Aspect of identity, intention to perform three health behaviors, and implications for communication interventions.

A THESIS
SUBMITTED TO THE FACULTY OF THE GRADUATE SCHOOL
OF THE UNIVERSITY OF MINNESOTA
BY

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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
MASTER OF ARTS

Adviser: Marco Yzer

February 2011

Acknowledgements

I am heartily thankful to my advisor, Dr. Marco Yzer, whose encouragement, guidance and support from the initial to the final level enabled me to develop an understanding of the subject.

I would like to thank Dr. Brian Southwell and Dr. Charles Oberg for being my committee members and supported me during my graduate study.

Dedication

This thesis is dedicated to my parents, Xiaoming Wang and Yali Xiao. They bore me, raised me, supported me, taught me, and loved me.

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Chapter 1: Introduction

Developing an effective public health campaign is a complicated interdisciplinary project. A number of decisions are in front of message designers including, but not limited to the primary goal of the intervention, the target population, and the key intervention message. What is complicating intervention design is that many social, cultural, and economic factors contribute to the development, maintenance, and change of health behavior patterns (Smedley & Syme, 2000). That is to say no single factor or set of factors adequately accounts for why people eat as they do, smoke or do not smoke, and are active or sedentary. One solution would be putting all relevant factors into our messages as comprehensively as we could, and hope that the audience will be persuaded by our arguments and change their behaviors.

However, in reality, we can not simply do that because of two major constraints. One, for developing a public health campaign we could only have limited messages, limited media space, limited channels, etc. which make it unfeasible to put every relevant factors we can think of into the messages. Second, even if we can deliver every aspect about a target health behavior to the audience without the consideration of budgets, can people consume these messages? The answer is simply no because one only has limited mental resources to process the information that is given. The messages also will fail in the end if people stop processing information because their exhausted processing system.

Those two seemingly obvious yet important factors make our job of creating effective public health campaign such a complication of choices. Therefore, how to select the target message through which channel towards what population is the key task for message designers.

Experiences and previous literature show that theories of behavioral prediction and behavior change provide an important tool in situations like those mentioned above (Fishbein & Cappella, 2006; Fishbein & Yzer, 2003). Remember what we discussed above, it is important for the message designer to understand which aspect is the most important for the audience to make a decision or change a behavior, and to identify what information is needed to design an effective intervention strategy. We bring theories which by their nature are abstract and non content – or topic – specific into a particular context including specific topic and population. We measure and analyze the constructs of the behavior theories to find out the most salient aspects for the intervention design. By doing this, interventions to improve health behaviors can be best designed because of the understanding of relevant theories and the ability of use them skillfully (Glanz & Bishop 2010). A growing body of evidence suggests that interventions developed with an explicit theoretical foundation are more effective than those lacking a theoretical base (Ammerman et. al, 2002; Legler, 2002; Noar et al, 2007).

The Theory of Planned Behavior

The theory of planned behavior (TPB; Ajzen, 1985; 1991) is one of the most influential and well-supported social psychological theories for predicting human behavior. It has made an important contribution to the understanding of social behaviors and is a popular, effective and proven framework to map the decision-making processes prior to intention formation and behavioral enactment (see figure 1 below). TPB specifies that an individual's behavior is determined proximally by his or her intentions to engage in the action, and a person's intention is hypothesized to be a function of three other belief-based components; attitude, subjective norm, and perceived behavioral control (PBC). A person's attitude reflects his or her personal evaluation, positive or negative, regarding the target behavior. Subjective norms are an individual's beliefs that significant others expect them to engage in or avoid the behavior. PBC is a summary of an individual's beliefs that the target behavior is easy or difficult to perform and whether he or she has the personal resources to successfully engage in the behavior.

Figure 1 goes about here

Meta-analytic studies have revealed that TPB accounts for a significant amount of variance in intentions across a wide variety of social behaviors (Armitage& Conner, 2001; Conner& Armitage, 1998; Sheeran& Orbell, 1998). The TPB has been used extensively in the prediction of health behaviors, such as safer sex

behavior (e.g., Terry, Galligan, & Conway, 1993), healthy eating (e.g., Conner, Norman, & Bell, 2002), illicit drug use (e.g., Conner & McMillan, 1999), and exercise behavior (e.g., Kimiecik 1992). The TPB has also been successfully applied to health behavior communication interventions (Fishbein & Cappella, 2006).

TPB and Aspect of Self Identity

TPB help us to break down people's intentions to three basic components: attitude, subjective norm and PBC, meanwhile another question could be raised is that what will be people's intentions in the situation of conflict between attitude towards the behavior and subjective norms? To answer such question, we need to know the relative importance of the attitudinal and normative factors as determinants of intentions. Recall that according to the TPB, both attitudes and subjective norms are function of beliefs. Generally speaking, attitudes beliefs are a person who believes that performing a given behavior will lead to mostly positive outcomes will hold a favorable attitude toward performing the behavior, while a person who believes that performing the behavior will lead to mostly negative outcomes will hold an unfavorable attitude. Subjective norms are beliefs of a different kind, namely the person's beliefs that specific individuals or groups think he should or should not perform the behavior. In other words, attitude is in the nature of the personal while subjective norm is reflecting social influence.

