo. In addition to the basic inclusion criteria (i.e., mainland Chinese females with the ages of 18 or above), the survey company added one more criterion (i.e., survey performance score) to obtain the participants with high credibility scores. Each CreDaMo worker has a performance score based on their previous survey participation. Higher score means better performance and higher credibility. For the present study, CreDaMo only allowed the participants who had a score higher than 70 to participate in this survey.

When qualified participants clicked the link to the survey, a consent form was provided to inform them about the purpose of this study, the length of the survey, their rights, the potential risks and benefits involved in participation, the explanation of confidentiality, and so forth. At the end of the consent form, they were asked to choose whether they agreed or disagreed to participate in this study. Those who agreed then started reading the definition of key word for this study (i.e., tampon) and answering questions.

An attention-check question was included in the questionnaire. The question asked participants to choose number 7. All respondents chose the correct number in pre-test. In addition, several participants from pre-test commented that the instruction for questions regarding personal network was tedious and confusing. Therefore, that instruction was modified and clarified with less words. Furthermore, an average time for pre-test participants to complete the questionnaire was calculated, which was 25

minutes. In order to further improve the quality of data, the survey company CreDaMo was asked to exclude the responses that were completed using less than 25 minutes in the main test.

In February 2020, the revised questionnaire was distributed to 781 participants for the main test. For both pre-test and main test, the participants whose response was complete got ¥ 10 (around 1.5 dollars in U.S. currency) as compensation through WeChat Pay account, a popular and reliable tool for online payment in China.

Measures

This study examines several variables which may influence Chinese women's intentions to use tampons. All variables, adopted from previously established measures, were assessed by multiple choice or a 7-point Likert scale. The items and questions used to measure dependent variable, mediating variables and independent variable can be found in Table 2.

Dependent Variable

Intention to use tampons. Based on Ajzen's (2002) conceptualization, behavioral intention with respect to using tampons were measured with three items (e.g., I intend to use tampons in the near feature.). Participants were asked to choose from 1 meaning "strongly disagree" to 7 meaning "strongly agree". The scale reliability was excellent (Cronbach's $\alpha = .903$, $M = 2.60$, $SD = 1.44$).

Mediating Variables

Attitudes toward behavior. Both instrumental and experiential attitudes toward behavior were assessed by six items on a 7-point scale (from 1 meaning

"strongly disagree" to 7 meaning "strongly agree") (Ajzen, 2002). For example, participants were required to choose whether they thought using tampons during period was harmful or beneficial. The scale reliability for this construct was excellent (Cronbach's α = .939, *M* = 2.37, *SD* = 1.13).

Subjective norms. Subjective norms included injunctive norms and descriptive norms, which were measured by a 7-point scale from 1 meaning "strongly disagree" to 7 meaning "strongly agree" (Ajzen, 2002). Injunctive norms assessed the perceptions about whether significant others thought that tampon should be used, using three items (e.g., Most people who are important to me think that I should use tampons.). This scale reliability was good (Cronbach's α = .891, *M* = 3.07, *SD* = 1.48). In addition, three items examined descriptive norms – the perceptions that tampon was actually used by significant referents (e.g., Most people who are important to me sometimes use tampons.). This scale reliability was excellent (Cronbach's α = .915, *M* = 2.99, *SD* = 1.57).

Perceived behavior control. Perceived behavior control was measured with six items on a 7-point scale from 1 meaning "strongly disagree" to 7 meaning "strongly agree" (Ajzen, 2002; Walter et al., 2019). For instance, participants were asked whether it would be possible for them to use tampons or not. This scale reliability was acceptable (Cronbach's α = .790, *M* = 2.27, *SD* = 0.91).

Independent Variables

Social capital. Based on Burt's (1984, 1992) scholarship and other empirical research (e.g., Pescosolido et al., 1998; Walter et al., 2019), ego-network social capital, or the level of brokerage and closure was measured by self-report data. Participants were instructed to write down three to five names of people with whom

they had discussed women's menstrual issues. The questionnaire also asked participants to illustrate whether those people knew each other, with 1 meaning "yes" and 0 meaning "no". Considering confidentiality, participants were asked to provide people's first names or initials in phonetic notation, instead of full names with Chinese characters. Using this information, ego-network structures were illustrated by a computer program called UCINET (Borgatti et al., 2002). The output from UCINET provided two network measures, density and hierarchy, which could suggest the level of brokerage and closure (Burt, 2000).

Burt (2000) argued that higher density and hierarchy correspond to higher level of closure and lower level of brokerage. Higher level of closure and lower level of brokerage suggested that the people with whom a person discussed menstrual issues also talked with each other. By contrast, lower level of closure and higher level of brokerage demonstrated that the people with whom an individual had conversation about menstrual issues did not talk with each other.

Control Variables

Sexual behavior. Previous literature has suggested that some Chinese associate using tampon with sexual activity (e.g., Ren et al., 2018). Thus, two items adopted from The Centers for Disease Control and Prevention's survey, were included to examine whether sexual behavior influenced Chinese women's tampon use intentions. 238 participants (31.1%) reported that they were virgin and others (n = 528, 68.9%) had experienced sexual activities. When they were asked whether they had been sexually active over the past 12 months, 397 respondents (51.8%) chose "yes" whereas 369 (48.2%) chose "no".

Familiarity with tampon. The lack of tampon-related knowledge has been reported to be a barrier that prevents Chinese women from using tampons (Cotton Incorporated, 2015). Thus, one question was used to test the extent to which participants felt familiar with tampons (M = 5.36, SD = 1.27).

Cultural identity. According to Hofstede (1993), culture refers to "the collective programming of the mind which distinguishes one group or category of people from another" (p. 89). Scholars have recognized the role of culture in individuals' attitudes, norms, and behaviors (Fishbein & Cappella, 2006), as well as providing social context which may indirectly influence people's behaviors (Maxwell, 2002). For instance, the Confucian culture which values virtue of chastity and virginity can affect people's decision on whether or not to use tampons since tampon is thought of as a threat to breaking hymen. As such, a person who has stronger cultural identification with Confucianism and Chinese heritage would be more likely subject to those shared values. Such identification with a particular cultural group has been operationalized as cultural identity (Usborne & Taylor, 2010). In this study, a participant's cultural identity was measured by eight items on a 7-point scale from 1 = strongly agree to 7 = strongly disagree. The reliability of this scale was good (M = 3.57, SD = 0.88, Cronbach's α = .745).

Media use. Media use can lead to attitudinal or behavioral outcomes (Slater, 2007), such as children's sleep duration (Moorman & Harrison, 2019), young adults' perceptions of smoking (Namkoong et al., 2017), and behavior of women receiving hormone replacement therapy (McIntosh & Blalock, 2005). Informed by these studies, media use was included as an additional control variable for the present study. The questions were adopted from Kamal et al. (2013), to test the level of media use of

the participants. The two items about media use hours were significantly correlated (r = .563, p < .001, M = 2.60, SD = 1.61).

General exposure to tampon-related information. Yet through a variety of mechanisms, information exposure can potentially foster attitudinal and behavioral change. (Prochaska & Velicer,1997; Westerwick et al., 2017). Therefore, it was necessary to include general exposure to tampon-related information as a control variable in this study. Building upon previous literature (Hornik et al., 2008), respondents were asked to recall how often they had seen information regarding tampons through various media and channels (e.g., television, radio, newspaper, magazines, billboards, etc.). The scale reliability was good (Cronbach's α = .748, M = 2.23, SD = 0.85).

Demographic variables. A series of questions on demographic information were developed, including age, living area, education, employment status, marital status, annual household income, religion, etc.

Table 2.
Means (M), Standard Deviations (SD), and Cronbach's α of Main Variables (N=766)

Variables	Measurement item(s)	*M*	*SD*	Cronbach's α
Attitudes Toward Using Tampons	1. For me to use tampons for my period is__. beneficial 1:2:3:4:5:6:7 harmful	2.43	1.27	
	2. For me to use tampons for my period is__. pleasant 1:2:3:4:5:6:7 unpleasant	2.42	1.29	
	3. For me to use tampons for my period is__. good 1:2:3:4:5:6:7 bad	2.31	1.29	
	4. For me to use tampons for my period is__. helpful 1:2:3:4:5:6:7 not helpful	2.18	1.16	
	5. For me to use tampons for my period is__. enjoyable 1:2:3:4:5:6:7 unenjoyable	2.63	1.38	
	6. For me to use tampons for my period is__. convenient 1:2:3:4:5:6:7 inconvenient	2.26	1.37	
				.939
Injunctive Norms of Using Tampons	1. Most people who are important to me think that I should use tampons for my period.	3.03	1.62	
	2. It is expected of me that I use tampons for my period.	3.03	1.56	
	3. The people in my life whose opinions I value would approve of my using tampons for my period.	3.12	1.71	
				.891
Descriptive Norms of Using Tampons	1. Most people who are important to me use tampons sometimes.	2.98	1.72	
	2. The people in my life whose opinions I value use tampons for their periods.	3.15	1.72	
	3. Many people like me use tampons sometimes.	2.83	1.65	
				.915
Perceived Behavior Control of Using Tampons	1. For me to use tampons for my period would be possible.	2.42	1.42	
	2. If I wanted I could use tampons for my period.	2.09	1.20	
	3. It is mostly up to me whether or not I use tampons for my period.	1.85	1.05	
	4. In general, how much control do you believe you have over using tampons?	2.75	1.51	
	5. I am confident that I could use tampons if I wanted.	2.16	1.27	
	6. I am confident that I could deal with any problems I encountered when using tampons.	2.35	1.34	
				.790
Intentions to Use Tampons	1. I intend to use tampons in the near future.	2.65	1.57	
	2. I will try to use tampons soon.	2.65	1.64	
	3. I plan to use tampons for my following menstrual periods.	2.49	1.51	
				.903
Social Capital (Closure)	Density	.37	.15	
	Hierarchy	.02	.03	
				N/A

Data Screening

Prior to data analysis, a series of data screening procedures were performed in SPSS. First, 10 cases that showed participants' ages under 18 years old were deleted, given that they did not meet the inclusion criterion regarding age. Second, a question used to check attention was sifted. Same as the attention check question in pre-test, the question asked participants to choose number 7. All respondents chose the correct number.

Third, the dataset was examined to detect outliers, or extreme values that were substantially different from the other observations (Hair et al., 2010). Following Hair et al. (2010), outlier detection was conducted with two approaches. A univariate detection (i.e., examining each variable individually) was first performed by converting the data values into standard scores (i.e., *z* scores). The scores falling in outer ranges of distribution (|3.29|) were designated as possible outliers (Hair et al., 2010; Tabachnick & Fidell, 2013).

Since a single approach could not provide enough evidence to designate outliers, a multivariate method (i.e., examining observations across all variables) was then conducted. This method measured the multidimensional position of each observation relative to the mean center of all observations, which was suggested by the Mahalanobis D^2 measure (Hair et al., 2010). The observations with a D^2/df value exceeding 4 were identified as possible outliers. Following Hair et al. (2010) who suggested that outlier identification should be based on a concerted manner of multiple methods, the possible outliers detected by both univariate and multivariate methods were designated as real outliers. 5 cases with real outliers were deleted. Hence, 15 cases were excluded in total by data screening procedures.

Network Analysis

The data that measured independent variable (i.e., ego-network social capital) were analyzed with a computer program, UCINET, which was specially designed for network analysis (Borgatti et al., 2002). According to Hanneman and Riddle (2005), UCINET contains various network analytical tools. Among these tools, structural holes analysis was run for this study, because it can provide the outputs that indicate the level of closure and brokerage.

To begin with, the dataset was imported into Microsoft Excel, and transformed into an appropriate format including ego-alter relationships (i.e., relationships between the focal person and the people connected to her/him) and alter-alter relationships (i.e., relationships between the people connected to the focal person). Then, the Microsoft Excel file was imported into UCINET for running network analysis. By performing structural holes analysis, UCINET produced an output that demonstrated two distinct measures that have been used to reveal the levels of brokerage and closure of participants' ego networks (Burt, 2000).

The first one is network density, or "the average strength of connection between contacts" (M = .37, SD = .15) (Burt, 2000, p. 374). The second measure, hierarchy, is an alternative form for the level of network brokerage and closure (M = .02, SD = .03), showing how much the redundancy within a network can be "traced to a single contact in that network" (Burt, 2000, p. 375). Density ranged from 0 to 0.5 and hierarchy ranged from 0 to 0.248, as higher number meant higher level of closure and lower level of brokerage. These two important but distinct measures were later used simultaneously, as independent variables, to indicate each respondent's ego-network social capital.

Figure 2 provides the examples of different ego-network structures base on the data.

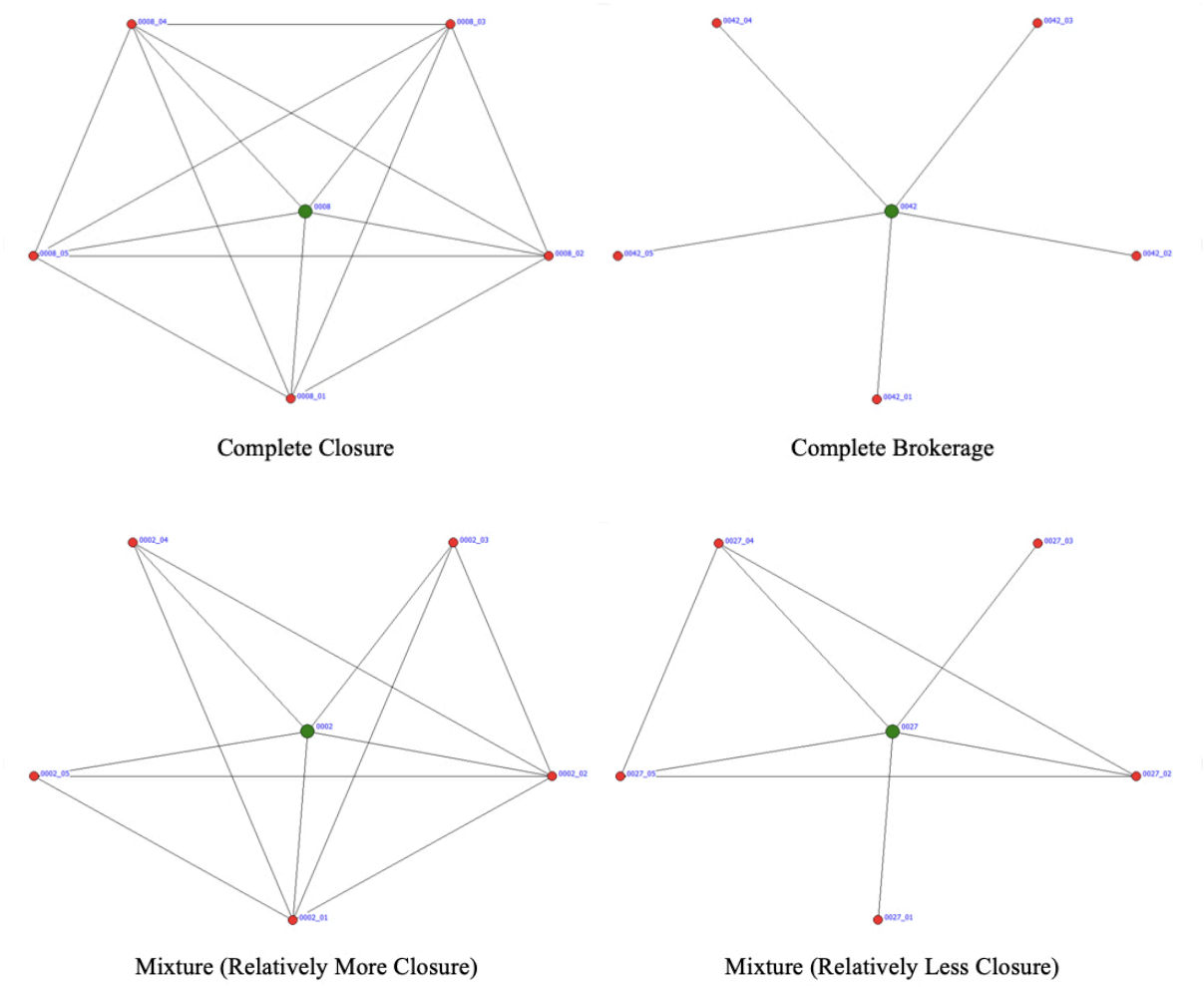

Figure 2. *Different Network Structures*
Note. Complete closure means that the contacts (red dots) connected to the ego (green dot) are connected to every other contacts. *Complete brokerage* indicates that the contacts (red dots) connected to the ego (green dot) are not connected to any other contacts except for the ego. *Mixture structure* represents that some contacts (red dots) connected to the ego (green dot) are connected to some other contacts while some are not.

Confirmatory Factor Analyses

Confirmatory factor analysis (CFA) was performed in SPSS file using AMOS 25. CFA can suggest whether and how well the measured variables (i.e., loadings) represent the constructs by testing the fitness of the measurement model (Hair et al.,

2010; Kline, 2016). If a set of measured items accurately reflects the construct, construct validity is achieved, with which the results of this study can better obtain scientific values and generalizability (Hair et al., 2010). In other words, only valid measurement can generate valid conclusions. Also, CFA has been widely used for questionnaires of social science, which shows researchers' recognition for this statistic tool (Prudon, 2015). Therefore, this study performed CFA prior testing hypotheses and answering research questions.

In order to support construct validity, two core components were examined. First, convergent validity, or the degree to which the items of a given construct obtain a high proportion of common variance, was tested by calculating construct reliability (Hair et al., 2010). Second, discriminant validity was assessed to suggest how much a certain construct is distinct from other constructs. If the average variance extracted (AVE) for a given construct is greater than the shared variance between constructs (ASV), high discriminant validity will be demonstrated (Hair et al., 2010). This means that the construct really represents some unique phenomena that other measures do not.

The initial CFA model revealed that there existed violations of construct validity, given that the χ^2/df was greater than 3, and the average variance extracted (AVE) of *perceived behavior control* was less than its average shared variance (ASV). In order to improve the goodness-of-fit of this CFA model, the following adjustments were applied.

First, according to modification indices, within-construct error covariances were added between the errors that were under the same construct. Second, the items that had low level standardized loading ($\beta < 0.5$) for *perceived behavior control* were

deleted. Third, AMOS suggested that an item for *attitudes toward using tampons* caused high standardized residual covariances. Thus, it was also deleted.