Back to the question we asked before, the relative weights of the attitudinal and normative factors may vary from one person to another. This current study

proposed that self-identity scales is one moderator that distinguished people who have relative higher weights on attitudes and people who have relative higher weights on subjective norms.

Within both the sociological and psychological literature, a person's self-identity has been viewed as an important influence on behavior (e.g., Epstein 1973; Markus 1980; Rosenberg, 1981; Turner 1982). Self-identity has been theorized in these previous researches as the salient part of an actor's self that relates to a particular behavior (e.g., "I think myself as a healthy eater."). It can be thought of as the extent to which performing the behavior is an important component of the person's self-concept (Smith et al, 2007). In other words, self-identity has been constructed according to specific attribute dimensions and to different behaviors (e.g. I consider myself a typical smoker/an environmental friendly person/big fan of classical music, etc.).

However, rather than specifying the content of people's self-concepts along a large number of specific attribute dimensions, there is another way of looking at identity: the location of identity characteristics—whether it reflects an aspect of the person or is an aspect of the environment—has implications for personality and behavior (e.g. Leary, Wheeler & Jenkins 1986). Simply stated, location refers to whether a characteristic is said to be a part of the person (internal location) or a part of the external environment (Sampson, 1978). For example, some people may define their identity primarily in terms of their occupational role which is felt to be an aspect

of their external environment. Others may regard their likes and tastes as identity characteristics and see these as aspects of their person.

Cheek and Briggs (1982) took this definition of aspect of identity and further suggested that the characteristics that constitute people's identities might be dichotomized into personal and social elements: people's self-presentations tend to be either associated with their social roles ("social identity; e.g., being company employee) or their more personal conceptions of self ("personal identity"; e.g., pursuing a career). Although all individuals' identities include both personal and social elements, people differ in the relative importance they place on these components, which will have influence on their behaviors (Cheek, 1982; Sampson, 1978). These representations are relatively stable, trait-like self-descriptions that describe self-related individual differences in beliefs and goals (Hagger, Anderson, Kyriakaki, & Darkings, 2007; Leary, Wheeler, & Jenkins, 1986).

In this study, we take the conceptual definition of self-identity as the aspect of identity stated above. In this sense, self-identity is defined as dimensions of individual differences in tendencies to show consistent patterns of thoughts, feelings, and actions.

There are several advantages of taking this aspect of self-identity into the TPB model. Firstly, it has broader implications to variety of behaviors since the definition of identity is not constructed according to specific attributes or behaviors. Second, recent research seeking to augment the TPB to form a more comprehensive model for intentional behaviors have focused on the role of trait-like, dispositional constructs such as personality because applying the findings may be very helpful in intervention

efforts (Rhodes et al, 2005). For example, being able to identify individuals who are normatively influenced will help to narrow down the focus of intervention messages on normative aspects. This study aimed to look at a potential moderator of the TPB - self-identity – to see how it will fit into the TPB model.

To be clearer, self-identity in this study comprises a number of "self – images" that lie on a continuum, with personalized self-schemata at one extreme and self-characteristics related to social categories at the others. Thus the self-identity perceptions may affect intentional behavior by serving as a source of information when people making plans to act and they would be expected to have a pervasive influence on intentions and behavior in a number of domains (Hagger & Chatzisarantis, in press; Hagger, Anderson, Kyriakak, & Darkings, 2007). While personal and social self-identities can be regarded as two separate dimensions, people may differ in the relative salience they assign to each type of identity (Cheek & Briggs, 1982). In other words, when people engage with a decision making process, the sense of "who am I", that is self-identity will be the references of perceiving the consequences of a given behavior: for people who are relatively high in personal identity, their decision making process might involve more thinking of "I", that is my feelings, benefits, opinions, etc. are more important elements to consider when making a decision. Relatively, for people who are relative high in social identity, their decision making process will have more cognitive thoughts about "others".

Hypotheses

In this study, we expect that generalized self-related constructs would affect behavior via attitude of intentions in the TPB. It would be expected that people with higher levels of personal identity are more likely to be influenced by their own attitudes in the decision making process for a given behavior. In contrast, those who tend to be oriented towards social aspects of identity will be more likely to rate subjective norm higher when forming behavior intentions. Therefore, this paper hypothesized that personal identity will moderate the relationship between attitudes and behavior intentions, respectively; social identity will moderate the relationship between subjective norms and behavior intentions. More specifically, for people who have higher ratings for personal identity, they will weight attitude more than people who have lower ratings for personal identity; respectively, for people who have higher ratings for social identity, they will rate subjective norm higher than people who are lower in social identity.