After modification, the CFA model was then run again and showed satisfactory goodness-of-fit indices according to Hu and Bentler's (1999) criteria: χ^2 (104, N = 766) = 309.324, χ^2/df = 2.974, p < 0.001, Comparative Fit Index (CFI) = .982, Standardized Root Mean Square Residual (SRMR) = .03, Root Mean Square Error of Approximation (RMSEA) = .05. Moreover, construct validity (including convergent validity and discriminant validity) and composite reliability were established by meeting the following criteria: standardized loading estimate > .70, average variance extracted (AVE) > .70, average variance extracted (AVE) > average shared variance (ASV), and composite reliability (CR) > .80. Therefore, the revised CFA model was good enough for further analyses.

IV. RESULTS

Multiple Ordinary Least Squares (OLS) Regression Analysis

Multiple OLS regression analysis is a statistical technique to test the relationship between multiple independent variables and a single dependent variable (Hair et al., 2010). The multiple regression analyses for this study were conducted using STATA 14, since this statistic program has its strength in providing "the option to estimate standard errors that are 'robust' to certain violations" (Hoechele, 2007, p. 2). Before performing multiple regression analyses, the assumptions for both individual variables and the regression variate were assessed, in order to know whether the prediction errors were caused by the absence of relationship among the variables, or by certain characteristics of data not recommended by the regression model (Hair et al., 2010).

First assumption, the variance inflation factor (VIF) and tolerance of each variable were assessed to examine multicollinearity. All VIF values were less than 10 and tolerance values were above 0.10, which revealed nonexistence of multicollinearity. Second, homoskedasticity was examined by Breusch-Pagan/Cook-Weisberg test. The fitted values of tampon use intention ($\chi^2 = 14.55$, $p < .05$), attitudes ($\chi^2 = 15.10$, $p < .05$), injunctive norms ($\chi^2 = 12.08$, $p < .05$), descriptive norms ($\chi^2 = 26.68$, $p < .05$) and perceived behavior control ($\chi^2 = 20.64$, $p < .05$) were smaller than .05, which showed heteroskedasticity of these variables. Therefore, White's heteroskedastic robust error was used as a remedial measure in the present study. This study reports the results from White's heteroskedastic robust error.

Then, a series of multiple OLS regression analyses were run to test H1a, H1b, H1c and H1d, and answer RQ1, RQ2, RQ3, RQ4 and RQ6. The predictor of this

study, social capital, was measured by two dimensions: network density and network hierarchy. Both were introduced as independent variables for RQ1, RQ2, RQ3, RQ4 and RQ6. Meanwhile, tampons use intention, attitudes toward behavior, injunctive norms, descriptive norms and perceived behavior control were the dependent variables of RQ1, RQ2, RQ3, RQ4 and RQ6 respectively. Further, attitudes, injunctive norms, descriptive norms and perceived behavior control that served as mediators of the overall model for this study, were independent variables for H1a, H1b, H1c and H1d. The dependent variable of these four hypotheses were tampon use intention.

Based on previous literature, several control variables and demographic variables were added, including sexual behavior, familiarity with tampon, cultural identity, media use, general exposure to tampon-related information, age, education, income, etc. Moreover, living area (rural, urban or suburban), employment status (full-time, part-time or others), marital status (married, single or in a relationship), and experience of living abroad (yes or no) were recoded as categorical or dichotomous predictors and added into the regression model as additional demographic variables.

RQ1 asked how ego-network social capital would be directly related to Chinese women's tampon use intentions. Independent variables in the model (two dimensions of social capital, control variables and demographic variables) accounted for a significant proportion of the variance in tampon use intentions, $R^2 = 0.23$, F (18, 673) = 17.30, $p < .001$ (See Table 3). The results revealed that network density (b = 1.06, $t = 2.36$) was a strong predictor for tampon use intention. As every one-unit network density increased, tampon use intention increased by 1.06, suggesting that the increase in tampon use intention could be explained by the increase in level of

closure. Among all control variables and demographic variables, the level of being sexually active ($b = 0.45$, $t = 3.42$), familiarity with tampon ($b = 0.22$, $t = 4.37$), media use ($b = 0.11$, $t = 2.88$), general exposure to tampon-related information ($b = 0.24$, $t = 3.11$) and income ($b = 0.06$, $t = 2.06$) were positively and significantly associated with tampon use intention. In other words, Chinese females who were more sexually active, were more familiar with tampons, spent more hours using media for tampon-related information, were exposed to more tampon-related information and earned more money would be more likely to use tampons.

Table 3.
OLS Regression Analysis for the Association Between Level of Closure and Brokerage, and Tampon Use Intention (N=766)

Variables	Tampon Use Intention	
	b	*t*
Constant	2.296	3.89***
Density	1.055	2.36*
Hierarchy	2.604	1.19
Sexual Experience (Yes: 1, No: 0)	0.059	0.39
Sexual Activeness (Yes: 1, No: 0)	0.445	3.42**
Familiarity with Tampon	0.220	4.37***
Cultural Identity	-0.056	-0.98
Media Use	0.112	2.88**
General Exposure to Tampon-Related Information	0.242	3.11**
Age	0.005	0.39
Living Area – Rural (Rural: 1, Others: 0)	0.114	0.64
Living Area – Suburban (Suburban: 1, Others: 0)	0.058	0.32
Education	0.010	0.18
Employment – Part-Time (Part-Time: 1, Others: 0)	0.110	0.57
Employment – Other Status (Other Status: 1, Others: 0)	-0.303	-1.87*
Annual Household Income	0.059	2.06
Marital Status – Single (Single: 1, Others: 0)	0.250	1.31
Marital Status – In Relationship (In Relationship: 1, Others: 0)	0.258	1.67
Religion (Yes: 1, No: 0)	0.110	1.04
R^2	0.23	
F	17.30***	

Note. ***$p < .001$, **$p < .01$, *$p < .05$. Results were based on White's heteroskedastic robust standard errors because the Breusch-Pagan/Cook-Weisberg test revealed that there was heteroskedasticity ($\chi^2 = 14.55$, $p < .05$). Independent variables were not in a violation of multicollinearity (i.e., VIF of each variable < 10 and Tolerance (T) of each variable > 0.10).

RQ2 investigated the relationship between the level of brokerage and closure and Chinese women's attitudes toward using tampons. The model constituted by two variables of social capital, control variables and demographic variables accounted for a significant proportion of the variance in attitudes toward using tampons, $R^2 = 0.26$, F (18, 673) = 20.05, $p < 0.001$ (See Table 4). Based on this model, network density ($b = 0.78$, $t = 2.38$) could predict Chinese women's attitudes toward using tampons. The increase in the level of closure resulted in the increase of positive attitudes toward using tampons. As control variables, the level of being sexually active ($b = 0.26$, $t = 2.75$), familiarity with tampon ($b = 0.24$, $t = 6.83$) and general exposure to tampon-related information ($b = 0.28$, $t = 4.49$) were found as predictors for attitudes toward using tampons. Among demographic variables, education ($b = 0.08$, $t = 2.16$) and religion ($b = 0.19$, $t = 2.32$) also served as predictors. Therefore, being sexually active, familiar with tampons, exposed to tampon-related information, as well as being religious and obtaining high education would result in positive attitudes toward using tampons.

Table 4.
OLS Regression Analysis for the Association Between Level of Closure and Brokerage, and Attitudes (N=766)

Variables	Attitudes	
	b	*t*
Constant	2.480	5.78***
Density	0.785	2.38*
Hierarchy	0.984	0.55
Sexual Experience (Yes: 1, No: 0)	0.094	0.91
Sexual Activeness (Yes: 1, No: 0)	0.258	2.75**
Familiarity with Tampon	0.242	6.83***
Cultural Identity	-0.064	-1.36
Media Use	-0.009	-0.31
General Exposure to Tampon-Related Information	0.278	4.49***
Age	0.014	1.62
Living Area – Rural (Rural: 1, Others: 0)	0.191	1.32
Living Area – Suburban (Suburban: 1, Others: 0)	0.248	1.56
Education	0.078	2.16*
Employment – Part-Time (Part-Time: 1, Others: 0)	-0.002	-0.01

Table (continued).

Variables	Attitudes	
	b	*t*
Employment – Other Status (Other Status: 1, Others: 0)	-0.027	-0.21
Annual Household Income	0.031	1.33
Marital Status – Single (Single: 1, Others: 0)	-0.056	-0.39
Marital Status – In Relationship (In Relationship: 1, Others: 0)	0.140	1.12
Religion (Yes: 1, No: 0)	0.189	2.32*
R^2	0.26	
F	20.05***	

Note. ***$p < .001$, **$p < .01$, *$p < .05$. Results were based on White's heteroskedastic robust standard errors because the Breusch-Pagan/Cook-Weisberg test revealed that there was heteroskedasticity ($\chi^2 = 15.10$, $p < .05$). Independent variables were not in a violation of multicollinearity (i.e., VIF of each variable < 10 and Tolerance (T) of each variable > 0.10).

The model constructed for answering RQ3 suggested a significant proportion of the variance in Chinese women's injunctive norms of using tampons, $R^2 = 0.34$, F (18, 673) = 27.00, $p < 0.001$ (See Table 5). The results illustrated that network density and injunctive norms were positively associated ($b = 1.62$, $t = 4.36$), which indicated that this type of norms would be higher if the level of closure increased. In this model, four control variables and one demographic variable served as predictors, including being sexually active ($b = 0.38$, $t = 3.05$), familiarity with tampon ($b = 0.18$, $t = 3.96$), cultural identity ($b = -0.15$, $t = -2.55$), and general exposure to tampon-related information ($b = 0.48$, $t = 6.72$). Among all demographic variables, religion ($b = 0.25$, $t = 2.49$) was positively associated with injunctive norms. Put another way, women in China would have a high level of injunctive norms about using tampons if they had a low level of cultural identity, and were sexually active, familiar with tampons, exposed to tampon-related information and religious.