TPB & Multiple behaviors

In the early literature, Ajzen (1991, p. 188) stated that: "The relative importance of attitude, subjective norm, and perceived behavioral control in the prediction of intention is expected to vary across behaviors and situations". Traditionally, health behavior theories have been applied in studies to a single behavior at a time, advancing our understanding of that particular behavior but providing little guidance on the process of multiple behavior change (Noar, Chabot &

Zimmerman, 2007; Noar & Zimmerman, 2005). Only a few empirical studies did test the predict power of each construct in the context of multiple behaviors within the same subjects (Garcia & Mann, 2003; Mullen et al, 1987; Warshaw & Davis, 1985).

Since the strength of predictive power of each construct (attitude, subjective norms, and PBC) is highly related to the nature of the health related behavior, we should expect more robust support for the role that self-identity play in the TPB model in a multiple behavior context. In other words, we expect the moderating effect between attitude and personal identity would be stronger in an attitude-dominated behavior, respectively, the interaction between subjective norm and social identity would be stronger in a subjective norm-dominated behavior. Last, we would expect the least interaction effect for a PBC-dominated behavior.

Three behaviors were chosen for this study: receiving a flu-shot, having a conversation with a new partner about HIV/AIDS, and diet. Those three behaviors are considered as common, well-known health related behaviors to college students. Moreover, each of them has some attributes that could be considered as one factor-dominated (attitude, subjective norms or PBC) behavior given the context of TPB model. That is receiving a flu-shot is a attitude-dominated behavior, having a conversation with a new partner about HIV/AIDS is a social norm-dominated behavior, and dieting is a PBC dominated behavior.

Chapter 2: Method

Participants and Procedure

Undergraduate students of the University of Minnesota were recruited to participate in the survey. In return they received extra course credits. All participants were asked to come to the research lab, after signed up, they were asked to complete the survey on a computer. The survey took them about 20 minutes to finish.

The sample consisted of 124 students of whom 86 (69%) were female and 38 (31%) were male. Mean age was 20.12 years (SD=1.48 years, range = 18 to 27 years). Ethnically the sample group consisted out of 80% Caucasians, 12% Asian Americans, 3% African Americans, and 5% were from other ethnic or racial groups.

Measurements

Aspects of identity. The personal (9 items) and social (7 items) identity scales from Cheek's (1989) *Aspects of Identity Questionnaire* (AIQ) were used to measure the dispositional aspects of identity constructs. Participants were asked to respond to a series of statements relating to *personal aspects of identity*: My personal values and moral standards; My dreams and imagination, My emotions and feelings; My thoughts and ideas; The ways I deal with my fears and anxieties; Knowing that I continue to be essentially the same inside even though life involves many external changes; my self-knowledge, My ideas about what kind of person I really am; My personal self-evaluation, the private opinion I have of myself (1= not important to my sense of who I am, 5= extremely important to my sense of who I am); Cronbach's alpha was .71.

Social aspects of identity contains statements of such as, My popularity with other people; The ways in which other people react to what I say and do; My physical appearance: my height, my weight, and the shape of my body; My reputation, what others think; My attractiveness to other people; My gestures and mannerisms, the impression I make on others; My social behavior, such as the way I act when meeting people (1= not important to my sense of who I am, 5=extremely important to my sense of who I am); Cronbach's alpha was .85. Correlation between personal identity and social identity is .15.

TPB measures for all three behaviors were based on standard wording recommended for measuring components of the TPB (Ajzen, 2002, revised 2006).

Receive the flu-shot in the next flu season.

Intention to receive the flu-shot was assessed as the mean of three items, each measured on 7-point bipolar scales ("I intend to receive the flu-shot in the next flu-season," *extremely unlikely – extremely likely*; "I will try to receive the flu-shot in the next flu season," *definitely false – definitely true*; "I plan to receive the flu-shot in the next flu season," *strongly disagree – strongly agree*. Cronbach's alpha was .97.

Attitudes towards receiving the flu-shot were assessed as the mean of seven semantic differential scales ("For me to receive the flu-shot in the next flu season is…" *harmful – beneficial, unpleasant – pleasant, bad – good, worthless – valuable, un-enjoyable – enjoyable*). Cronbach's alpha was .86.

Subjective norms were assessed as the mean of seven semantic differential scales ("Most people who are important to me think that I *should not* – I *should* receive the flu

shot in the next flu season"; "It is expected for me that I receive the flu shot in the next flu season," *extremely likely – extremely unlikely*; "The people in my life whose opinions I value would *disapprove – approve* of me receiving the flu shot in the next flu season"; "Most people who are important to me receive the flu shot," *completely false – completely true*; "The people in my life whose opinions I value *do not receive – receive* the flu shot", "Many people like me receive the flu shot," *extremely unlikely – extremely likely*). Cronbach's alpha was .87.

PBC was assessed the mean of two 7-point unipolar (1 to 7) items ("For me to receive the flu shot in the next flu season would be …" *impossible – possible*; "If I wanted to I could receive the flu shot in the next flu season" *definitely false – definitely true*). The correlation between the two is .77.