Table 5.
OLS Regression Analysis for the Association Between Level of Closure and Brokerage, and Injunctive Norms (N=766)

Variables	Injunctive Norms	
	b	*t*
Constant	1.690	3.00**
Density	1.621	4.36***
Hierarchy	1.583	0.82
Sexual Experience (Yes: 1, No: 0)	0.126	0.83
Sexual Activeness (Yes: 1, No: 0)	0.375	3.05**
Familiarity with Tampon	0.181	3.96***
Cultural Identity	-0.151	-2.55*
Media Use	0.033	0.92
General Exposure to Tampon-Related Information	0.478	6.72***
Age	0.013	1.15
Living Area – Rural (Rural: 1, Others: 0)	0.081	0.47
Living Area – Suburban (Suburban: 1, Others: 0)	-0.039	-0.24
Education		
Employment – Part-Time (Part-Time: 1, Others: 0)	-0.084	-0.44
Employment – Other Status (Other Status: 1, Others: 0)	-0.232	-1.49
Annual Household Income	0.035	1.29
Marital Status – Single (Single: 1, Others: 0)	-0.185	-0.97
Marital Status – In Relationship (In Relationship: 1, Others: 0)	-0.078	-0.54
Religion (Yes: 1, No: 0)	0.246	2.49*
R^2	0.34	
F	27.00***	

Note. ***$p < .001$, **$p < .01$, *$p < .05$. Results were based on White's heteroskedastic robust standard errors because the Breusch-Pagan/Cook-Weisberg test revealed that there was heteroskedasticity ($\chi^2 = 12.08$, $p < .05$). Independent variables were not in a violation of multicollinearity (i.e., VIF of each variable < 10 and Tolerance (T) of each variable > 0.10).

Similar to RQ3, RQ4 focused on descriptive norms. Independent variables (two variables of social capital, control variables and demographic variables) in this model accounted for a great proportion of the variance in Chinese women's descriptive norms of using tampons, $R^2 = 0.41$, F (18, 673) = 33.85, $p < 0.001$ (See Table 6). One of the social capital variables, network density ($b = 1.64$, $t = 4.14$), or high level of closure, resulted in the increase of descriptive norms. In regard to control variables and demographic variables, Chinese female individuals with active sexual activity ($b = 0.40$, $t = 3.22$), familiarity with tampon ($b = 0.20$, $t = 4.42$), low cultural identity ($b = -0.17$, $t = 2.83$), much general exposure to tampon-related

information (b = 0.56, t = 7.86) and religion (b = 0.31, t = 3.12) had high scores on their descriptive norms. In addition, those who reported their employment status as "other" (b = -0.52, t = -3.30) instead of full-time or part-time, had less descriptive norms about using tampons compared to full-time and part-time employees.

Table 6.
OLS Regression Analysis for the Association Between Level of Closure and Brokerage, and Descriptive Norms (N=766)

Variables	Descriptive Norms	
	b	*t*
Constant	1.533	2.71**
Density	1.642	4.14***
Hierarchy	0.502	0.26
Sexual Experience (Yes: 1, No: 0)	0.193	1.34
Sexual Activeness (Yes: 1, No: 0)	0.398	3.22**
Familiarity with Tampon	0.201	4.42***
Cultural Identity	-0.165	-2.83**
Media Use	0.040	1.13
General Exposure to Tampon-Related Information	0.562	7.86***
Age	0.016	1.37
Living Area – Rural (Rural: 1, Others: 0)	0.043	0.24
Living Area – Suburban (Suburban: 1, Others: 0)	0.027	0.14
Education	0.022	0.42
Employment – Part-Time (Part-Time: 1, Others: 0)	-0.049	-0.27
Employment – Other Status (Other Status: 1, Others: 0)	-0.519	-3.30**
Annual Household Income	0.041	1.53
Marital Status – Single (Single: 1, Others: 0)	-0.069	-0.37
Marital Status – In Relationship (In Relationship: 1, Others: 0)	0.102	0.73
Religion (Yes: 1, No: 0)	0.306	3.12
R^2	0.41	
F	33.85***	

Note. ***p < .001, **p < .01, *p < .05. Results were based on White's heteroskedastic robust standard errors because the Breusch-Pagan/Cook-Weisberg test revealed that there was heteroskedasticity (χ^2 = 26.68, p < .05). Independent variables were not in a violation of multicollinearity (i.e., VIF of each variable < 10 and Tolerance (T) of each variable > 0.10).

RQ6 asked about the relationship between the level of brokerage and closure and Chinese women's perceived behavior control of using tampons. Although the overall model (two variables of social capital, control variables and demographic variables) revealed a significant proportion of the variance in perceived behavior control (R^2 = 0.22, F (18, 673) = 22.09, p < 0.001) (See Table 7), neither network

density (b = 0.46, t = 1.37) nor network hierarchy (b = 2.11, t = 1.71) significantly predicted the change in perceived behavior control. However, several control variables and demographic variables were strong predictors, including active sexual activity (b = 0.35, t = 3.51), familiarity with tampon (b = 0.18, t = 5.13), general exposure to tampon-related information (b = 0.23, t = 3.79), "other" employment status (b = -0.27, t = -2.11), income (b = 0.08, t = 3.40), staying in a romantic relationship instead of married or single (b = 0.26, t = 2.23), and religion (b = 0.18, t = 2.20).

Table 7.
OLS Regression Analysis for the Association Between Level of Closure and Brokerage, and Perceived Behavior Control (N=766)

Variables	Perceived Behavior Control	
	b	*t*
Constant	3.202	7.02***
Density	0.464	1.37
Hierarchy	2.114	1.23
Sexual Experience (Yes: 1, No: 0)	-0.111	-0.94
Sexual Activeness (Yes: 1, No: 0)	0.353	3.51***
Familiarity with Tampon	0.184	5.13***
Cultural Identity	0.042	0.97
Media Use	-0.022	-0.76
General Exposure to Tampon-Related Information	0.227	3.79***
Age	0.009	1.08
Living Area – Rural (Rural: 1, Others: 0)	0.081	0.56
Living Area – Suburban (Suburban: 1, Others: 0)	-0.148	-0.84
Education	-0.043	-1.02
Employment – Part-Time (Part-Time: 1, Others: 0)	-0.082	-0.52
Employment – Other Status (Other Status: 1, Others: 0)	-0.269	-2.11*
Annual Household Income	0.079	3.40**
Marital Status – Single (Single: 1, Others: 0)	0.201	1.40
Marital Status – In Relationship (In Relationship: 1, Others: 0)	0.258	2.23*
Religion (Yes: 1, No: 0)	0.178	2.20*
R^2	0.22	
F	12.97***	

Note. ***p < .001, **p < .01, *p < .05. Results were based on White's heteroskedastic robust standard errors because the Breusch-Pagan/Cook-Weisberg test revealed that there was heteroskedasticity (χ^2 = 20.64, p < .05). Independent variables were not in a violation of multicollinearity (i.e., VIF of each variable < 10 and Tolerance (T) of each variable > 0.10).

H1a proposed that Chinese women's attitudes toward using tampons would be positively related to their tampon use intentions. As expected, attitudes appeared as a strong predictor for tampon use intentions among Chinese women. According to the results, every one-unit increase in attitudes resulted in an increase of 0.72 in tampon use intentions ($b = 0.72$, $t = 17.16$), controlling for effects of other independent variables in the models (See Table 8). Thus, H1a was supported.

Table 8.
OLS Regression Analysis for the Association Between Attitudes and Tampon Use Intention (N=766)

Variables	Tampon Use Intention	
	b	*t*
Constant	0.750	1.57
Attitudes	0.723	17.16***
Sexual Experience (Yes: 1, No: 0)	-0.005	-0.04
Sexual Activeness (Yes: 1, No: 0)	0.263	2.41**
Familiarity with Tampon	0.045	1.15
Cultural Identity	-0.012	-0.25
Media Use	0.115	3.40
General Exposure to Tampon-Related Information	0.055	0.83
Age	-0.007	-0.69
Living Area – Rural (Rural: 1, Others: 0)	-0.024	-0.17
Living Area – Suburban (Suburban: 1, Others: 0)	-0.138	-0.87
Education	-0.049	-1.17
Employment – Part-Time (Part-Time: 1, Others: 0)	0.100	0.53
Employment – Other Status (Other Status: 1, Others: 0)	-0.296	-2.48*
Annual Household Income	0.038	1.55
Marital Status – Single (Single: 1, Others: 0)	0.283	1.82
Marital Status – In Relationship (In Relationship: 1, Others: 0)	0.151	1.15
Religion (Yes: 1, No: 0)	-0.029	-0.34
R^2	0.46	
F	33.80***	

Note. ***$p < .001$, **$p < .01$, *$p < .05$. There was no violation of homoscedasticity and multicollinearity, $\chi^2 = 3.26$, $p > .05$, VIF < 10, and T > 0.10.

H1b posited that injunctive norms of using tampons would be positively related to Chinese women's tampon use intentions. This hypothesis was supported ($b = 0.49$, $t = 10.31$), controlling for other independent variables' effects (See Table 9). In other words, each unit increase in injunctive norms predicted an increase by 0.49 in tampon use intentions. In a similar vein, H1c was supported. Controlling for the

effects of control variables and demographic variables, Chinese women's descriptive norms of using tampons were positively related to their tampon use intentions (b = 0.48, t = 10.39) (see Table 10). One unit increase in descriptive norms predicted 0.48 tampon use intentions among women in China.

Table 9.
OLS Regression Analysis for the Association Between Injunctive Norms and Tampon Use Intention (N=766)

Variables	Tampon Use Intention	
	b	*t*
Constant	1.620	3.26**
Injunctive Norms	0.490	10.31***
Sexual Experience (Yes: 1, No: 0)	-0.002	-0.01
Sexual Activeness (Yes: 1, No: 0)	0.264	2.19*
Familiarity with Tampon	0.130	2.84**
Cultural Identity	0.018	0.34
Media Use	0.093	2.50*
General Exposure to Tampon-Related Information	0.014	0.19
Age	-0.002	-0.23
Living Area – Rural (Rural: 1, Others: 0)	0.075	0.54
Living Area – Suburban (Suburban: 1, Others: 0)	0.067	0.40
Education	-0.018	-0.36
Employment – Part-Time (Part-Time: 1, Others: 0)	0.147	0.77
Employment – Other Status (Other Status: 1, Others: 0)	-0.198	-1.50
Annual Household Income	0.043	1.63
Marital Status – Single (Single: 1, Others: 0)	0.347	2.08*
Marital Status – In Relationship (In Relationship: 1, Others: 0)	0.298	2.20*
Religion (Yes: 1, No: 0)	-0.013	-0.14
R^2	0.39	
F	28.41***	

Note. ***p < .001, **p < .01, *p < .05. Results were based on White's heteroskedastic robust standard errors because the Breusch-Pagan/Cook-Weisberg test revealed that there was heteroskedasticity (χ^2 =28.25, p < .05). Independent variables were not in a violation of multicollinearity (i.e., VIF of each variable < 10 and Tolerance (T) of each variable > 0.10).

Table 10.
OLS Regression Analysis for the Association Between Descriptive Norms and Tampon Use Intention (N=766)

Variables	Tampon Use Intention	
	b	*t*
Constant	1.73	3.42**
Descriptive Norms	0.479	10.39***
Sexual Experience (Yes: 1, No: 0)	-0.034	-0.26
Sexual Activeness (Yes: 1, No: 0)	0.257	2.16*

Table 10 (continued).

Variables	Tampon Use Intention	
	b	*t*
Familiarity with Tampon	0.122	2.71**
Cultural Identity	0.024	0.45
Media Use	0.090	2.47*
General Exposure to Tampon-Related Information	-0.022	-0.31
Age	-0.003	-0.29
Living Area – Rural (Rural: 1, Others: 0)	0.095	0.66
Living Area – Suburban (Suburban: 1, Others: 0)	0.033	0.20
Education	-0.001	-0.03
Employment – Part-Time (Part-Time: 1, Others: 0)	0.130	0.72
Employment – Other Status (Other Status: 1, Others: 0)	-0.064	-0.46
Annual Household Income	0.040	1.52
Marital Status – Single (Single: 1, Others: 0)	0.297	1.81
Marital Status – In Relationship (In Relationship: 1, Others: 0)	0.213	1.56
Religion (Yes: 1, No: 0)	-0.040	-0.42
R^2	0.38	
F	28.38***	

Note. ***$p < .001$, **$p < .01$, *$p < .05$. Results were based on White's heteroskedastic robust standard errors because the Breusch-Pagan/Cook-Weisberg test revealed that there was heteroskedasticity (χ^2 =25.17, $p < .05$). Independent variables were not in a violation of multicollinearity (i.e., VIF of each variable < 10 and Tolerance (T) of each variable > 0.10).

H1d anticipated that Chinese women's perceived behavior control of using tampons would be positively related to their tampon use intentions, which was supported ($b = 0.89$, $t = 22.94$) (See Table 11). The results illustrated that one unit more behavior control Chinese women perceived about using tampons, 0.89 more intention they had to use tampons.

Table 11.
OLS Regression Analysis for the Association Between Perceived Behavior Control and Tampon Use Intention (N=766)

Variables	Tampon Use Intention	
	b	*t*
Constant	-0.278	-0.61
Perceived Behavior Control	0.892	22.94***
Sexual Experience (Yes: 1, No: 0)	0.168	1.64
Sexual Activeness (Yes: 1, No: 0)	0.135	1.45
Familiarity with Tampon	0.059	1.56
Cultural Identity	-0.098	-2.18*
Media Use	0.129	4.40***
General Exposure to Tampon-Related Information	0.062	1.11

Table 11 (continued).

Variables	Tampon Use Intention	
	b	*t*
Age	-0.005	-0.57
Living Area – Rural (Rural: 1, Others: 0)	0.039	0.31
Living Area – Suburban (Suburban: 1, Others: 0)	0.172	1.40
Education	0.044	1.05
Employment – Part-Time (Part-Time: 1, Others: 0)	0.166	1.36
Employment – Other Status (Other Status: 1, Others: 0)	-0.076	-0.69
Annual Household Income	-0.009	-0.40
Marital Status – Single (Single: 1, Others: 0)	0.037	0.27
Marital Status – In Relationship (In Relationship: 1, Others: 0)	0.122	0.11
Religion (Yes: 1, No: 0)	-0.050	-0.66
R^2	0.58	
F	70.63***	

Note. ***$p < .001$, **$p < .01$, *$p < .05$. Results were based on White's heteroskedastic robust standard errors because the Breusch-Pagan/Cook-Weisberg test revealed that there was heteroskedasticity ($\chi^2 = 13.76$, $p < .05$). Independent variables were not in a violation of multicollinearity (i.e., VIF of each variable < 10 and Tolerance (T) of each variable > 0.10).

Path Analysis

H2a, H2b, RQ5 and RQ7 concerned mediating roles of attitude, injunctive norms, descriptive norms and perceived behavior control in the relationship between social capital and tampon use intentions. The relationships that make up the model for this study are visually displayed in Figure 1 using a path diagram. These relationships were validated by path analysis using structural equation modeling (SEM), given that SEM enables the estimates of a series of separate but interdependent multiple regression equations simultaneously (Hair et al., 2010; Zhao et al., 2010), and allows "complete and simultaneous tests of all the relationships" (Tabachnick & Fidell, 2013, p. 684). Also, SEM has the capacity to incorporate latent variables, or unobservable concepts that should be measured by observable variables, into the analysis. In this process, the statistical estimation can be enhanced by accounting for measurement error.

Following Zhao et al. (2010), the mediation tests in this study were conducted by a bootstrapping method. Although there are multiple computer programs available for conducting SEM, this study used AMOS program, given its several strengths, such as allowing users to either enter model graphically or use commands, and providing multiple efficient estimation techniques. Using AMOS, the bias-corrected bootstrapping was run (N=5,000).

The initial path analysis model that was constructed in AMOS 25 included the direct and indirect effects of social capital (network density and network hierarchy) on tampon use intentions, as well as a control variable (i.e., tampon-related media use) that was found as a significant predictor for dependent variable by running regression analysis. However, the initial path analysis model did not show an acceptable goodness-of-fit according to Hu and Bentler (1999)'s criteria. Therefore, a series of adjustments were carried out based on the output of initial path analysis model.

First, several insignificant paths were deleted one by one, including the paths between network hierarchy and perceived behavior control, between network hierarchy and attitudes, between injunctive norms and tampon use intentions, and between network hierarchy and injunctive norms. Second, within-construct error covariances were added based on modification indices. After being adjusted, the finalized path analysis model exhibited an acceptable model fit, $\chi^2 = 5.397$, $df = 2$, $\chi^2/df = 2.699$, $p < 0.001$, Comparative Fit Index (CFI) = .998, Standardized Root Mean Square Residual (SRMR) = .021, Tucker-Lewis Index (TLI) = 0.986, Root Mean Square Error of Approximation (RMSEA) = 0.047. Thus, it met the critical criteria for goodness-of-fit agreed by scholars such as Hu and Bentler (1999) (i.e., CFI $\geq$ 0.95 and SRMR $\leq$ 0.08, or RMSEA $\leq$ 0.05 and SRMR $\leq$ 0.08) and Hair et al. (2010) (i.e.,

significant *p*-values expected; CFI or TLI ≥ 0.92, SRMR ≤ 0.08 with CFI ≥ 0.92, and RMSEA < 0.07 with CFI ≥ 0.92, when $N > 250$ and $12 > m > 30$).

Figure 3 shows the final path analysis model.