Conversation with a new partner about HIV/AIDS and STDs

Participates were given the following instruction: "imagine you are in a new relationship, and you are concerned about HIV/AIDS and STDs. Think about having a conversation with you partner". *Intention* to talk about HIV/AIDS and STD with new partner was assessed as the mean of three items, each measured on 7-point bipolar scales ("I intend to talk about HIV/AIDS and STD with my new partner," *extremely unlikely – extremely likely*; "I will try to talk about HIV/AIDS and STD with my new partner," *definitely false – definitely true*; "I plan to talk about HIV/AIDS and STD with my new partner," *strongly disagree – strongly agree*. Cronbach's alpha was .92.

Attitudes towards a conversation about HIV/AIDS and STD with a new partner were assessed as the mean of seven semantic differential scales ("For me to talk about

HIV/AIDS and STD with my new partner is…" *harmful – beneficial, unpleasant – pleasant, bad – good, worthless – valuable, unenjoyable – enjoyable*). Cronbach's alpha was .77.

Subjective norms were assessed as the mean of seven semantic differential scales ("Most people who are important to me think that I s*hould not* – I s*hould* talk about HIV/AIDS and STD with my new partner"; "It is expected for me that I talk about HIV/AIDS and STD with my new partner," *extremely likely – extremely unlikely*; "The people in my life whose opinions I value would *disapprove – approve* of me talking about HIV/AIDS and STD with my new partner"; "Most people who are important to me talk about HIV/AIDS and STD," *completely false – completely true*; "The people in my life whose opinions I value *do not* talk – talk about HIV/AIDS and STD", "Many people like me talk about HIV/AIDS and STD with their new partners," *extremely unlikely – extremely likely*). Cronbach's alpha was .86.

PBC was assessed the mean of two 7-point unipolar (1 to 7) items ("For me to talk about HIV/AIDS and STD with my new partner would be…" *impossible – possible*; "If I wanted to I could talk about HIV/AIDS and STD with my new partner" *definitely false – definitely true*). The correlation between the two is .80.

Diet

Intention to watch diet (did u mean to go on a diet or check my diet or monitor my dirt?) in the forthcoming month was assessed as the mean of three items, each measured on 7-point bipolar scales ("I intend to watch my diet in the forthcoming month," *extremely unlikely – extremely likely*; "I will try to watch my diet in the forthcoming

month," *definitely false – definitely true*; "I plan to watch my diet in the forthcoming month," *strongly disagree – strongly agree*. Cronbach's alpha was .95.

Attitudes towards watch diet in the forthcoming month were assessed as the mean of seven semantic differential scales ("For me to watch my diet in the forthcoming month …" *harmful – beneficial, unpleasant – pleasant, bad – good, worthless – valuable, unenjoyable – enjoyable*). Cronbach's alpha was .82.

Subjective norms were assessed as the mean of seven semantic differential scales ("Most people who are important to me think that I *should not* – I *should* watch my diet in the forthcoming month"; "It is expected for me that I watch my diet in the forthcoming month," *extremely likely – extremely unlikely*; "The people in my life whose opinions I value would *disapprove – approve* of me watching my diet in the forthcoming month"; "Most people who are important to me watch their diet," *completely false – completely true*; "The people in my life whose opinions I value *do not watch – watch* their diet", "Many people like me watch their diet," *extremely unlikely – extremely likely*). Cronbach's alpha was .77.

PBC was assessed the mean of two 7-point unipolar (1 to 7) items ("For me to watch my diet in the forthcoming month would be …" *impossible – possible*; "If I wanted to I could watch my diet in the forthcoming month" *definitely false – definitely true*). The correlation between the two was .71.

Chapter 3: Result

Table 1 reports the inter-correlations, means, and standard deviations for the different measures of three behaviors in the TPB. In general, levels of attitudes, subjective norm, PBC, and intentions were relatively high, ranging from 4.39 to 6.25 on 7-point scale. For all three behaviors, intentions were strongly associated with attitudes, subjective norm, and PBC. The correlation between personal identity and social identity was .15, indicating that these are two fairly distinct dimensions of identity. It is noteworthy that the SD of Personal identity and Social identity were lower than attitudes, subjective norm, PBC and intentions.

Table 1 goes about here

Main effects

Hierarchical multiple regressions were performed. At step 1, personal identity and social identity were entered. The constructs representing the standard TPB model (i.e., attitude, subjective norms, PBC) were entered at Step 2, respectively. The interactions between personal identity/social identity and the three constructs of TPB were entered last. All variables were mean-centered before computing interaction terms in order to minimize problems of multicollinearity (Aiken & West, 1991).

Table 2, 3 and 4 report the linear regression results for predicting 3 behavior intentions. The results of the first steps of the analysis for each behavior show that just

self-identity can not account for significant variance in predicting intentions. TPB constructs were entered at step 2, and in general the TPB accounted for 71% (69% adjusted) of the variance in intentions of receiving the flu-shot in the next flu season, 63% (62% adjusted) for having conversations with a new partner about HIV/AIDS and STD, and 62% (61% adjusted) for watching the diet in the forthcoming month. As shown in step 2 of Table 2, 3 and 4, both our main effect hypothesis that attitude ($B = .86$, $p<.001$) contributes most significantly for predicting the intention of receiving a flu shot before the next flu season, and subjective norm ($B = .58$, $p<.001$) has the greatest influence on intention of having a conversation with a new partner about HIV/AIDS and STD were confirmed. However, the hypothesis for the main effect on dieting was not supported by the data, instead of PBC ($B = .18$, $p=.05$), attitude ($B = .71$, $p<.001$) had the most significant influence for diet.

The TPB and aspects of identity.

As the step 3 of Table 2, 3, and 4 show, the only significant interaction between attitude and personal identity is for predicting the intention of having conversations with new partner about HIV/AIDS and STDs ($B_{PI\&Att} = .47$, $t = 2.52$, $p < .05$). Surprisingly, we also found there is a significant interaction between PBC and personal identity for predicting the intention of having conversation ($B_{PI\&PBC} = -.52$, $t = -2.54$, $p < .01$).

For receiving a flu shot, both interactions (attitude and PI, PBC and PI) are in the same directions but only with marginally significant level. There is no significant interactions between PI and diet in TPB.

None of the SI (social identity) and TPB interactions is significant among three behaviors.

Table 2 goes about here

Table 3 goes about here

Table 4 goes about here

Chapter 4: General Discussion

Discussion

The primary goal of this study was to examine the link between aspect of identity and the TPB model in a multi-behavior context from a somewhat different perspective than adopted in previous research. Rather than studying how specific aspects of individuals' self-concept related to identity-relevant behavior, this study focused on the behavioral implications of having one's identity formed primarily of personal versus social elements. Following this logic, self-identity becomes an abstract and more stable trait-like self-description than the term is usually used. Two people with very different self-concepts towards one behavior (e.g., one considers him/her self as a typical vaccination receiver, the other one considers him/her self as a typical non-vaccination receiver) might actually share the same aspects of identities are based primarily upon either personal or social attributes. Therefore, this sharing similarity provide us evidences to argue that they may view personal and social aspects of life similarly, be motivated by similar (personal or social) incentives, emphasize similar factors when making decisions, and so on (Leary, Wheeler, & Jenkins, 1986).

This study provided some support for the processes by which aspects of identity influence intentions. Our results illustrated that aspects of identity, particularly personal identity, affected intentions in the health related behaviors here indirectly through the proximal predictors of intention.

Although remarkably different operationalizations of self-identity have been used in all the previous researches that has examined self-identity in the context of the TPB. A significant number of studies have found that self-identity explains variance intention after controlling for attitude, subjective norms, and PBC (e.g., Astrom & Rice, 2001; Walsh & White, 2007). Thus, many researchers have concluded that the TPB can be extended to include self-identity as an additional determinant of intention (e.g., Hamilton & White, 2008; Rice et al., 2005; Sparks & Guthrie, 1998). Unfortunately, as van den Putte and the colleagues in their most recent work (2009) pointed out, few arguments for self-identity as a fourth TPB determinant variable are presented that convincingly build on theoretical ideas on the concept of self-identity. Increasing evidence suggests that self-identity is important, but the exact role of self-identity has not been conclusively explicated. This present study provided empirical evidence to explore the role of self-identity in the TPB: self-identity serving as a source of information when people making plans to act and thus have indirect influences on intentions in the TPB.

Significant effects of personal identity (PI) on attitudes were found in the conversation about HIV/AIDS and STDs context, and marginally significant in receiving a flu shot context. The results are in line with the theory and our hypothesizes, which argue that people draw from their personal evaluation of their self when making decisions to act. Surprisingly, the interactions between personal identity and the PBC were found significant in conversations context, and marginally significant in receiving a flu-shot. Both interaction terms between PI and the PBC in two behaviors are negative which make this puzzle interesting.

It is expected that the interaction term between PI and attitude is positive because people with higher level of PI tend to make decisions more upon their own attitudes rather than subjective norms nor PBC in the TPB model (see figure 2). As PI moderates the relationship between attitude and intention, the messages that are emphasized on attitudes change might not be effective any more for people with low PI even if the behavior itself is attitude-dominated in nature or previous literature.

However, how can we explain the negative interaction between PI and PBC (see figure 3)? The results suggest that for people with higher level of PI, whether they feel more or less controlling of a given behavior will not influence their decision making process. However, for people with lower level of PI, their intentions of perform a given behavior will be stronger with an increase in PBC. That means, for low PI people the level of PBC become more salient in the decision making process. However, since PBC in general was found has less effect than attitude and subjective norm on predicting intentions in this study and previous research (e.g., see the recent review by Armitage & Conner, 2001), understanding the implication of this negative interaction between PI and PBC need further research.

Social identity was found has no effect on subjective norms across the three behavioral intentions which was also unexpected. We expected the people who are high in social identity would weight subjective norms more important in their decision making process, especially for subjective norms-dominated behavior – conversation with a new partner about HIV/AIDS and STDs in the current study.