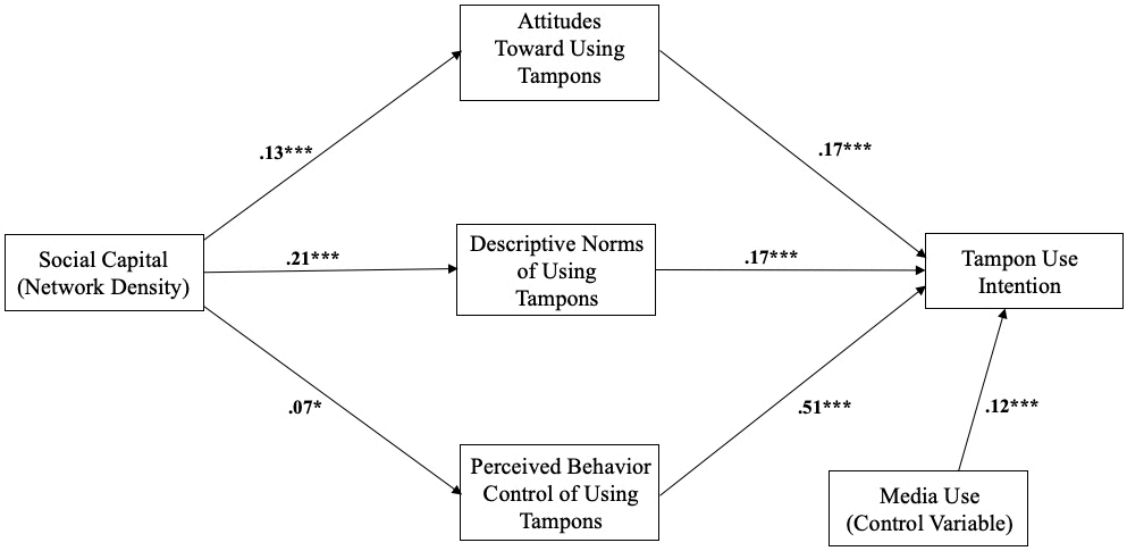

Figure 3. *Final Path Analysis Model.* In order to be concise, only the retained (simplified) model without insignificant paths is demonstrated. Model fit indices: $\chi^2 = 5.397$, $df = 2$, $\chi^2/df = 2.699$, $p < .001$. CFI = .998, TLI = .986, RMSEA = .047, SRMR = .021. *$p < .05$, ***$p < .001$.

As recommended by Zhao et al. (2010), the mediation effects in the adjusted path analysis model were validated by the bias-corrected bootstrapping procedure ($N = 5{,}000$). The results turned out to be identical with the final path analysis model. The direct effects of network density on attitudes ($\beta = 0.13$, $p < 0.001$, 95% CI [0.07, 0.19]), descriptive norms ($\beta = 0.21$, $p < 0.001$, 95% CI [0.16, 0.27]) and perceived behavior control ($\beta = 0.07$, $p < 0.05$, 95% CI [0.02, 0.13]) were all positive and statistically significant. Meanwhile, the direct effects of attitudes ($\beta = 0.17$, $p < 0.001$, 95% CI [0.11, 0.24]), descriptive norms ($\beta = 0.17$, $p < 0.001$, 95% CI [0.10, 0.23]) and perceived behavior control ($\beta = 0.51$, $p < 0.001$, 95% CI [0.44, 0.58]) on tampon use intentions were also positive and statistically significant.

In addition, the bootstrapping analysis revealed the indirect effect of network density on tampon use intentions ($\beta = 0.10$, $p < 0.001$, 95% CI [0.05, 0.14]) through attitudes, descriptive norms and perceived behavior control. Hence, the bootstrapping procedure confirmed that attitudes, descriptive norms and perceived behavior control mediated the relationship between ego-network social capital and tampon use intentions. H2a and H2b was supported, and RQ7 was answered. By contrast, path analysis showed an opposite result for RQ5. Due to its insignificance, the path between injunctive norms and tampon use intentions was deleted. As a result, the expected mediating role of injunctive was not validated.

Table 12.
Direct, Indirect and Total Effects in the Proposed Path Analysis Model Using Bootstrapping (N=5,000)

	Parameters			Standardized Coefficient (β)	S.E.	p	95% CI
Total Effects	ND	→	TUI	0.10	0.03	0.000	[0.05, 0.14]
Direct Effects	AT	→	TUI	0.17	0.04	0.000	[0.11, 0.24]
	DN	→	TUI	0.17	0.04	0.000	[0.10, 0.23]
	PBC	→	TUI	0.51	0.04	0.000	[0.44, 0.58]
	ND	→	AT	0.13	0.04	0.000	[0.07, 0.19]
	ND	→	DN	0.21	0.03	0.000	[0.16, 0.27]
	ND	→	PBC	0.07	0.04	0.039	[0.02, 0.13]
	MU	→	TUI	0.12	0.02	0.000	[0.08, 0.15]
Indirect Effects	ND	→	TUI	0.10	0.03	0.000	[0.05, 0.14]

Note. S.E.: bootstrap standard errors, p: two tailed significance, CI: confidence intervals, ND: network density, TUI: tampon use intentions, AT: attitudes, DN: descriptive norms, PBC: perceived behavior control, and MU: media use.

V. DISCUSSION AND IMPLICATIONS

The purpose of this study was to explore how social capital embedded in ego-network affected Chinese women's tampon use intentions through their attitudes, subjective norms and perceived behavior control of using tampons. Additional control variables and demographic variables were taken into consideration to examine Chinese women's intentions of tampon use. The current study also addressed the research gap by connecting network structure to the Theory of Planned Behavior (TPB). Indeed, this study is the first attempt that explains and predicts Chinese females' tampon use intentions using the TPB with ego-network structures.

Through ego-network analysis, multiple OLS regression analyses, and path analyses, this study found the following results: First, the findings from multiple OLS regression analyses empirically supported the TPB. Specifically, Chinese women's attitudes, their injunctive and descriptive norms, and perceived behavior control about using tampons were positively and significantly related to their tampon use intentions. Also, the results found that media use was an additional control variable which positively and significantly affected such tampons.

Second, ego-network social capital, or network density in this study, was positively associated with Chinese women's attitudes, injunctive norms and descriptive norms regarding tampon usage. However, the association between network density and perceived behavior control was not statistically significant. Third, structural equation modeling revealed the mediating roles of attitudes, descriptive norms and perceived behavior control in the relationship between Chinese women's personal network density and their tampon use intentions. Nonetheless, injunctive norms did not serve as a mediator between ego-network social capital and tampon use intentions.

The results of this study provide theoretical implications for health communication and health behavior research from multiple perspectives. It also sheds light on tampon promotion and public health education among Chinese women from multiple perspectives. The following sections will discuss those findings and corresponding implications in detail.

Explaining and Predicting Chinese women's Tampon Use Intentions

The findings of this study indicate that attitudes, subjective norms, and perceived behavior control can explain and predict a great amount of variance in behavioral intention. Put another way, the results corroborate the TPB, and the TPB can make an explanation and prediction in this study's context. First proposed by Ajzen (1985), the TPB has been tested repeatedly and used for decades for human behavior research in varying contexts, including health communication. In recent decades, researchers have also applied the TPB to health communication in many other countries in addition to the United States, such as China (Chan & Tsang, 2011; Niu & Willoughby, 2018). But the context of this study, namely tampon usage in China, has never been explored before. In other words, the current study extends the TPB to a more specific and new context.

In addition to the TPB variables, this study finds that media use is a strong predictor for Chinese women's tampon use intentions. As individuals spend more time in using media for tampon-related information, their propensity toward tampon usage increases. This finding corresponds with previous studies that have established a link between media use and behavioral outcomes (Moorman & Harrison, 2019; Namkoong et al., 2017). While such link can be informative for health communication practitioners promoting tampons, some scholars have proposed a

careful examination of the relationship between media use and behavioral intentions. There could be differences between impersonal contexts (e.g., climate change) and personal contexts (e.g., individual health issues), as well as among distinct types of media (Ho et al., 2014; Niu & Willoughby, 2018).

This study also examines other control variables and demographic variables that may be important in explaining and predicting behavioral intention. Although the current study does not find additional variables that predict tampon use intentions other than media use, it is necessary to include those variables related to specific contexts. As Willoughby and Myrick (2016) argued, the strength of perceived behavior control as a predictor for behavioral intention may rely on specific health contexts. Similarly, Wolff et al. (2011) proposed that the TPB requires minor additions and variations based on varying contexts. Recent studies have shown the importance of including additional variables when applying the TPB to varying contexts (e.g., Johnson-Young, 2019). This study also supports this argument.

In exploring the effects of subjective norms on tampon use intention, this study treats injunctive norms and descriptive norms as separate variables. Although this study finds that these two norms are both positively and significantly associated with tampon use intention, they may display different mechanisms when they exert influences on behavioral intention. Park and Smith (2007) explained that the differences might come from different levels of outcome expectations and social approval. Specifically, injunctive norms focus on what individuals think they should do, whereas descriptive norms show what individuals think their significant others actually do. Therefore, Lapinski and Rimal (2005) argued that social norms-related research should differentiate injunctive norms and descriptive norms. Niu and Willoughby (2018) also advised further research to investigate the two norms

separately. Following these arguments from previous literature, this study elucidates the dissimilar impacts of the two norms by examining their mediating roles. The results about mediation will be discussed later.

Impacts of Network Structure on Attitudes, Norms, Behavior Control and Intentions

This study runs a series of regression analyses with network density and hierarchy as independent variables, and the TPB constructs as dependent variables. Whereas dense networks are positively and significantly associated with attitudes, injunctive norms, and descriptive norms, the results do not reveal the association between social network structure and perceived behavior control. Closure is not able to predict more or less perceived behavior control of tampon usage among Chinese women. This finding contradicts previous research that has found a relationship between social capital and individuals' capacities to cope with given situations (Rimal & Real, 2003). For example, Walter and his colleagues (2019) found that a high level of network closure was significantly related to Latino American women's low confidence in their ability to get cervical cancer screening. Regarding socially disapproved behaviors such as Pap tests among Latinas, fear of social sanctions can be one of the causes for people within dense networks to perceive low behavior control (Walter et al., 2019).