However, the data failed to provide evidence to support this conjecture. There are several factors that might lead to inadequate power in moderated regression analysis of SI and subjective norms in this study. Like most of the previous standard practice for the TPB research (Ajzen & Fishbein, 1980; von Haeften, Fishbein, Kasprzyk & Montano, 2001), this study also used observational data in survey. Typically, an observational study is conducted that measures all theoretical constructs, and once data gathering has been completed, the data are used to explore theoretical issues (Yzer, 2007). However, by using observational data we sacrifice a significant amount of statistical power relative to an experimental design (McClelland & Judd, 1993). As Yzer (2007) suggested that several factors can reduce statistical power for interactions tests. The first concerns the theoretical expectations of the scope of the interactions between social identity and subjective norms: it is more reasonable to expect the interaction where within the range of possible values the simple slopes have the same sign. It is hypothesized that subjective norm can have a strong positive effect on intention if social identity rating is high, and an attenuated effect if social identity is low. Thus same sign interactions are more difficult to demonstrate than opposite sign interactions. In this study, because we theorize same sign slopes and, hence, relatively small social identity interactions effects, difficulty of detecting interactions should not come as a surprise.

A second, and arguably more important threat to statistical power of interaction tests in moderated regression analysis, concerns the distribution of the predictor and moderator variables (McClelland & Judd, 1993; Yzer, 2007). In effect, interaction variance is maximal when all observations jointly lie at the extreme points of the

predictor and moderator scales (i.e., low-low, low-high, high-low, or high-high; McClelland & Judd, 1993; Yzer 2007). The current data in this study (see figure 4, 5 and 6), however, suggested that there are only a few observations on relatively high and low social identity rating. In the other words, most of the observations were around the mean of the social identity scores that contributes the difficulty to demonstrate the interaction effects. Large samples will be needed to have enough statistical power to demonstrate the interaction effects could be one of the suggestions for future research.

Even if we were able to collect more samples for this study, the non-significant interactions between subjective norms and social identity can still probably occur because of the nature of the questions being asked of the subjects. The social-identity scales inquire whether social aspects are important; the subjective norms questionnaire inquires whether people who are important to the subjects would prove/value their decisions to a given behavior. It is highly possible that our subjects considered general social pressure and the perceived social pressure from people who are important to them are different. Therefore, the level of social-identity would not effect on their weight of subjective norms in a decision making process. In other words, subjects in our sample did not use social aspect of identity as sources when being asked about perceived social pressure from their important others simply because the pressure from their important others are not the same as general social pressure.

Another interesting finding in our study is that the general low score on social identity comparing to personal identity. As described early, samples are college undergraduate students in a mid-west university in the United States, who are likely to be

a bias sample in terms of aspect of identity. Across many subfields in psychology and sociology, one of the most widely used frameworks for characterizing and examining cultural differences pertains to how individuals define themselves and their relationship with others, in particular the groups or collectives to which they belong (Brewer & Chen, 2007). Previous research showed that in most western cultures, such as the United States, the core of self-definition is based on individual autonomy and separation from others. In contrast, in Eastern cultures, such as People's Republic of China, the self-concept is defined primarily based on social embeddedness and interdependence with others comprising their group (e.g., Chen, Mannix, & Okimura, 2003; Gardner, 1999; Morris, 1994). Our study showed the evidence for this interesting culture phenomena and opened doors for future research on the role of self-identity in the TPB across different cultures.

The reported results have a number of practical implications in health communications. The TPB is able to successfully predict the intentions of health related behaviors, and it can help identify the critical determinants of a given intention (or behavior) for interventions. However, appropriate application of the TPB and the major characteristics of the target audience are the crucial concerns for interventions design. The results of this study suggest that self-identity could be an important moderator in the TPB model. For example, a message focus on attitude change might not be effective for people who are at low level of personal-identity even if the attitude seems to be the most salient predictor for a given intention or behavior. For people who are at high level of personal-identity, our results suggest that PBC is not so important in their decision making process. In other words, increasing the level of PBC might not be enough to

persuade the audience to perform the given behaviors if they are at high level of personal identity. Those aspects of identity are pre-formed and they are more stable and consistent, and self-identity does serve as an important source for decision-making. Thus this specific personal difference might need special attention for designing an intervention.

Limitations and Conclusion

The present research provides strong empirical evidence to support that TPB's predictive power in multiple behavior intentions, and explored the effect of aspects of identity on the TPB variables. A number of limitations of this study restrict the confirmations of some hypothesizes and the generalizability of the current findings.

First, the sample studied was self-selecting in that respondents were students who had agreed to attend a health behavior related survey study. This may have resulted in a sample with an overall higher degree of interests in health related issues, and thus this might haven been expected to simply weaken the observed relationships. In additional, the sample overrepresented women (86% are women). Previous research has found that women place greater value on their health and are more likely to engage in health-protective behaviors compared with man (e.g., Liang, Shediac-Rizkallah, Celentano, & Rohde, 1999). In all, relatively homogenous sample causes low variances in the ratings of aspects of identity could be one reason that no significant interactions were found for SI and subjective norms as well as robust interaction results for PI on flu-shot behavior. Also, such a relatively homogenous group may not generalize well the wider population. Further replication of this TPB model in the general population is warranted.

Moreover, in order to get higher variance of ratings on aspects of identity, sampling from people with a culture background that has collectivism elements in it is strongly recommended.

Finally, these behaviors represent only a small sub-set of health behaviors and generally people already formed relatively strong attitudes towards these behaviors.

Future research should replicate this model in other behavioral contexts to arrive at converging evidence for the effects of identity considerations on intentional behavior.

Past reviews and meta-analysis (e.g.; Ajzen, 1991; Armitage & Conner, 2001; Sheppard, Hartwick & Warshaw, 1988; Sutton, 1998) showed that TPB accounted for average between 40% and 50% of the variance in intention. In the current study, TPB successfully explained on average more than 60% of the variance in intentions of all the three health related behaviors. This study proved that TPB can account for a large effect size in predicting health related behaviors by using multi-item measures. Although multi-item measures considerably increase questionnaire length, with associated respondent burden and financial costs (van den Putte et al, 2009), future studies should still consider using multi-item measures to increase the validity of the parameter estimates.

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Table 1

Descriptive statistics: means, standard deviations and correlations

Behavior		M(SD)	ATT	SN	PBC	BI	PI	SI
Flushot	ATT	4.77(1.36)	-	.64**	.49**	.79**	.17	-.01
	SN	4.96(1.27)			.41**	.71**	.11	-.02
	PBC	6.25(1.24)				.50**	-.03	-.22*
	BI	4.39(2.22)					.11	-.02
	PI	4.19(.60)						.15
	SI	3.44(.76)						
Conversations About HIV/ AIDS and STD	ATT	5.18(.98)		.59**	.62**	.66**	-.03	-.02
	SN	5.28(1.05)			.54**	.72**	.15	-.00
	PBC	6.21(1.10)				.63**	.06	-.14
	BI	5.57(1.44)					.19*	-.06
	PI	4.19(.60)						.15
	SI	3.44(.76)						
Dieting	ATT	4.90(1.08)		.57**	.58**	.71**	.26**	.19*
	SN	5.81(1.09)			.38**	.67**	.10	.13
	PBC	4.08(1.10)				.52**	.05	.11
	BI	5.06(1.70)					.04	.23*
	PI	4.19(.60)						.15
	SI	3.44(.76)						

Note: * p<.05; ** p<.01 (two tailed). ATT = attitude, SN = subjective norm, PBC = perceived behavior control, BI = behavior intention, PI = personal identity, and SI = social identity.

Table 2

Standard Multiple Regression Predicting Behavioral Intentions

		Flushot				
		R^2	$R^2\Delta$	F_{change}	t	B
Step 1	Constant	.01		.82	21.92	4.40***
	Personal Identity				1.27	.43
	Social Identity				-.37	-.10
Step 2	Constant	.71	.70	93.03	39.71	4.40***
	Personal Identity				-.32	-.06
	Social Identity				.34	.05
	Attitude				7.55	.86***
	Subjective norm				5.00	.57***
	PBC				1.90	.20
Step 3	Constant	.73	.02	1.21	37.15	4.32***
	Personal Identity				-.65	-.13
	Social Identity				.34	.05
	Attitude				7.74	.93***
	Subjective norm				5.00	.58***
	PBC				2.40	.29*
	Attitude*Personal Identity				1.37	.32
	Subjective norm * Personal Identity				-1.11	-.24
	PBC * Personal Identity				-1.06	-.24
	Attitude*Social Identity				.34	.05
	Subjective norm * Social Identity				-.52	-.08
	PBC * Social Identity				-1.40	-.20

Note: * p<.05; ** p<.01, ***p<.001

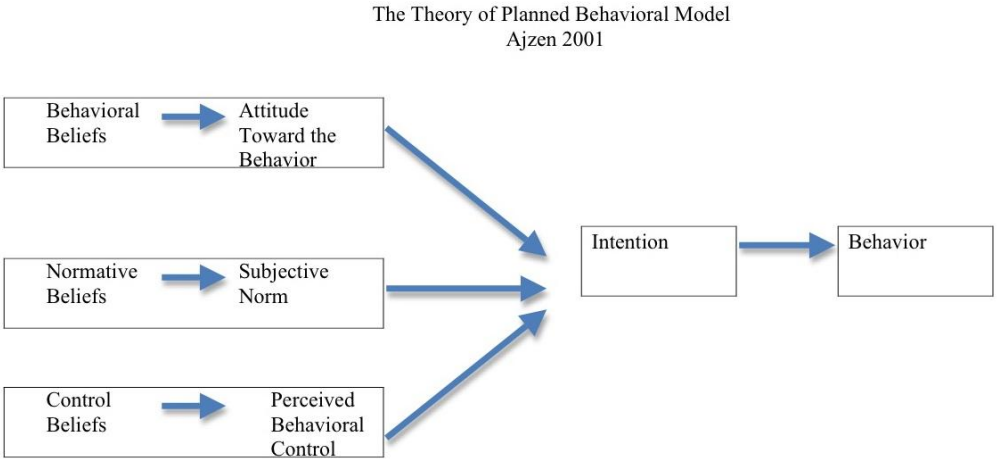
Table 3
Standard Multiple Regression Predicting Behavioral Intentions