As for this study's context (i.e., Chinese women's tampon use intentions), however, it is unknown whether using tampons is more likely to be socially approved or disapproved. On the one hand, non-sexually explicit culture resulting from Confucianism is still widespread in China, which prevents tampons from being advertised, discussed and used (Ren et al., 2018). On the other hand, Mou and her colleagues (2018) found that using tampon has been framed as a "trendy, healthy, and

independent lifestyle" (p. 11), which was valued by well-educated and relatively young middle-class Chinese women. In order to have a more clear picture of the relationship between social network compositions and perceived behavior control, it is necessary to determine whether relevant behaviors are socially approved or disapproved among groups with distinct characteristics (e.g., age, education, social class, income, etc.). A particular act that is disapproved by seniors could be approved by young people, which might be the case in terms of tampon usage. In this sense, it is necessary to determine the degrees of social approval concerning specific behaviors in social behavior research.

Regarding the effect of social network structures, the finding in this study shows the significant and positive effects of density only, not hierarchy, on the TPB constructs. However, Burt (2000) explicated that both density and hierarchy form the network closure. Since density directly represents "the strength of connection between contacts," it is often thought of as network closure. As an alternative form of closure, hierarchy stands for the extent to which one or two contacts within a network can be traced as the source of closure (Burt, 2000). Despite the inconsistent results in previous research about the relationship between hierarchy and behaviors or performance, this study included hierarchy as one of the independent variables, as Burt (2000) did. Compared with previous studies that have proved the association between hierarchy and individual performance, this study focuses on the personal networks with a smaller size (i.e., three to five contacts within a person's network) rather than community-based or organization-based networks. Based on the findings of this study, network hierarchy cannot serve as the antecedent of attitudes, injunctive norms, descriptive norms or perceived behavior control given the limited size of

networks. However, according to Burt (2000), hierarchy might have a significant association with the TPB variables with a larger network size.

Furthermore, this study adds insight into how different social network compositions are related to behavioral outcomes. With distinct compositions, social network closure and brokerage are two mechanisms that can bring social capital benefits to individuals, and influence people's beliefs, attitudes, behaviors and behavioral intentions (Thomas, 2010). Whereas closure depicts a situation in which an individual is connected by contacts who are connected to each other, brokerage describes networks in which a person is connected to unlinked contacts. From the network closure perspective, social capital is embedded in constraint networks that offer social support such as trust, cooperation, sense of fairness, and social harmony (Coleman, 1988; Limbu et al., 2018; Walter et al., 2019). In contrast, network brokerage stresses the connection established by heterogeneous information and diverse opinions (Shen et al., 2014).

The results of this study show the positive association between network closure and tampon use intentions. Researchers have suggested that social network closure can result in either positive or negative behavioral outcomes. On the positive side, Kim, Subramanian, and Kawachi (2006) argued that closure could be associated with knowledge diffusion, affective respect, and support. For instance, empirical research has found that network closure promoted the parent-child communication about drugs (Lee & Kam, 2015), and entrepreneurial intentions (Tatarko & Schmidt, 2016). This study confirms the positive relationship between network closure and behavioral outcomes found in these existing studies, because a highly connected network has the capacity to provide social support for Chinese women to try tampons, a relatively novel product. In addition, tampon usage is thought of as a taboo topic in

China. Previous research regarding gynaecological cancer has found that close and strong ties are especially important in taboo-related contexts (Solbrakke & Lorem, 2016). This argument is supported by the present study.

Mediating Roles of Attitudes, Norms and Behavior Control

This study suggests that network density does not directly result in tampon use intentions when controlling for the effects of attitudes, injunctive norms, descriptive norms and perceived behavior control. Instead, path analysis shows that network density indirectly impacts Chinese women's tampon use intentions through the mediating roles of attitudes, descriptive norms and perceived behavior control. Therefore, the final path model shows the full mediation effects of the three TPB variables. In other words, if a Chinese woman has multiple interconnected contacts with whom she discusses women's menstrual issues, she is more likely to hold positive attitudes, to perceive more descriptive norms and behavior control about tampon usage. Consequently, she is more likely to have higher intentions to use tampons.

In terms of the mediating role of attitudes, this study finds that network density is positively associated with attitudes, which in turn result in tampon use intentions. Such positive indirect effects of social capital on behavioral outcome through attitudes supports previous research in examining antidrug communication between parents and children (Lee & Kam, 2015). Similarly, Tatarko and Schmidt (2016) pointed out that resources obtained from personal networks had positive impacts on attitudes, which were positively associated with the intention to start one's own business. Tatarko and Schmidt's (2016) findings can provide one explanation for the results of this study regarding attitudes' role. Specifically, a dense network may

provide the resources needed for Chinese women to use tampons, such as relevant information and knowledge, as well as affective support and respect (Kim, Subramanian, & Kawachi, 2006). These resources result in positive attitudes toward using tampons and ultimately, the intention to use this uncommon product. Furthermore, Limbu et al. (2018) demonstrated another underlying mechanism of the indirect effects of social capital on health-related behavior. They found that social capital influenced individuals' assessment of a given behavior's benefits, which in turn had impacts on the behavior itself.

Path analysis also reveals that descriptive norms serve as a mediator between social capital and tampon use intentions, whereas injunctive norms do not. The results demonstrate the necessity to distinguish these two norms. When treating descriptive norms and injunctive norms as a whole (i.e., subjective norms or social norms), researchers have found contradictory results in terms of the mediating role of norms in the relationship between social capital and behavioral intentions (e.g., Lee & Kam, 2015; Rossem & Meekers, 2011). Walter and his colleagues (2019) addressed this limitation and demonstrated different mechanisms between injunctive norms and descriptive norms as mediators. This study substantiates Walter et al.'s (2019) finding by providing empirical evidence that descriptive norms mediate the effects of ego-network social capital on behavioral intention while injunctive norms do not.

One explanation for the insignificant mediation effects of injunctive norms could be that Chinese women do not strongly approve or disapprove tampon usage, resulting from the full range of respondents' ages. As illustrated by Mou and her colleagues (2018), young women were more likely to accept tampons than older women. Thus, there may yield different results with a narrower age range (e.g., 18-35 or over 55). Another possible explanation for the lack of evidence to support

injunctive norms' mediating role, may have something to do with the operationalization of injunctive norms. This study did not utilize specific significant others or groups (e.g., parents, partners, close friends, etc.) when assessing participants' injunctive norms. However, Shulman et al. (2017) advised that social norms research should consider levels of approval and disapproval of distinct behaviors from different significant others or groups. More valid results might be obtained if future research on social norms adopts Shulman et al.'s (2017) suggestion.

This study also finds the indirect effects of network closure on tampon use intentions through perceived behavior control. Social support embedded in a dense network instills a sense of control (Amoah et al., 2018), which can be explained by the "buffer effects of social support" (Cohen & Wills, 1985). The effects of social support are not necessarily generated by using resources, but also can be perceived when people know that resources are available even though they are not using them (Cohen & Hoberman, 1983). This "buffer effects" (e.g., providing confidence, encouraging, etc.) may play a facilitating role in the positive association of network closure and perceived behavior control. Then, when individuals conceive more behavior control about using tampons, they are more likely to use it.

Implications

Theoretical Implications

First, this study extends the Theory of Planned Behavior (TPB) to the context of Chinese women's tampon use intentions. Since Ajzen (1985) originated the TPB, it has been used in many areas of social science, including health communication, and in different cultural contexts. However, the current study is the first one that employs the TPB to explore females' intentions to use tampons in mainland China. The results

of this study strongly support the TPB, which demonstrates its usefulness in this unique context.

Second, the current study suggests the importance of making a distinction between injunctive norms and descriptive norms. According to Park and Smith (2007), injunctive norms are often associated with gaining social approval, whereas descriptive norms pertain to the expectations that things done by most others are wise to do. However, several recent studies have not distinguished them and produced mixed results (e.g., Guan et al., 2016; Niu & Willoughby, 2018). Following Park and Smith (2007), this study shows that it is necessary to examine these two norms separately, because injunctive norms and descriptive norms exert distinct effects when they function as mediators in the relationship between social capital and tampon use intentions of Chinese women. Therefore, future research should consider the differences of the two types between subjective norms and make decisions about operationalization and measurement.

Third, this study provides empirical evidence to some scholars' argument that the TPB may need minor variations and additions on the basis of specific contexts (Wolff et al., 2011). In the current study, media use for tampon-related information adds much of the variance in tampon use intentions. Previous research has revealed similar findings (e.g., Niu & Willoughby, 2018). They support Slater's (2007) reinforcing spirals framework, proposing that media use may result in behavioral outcomes.

Additionally, this study incorporates network social capital into the TPB and contributes a better understanding of social capital's role in human behavior. Moreover, this study focuses explicitly on individual-level social capital, instead of social capital at community-level or both, given two considerations. First, empirical

research has demonstrated more evidence that individual-level social capital was effective for health campaigns (Lee, 2014; Lee & Kam, 2015). Second, previous research has rarely attempted to link individual-level social capital resulting from network compositions, to the TPB. This study fills the void. Thus, the findings add meaningful insights into the theoretical discussions about individual-level social capital's impacts on behavioral outcomes. In addition to echoing prior studies in terms of personal social capital's effects on clarifying social norms and building behavior control (e.g., Kawachi et al., 2008; Viswanath & Emmons, 2006), this study finds the direct effects of ego-network social capital on predicting attitudes, and its indirect effects on behavioral intention though attitudes, descriptive norms and perceived behavioral control.

Last but not least, the findings from this study shed light on a new research direction for theory synthesis by linking network social capital to other human behavior theories, including the Integrate Model of Behavioral Prediction (Yzer, 2012), the Theory of Normative Social Behavior (Rimal & Real, 2005), the Risk Information Seeking and Processing Model (Griffin et al., 1999), and the Communication Theory of Identity (Hecht, Warren, Jung, & Krieger, 2004). These theoretical frameworks all pertain to the mechanisms of individuals' behaviors or behavioral intentions, in which social capital embedded in networks play a crucial role. Thus, it would produce informative findings if examining human behavior theories with social network analysis. For instance, the incorporation of structural hole analysis and constructs from human behavior theories can lead to a better understanding of the constructs' antecedents or outcomes.

Practical Implications

Social network approach. This study finds that network density offers social capital for Chinese women to use tampons, through the mediating roles of positive attitudes, subjective norms and perceived behavior control. The findings are in line with previous research (Limbu et al., 2018). In this sense, people who hope to promote tampons should make efforts to spark conversations surrounding tampon-related topics in constraint networks. For example, a flyer about tampons can be effective when it is posted in a pantry room of a company's department. In such a room, it is likely that people who see the flyer know and talk to each other during their break, which is expected to achieve network density. According to the findings of this study, the discussion about tampon usage among interconnected people can result in tampon use intentions. In a similar vein, tampon promotion materials will be more effective when they are distributed in an event where participants know more attendees, such as a community-based event. In a word, public health educators and health communication practitioners should make the use of network density, or adjust network structure to make it denser, which can increase trust, social harmony, and sense of fairness within networks (Limbu et al., 2018). Ultimately, the goals of health-related intervention can be achieved.

Message design. Product promotion relies on effective messages deeply (Moreno, et al., 2018). This study sheds light on message design for tampon promotion, which should give rise to more positive attitudes toward using tampons, perceptions that Chinese women actually use tampons, and perceived behavior control of using tampons. In order to cultivate positive attitudes, it may be useful to inform the audience about the outcomes of tampon usage objectively, and correct misinformation regarding using tampons (e.g., "Using tampons may break hymen."). Admittedly, it is not easy or ethical to claim that many people are using tampons

when this is not true in China. Under this circumstance, a tampon promotion message can show the increase in the number of Chinese women who use tampons in recent years. In this way, descriptive norms would be enhanced. Moreover, in order to promote perceived behavior control, it may be useful to help Chinese females address possible problems and challenges regarding using tampons.

Media use. This study suggests that media use is a strong predictor for tampon use intentions. The more time Chinese women spend on media for tampon-related information, the more likely they use tampons for their monthly menstruation. Therefore, using media will be a viable approach for public health educators and media practitioners to promote tampons in China. Generally speaking, it seems that online media platforms may be more appropriate for tampon promotion, considering China's cultural context and several regulations of traditional media and television advertising (Gao et al., 2012; Mou, Yin, & Wang, 2018). However, the survey of this study did not include the questions to specify which media could result in more tampon use intentions. Hence, professional practice and future research should address this problem.

Limitations and Suggestions for Future Research

Despite the theoretical and practical contributions, this study has limitations that should be noted for future research. To begin with, this study investigated social capital by measuring network density and network hierarchy at the individual level. Although social network scholars validated this approach (e.g., Burt 2000), it might produce more findings and implications if future studies also examine community-level social capital.

Second, the present study relied on the cross-sectional data. Thus, they could not lead to valid causal arguments. In other words, a reversed causal explanation can be also reasonable. For example, researchers have found that subjective norms may cause or be caused by human behavior (Rimal & Lapinski, 2015). Thus, future research could test bi-directional causations among the TPB variables and behavioral outcomes. In addition, longitudinal studies, instead of cross-sectional research, might be helpful for a better understanding of Chinese women's tampon usage.

Third, this study only examined general tampon-related media use, instead of investigating different effects of different media that women used to obtain tampon-related information. Some researchers have found that there were no significant differences between women who changed their health-related behavior and those wo did not regarding their belief that they received relevant information from different media resources (McIntosh & Blalock, 2005). However, other studies have suggested the different effects resulting from using varying media types (e.g., Anselmsson & Tunca, 2019). Thus, future research should ask more specific questions about media use, to explore how print media, television, video, social media and other media exert nuanced influences on tampon use intentions among Chinese females. As such, public health educators and media practitioners can have clearer implications when choosing the media types to promote tampons in China.

Forth, the proposed model of this study focused on behavior intention, not actual behavior. While findings regarding behavior intention are informative (Lee & Kam, 2015), previous research has found mixed results in terms of the relationship between behavioral intention and actual behavior (Sheeran, 2002). Future studies in this area can examine actual tampon usage as the dependent variable and suggest whether there exists gap between behavioral intention and behavior itself.

Fifth, since purposive online sampling, rather than nonprobability sampling, was adopted to collect data for the current study, the generalizability of the results could be limited. With the help of a survey firm (i.e., CreDaMo), the data were collected through the firm's online platform. The participants were those who knew how to use the Internet and owned the devices to surf the Internet. However, many Chinese women do not use the Internet. According to a survey report from China Internet Network Information Center (2019), more than two hundred million Chinse women are non-Internet users. They have less access to tampon-related information. Such online purposive sampling also led to the fact that the majority of the participants were from urban areas, but in reality, a larger proportion of the population in China were living in rural and suburban areas. In this sense, if future studies collect data based on nonprobability sampling, different findings may be generated.

Last, the findings of this study were revealed by quantitative analyses. Since tampon usage is related to cultural beliefs and social environment (Brooks-Gunn, 1982; Ren et al., 2018), the current research may neglect some contextual factors in terms of tampon use intention. To address this limitation, future research can adopt qualitative methods (e.g., in-depth interview, focus group, etc,) to demonstrate more explanations for the absence of tampons in China.

VI. CONCLUSION

This study examined whether and how ego-network social capital affected Chinese women's tampon use intention. The results demonstrate that network density has significant and positive impacts on (1) attitudes toward using tampons, (2) injunctive norms and descriptive norms of using tampons, and (3) perceived behavior control about using tampons. This study also finds that network density indirectly influences Chinese women's tampon use intention through attitudes, descriptive norms and perceived behavior control. In addition, the results reveal the role of media use in predicting intentions to use tampons among Chinese women.

The findings support the Theory of Planned Behavior (TPB) and make a contribution in linking the TPB variables to social network analysis. As the first attempt to incorporate the TPB to ego-network structure, this study provides theoretical implications for future exploration between other behavior change theories and social network analysis. Other theoretical discussion includes (1) importance of differentiating injunctive norms and descriptive norms, (2) minor variations and additions of the TPB.

Furthermore, this study also sheds light on tampon promotion by proposing practical implications for public health educators and media practitioners. In a word, dense social network, effective message design and media use will significantly facilitate tampon promotion in China. Finally, the limitations of this study and suggestions for future research were discussed. Future research should further this line of studies by considering other forms of social capital, more specific media use, using longitudinal research approach and examining actual behavior instead of behavioral intention.

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Appendix: Consent Form

MARQUETTE UNIVERSITY
AGREEMENT OF CONSENT FOR RESEARCH PARTICIPANTS
The Role of Social Capital in Tampon Use Intention Among Chinese Women: An Extension of The Theory of Planned Behavior
Yin Yang, Dr. Young Kim
Diederich College of Communication

You have been invited to participate in this research study. Before you agree to participate, it is important that you read and understand the following information. Participation is completely voluntary. Please ask questions about anything you do not understand before deciding whether or not to participate.

PURPOSE:

- The purpose of this research study is to examine how personal networks influence Chinese women's attitudes and perceptions of tampon, as well as the intentions to use tampon. For purpose of this study, a tampon is defined as a plug of soft material inserted into the vagina to absorb menstrual blood.
- You will be one of 881 participants in this research study.

PROCEDURES:

- First, you will be asked about your personal networks and the relationships within network.
- Second, you will be asked a series of questions about the factors that may influence your tampon use intention.
- Last, you will need to answer a few demographic questions.
- Your name will not be recorded.

DURATION:

- Your participation will consist of the time needed to complete the questionnaire, approximately 25 minutes.

RISK:

- The risks associated with participation in this study are no greater than you would experience in everyday life.

BENEFITS: Once you completely finish the questionnaire, you will get ¥ 10 (around 1.5 dollars in U.S. currency) into your WeChat Pay account, through a survey company called CreDaMo.

CONFIDENTIALITY: Data collected in this study will be kept confidential. When the results of the study are published, you will not be identified by name. The data will be destroyed by shredding paper documents and deleting electronic files within 3-5 years after the completion of the study. Your research records may be inspected by the Marquette University Institutional Review Board or its designees and (as allowable by law) state and federal agencies.

VOLUNTARY NATURE OF PARTICIPATION:

- Participating in this study is completely voluntary and you may withdraw from the study and stop participating at any time. If you withdraw, you will not receive the compensation.
- Your decision to participant or not will not impact your relationship with the investigators or Marquette University.
- Due to the anonymity of the survey, if you decide to withdraw it will not be viable to extract and remove a particular response from the data set.

ALTERNATVES TO PARTICIPATION:

- There are no known alternatives other than to not participate in this study.

CONTACT INFORMATION:

- If you have any questions about this research project, you can contact Yin Yang (yin.yang@marquette.edu) or Dr. Young Kim (young.kim@marquette.edu).
- If you have questions or concerns about your rights as a research participant, you can contact Marquette University's Office of Research Compliance at (414) 288-7570.

After learning about research information, I am willing to participate this study.

- Yes
- No