		Conversations about HIV/AIDS & STDs				
		R^2	$R^2\Delta$	F_{change}	t	B
Step 1	Constant	.05		2.83	43.56	5.57***
	Personal Identity				2.28	.49*
	Social Identity				-1.01	-.17
Step 2	Constant	.65	.61	67.91	71.03	5.57***
	Personal Identity				2.30	.31*
	Social Identity				-.79	-.08
	Attitude				3.77	.42***
	Subjective norm				5.85	.58***
	PBC				2.80	.27**
Step 3	Constant	.68	.03	1.94	70.40	5.60***
	Personal Identity				2.09	.31*
	Social Identity				-1.09	-.12
	Attitude				2.85	.33**
	Subjective norm				6.02	.63***
	PBC				3.18	.32**
	Attitude*Personal Identity				2.52	.47*
	Subjective norm * Personal Identity				-.70	-.11
	PBC * Personal Identity				-2.54	-.52*
	Attitude*Social Identity				-.56	-.10
	Subjective norm * Social Identity				1.30	.20
	PBC * Social Identity				-.39	-.05

Table 4
Standard Multiple Regression Predicting Behavioral Intentions

		Diet				
		R^2	$R^2\Delta$	F_{change}	t	B
Step 1	Constant	.05		3.28	33.71	5.07***
	Personal Identity				.10	.03
	Social Identity				2.5	.50*
Step 2	Constant	.64	.59	65.15	54.25	5.07***
	Personal Identity				-2.21	-.36*
	Social Identity				1.76	.22
	Attitude				5.67	.71***
	Subjective norm				5.37	.56***
	PBC				1.70	.18
Step 3	Constant	.66	.01	.74	51.47	5.09***
	Personal Identity				-2.13	-.36*
	Social Identity				1.63	.21
	Attitude				5.25	.69***
	Subjective norm				5.22	.57***
	PBC				1.79	.20
	Attitude*Personal Identity				-.17	-.04
	Subjective norm * Personal Identity				.27	.05
	PBC * Personal Identity				-.68	-.13
	Attitude*Social Identity				-.33	-.05
	Subjective norm * Social Identity				-1.39	-.18
	PBC * Social Identity				1.10	.17

Figure 1


The Theory of Planned Behavioral Model
Ajzen 2001
Behavioral Beliefs
Attitude Toward the Behavior
Normative Beliefs
Subjective Norm
Control Beliefs
Perceived Behavioral Control
Intention
Behavior

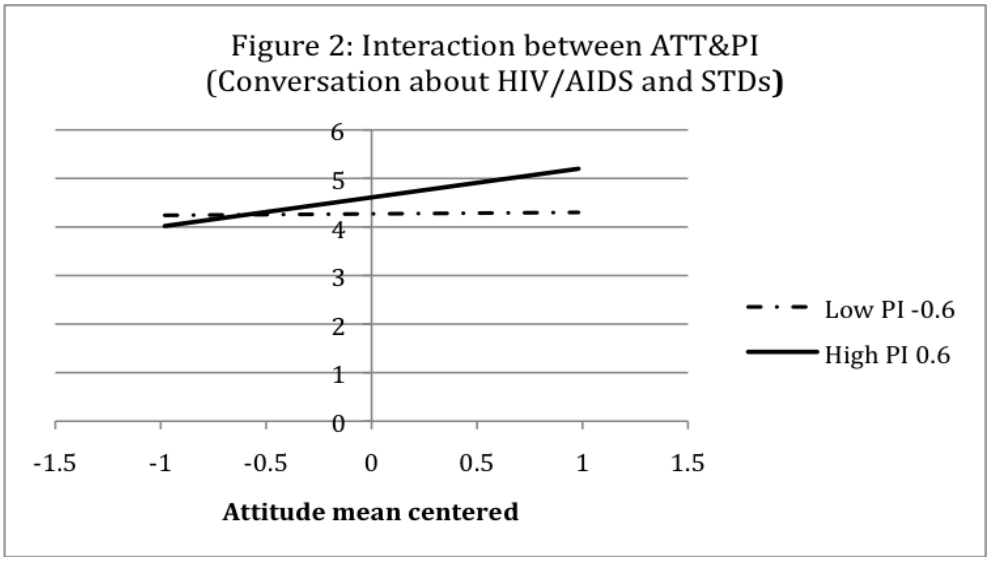


Figure 2: Interaction between ATT&PI
(Conversation about HIV/AIDS and STDs)
6
5
4
3
2
1
0
-1.5
-1
-0.5
0
0.5
1
1.5
Attitude mean centered
Low PI -0.6
High PI 0.6

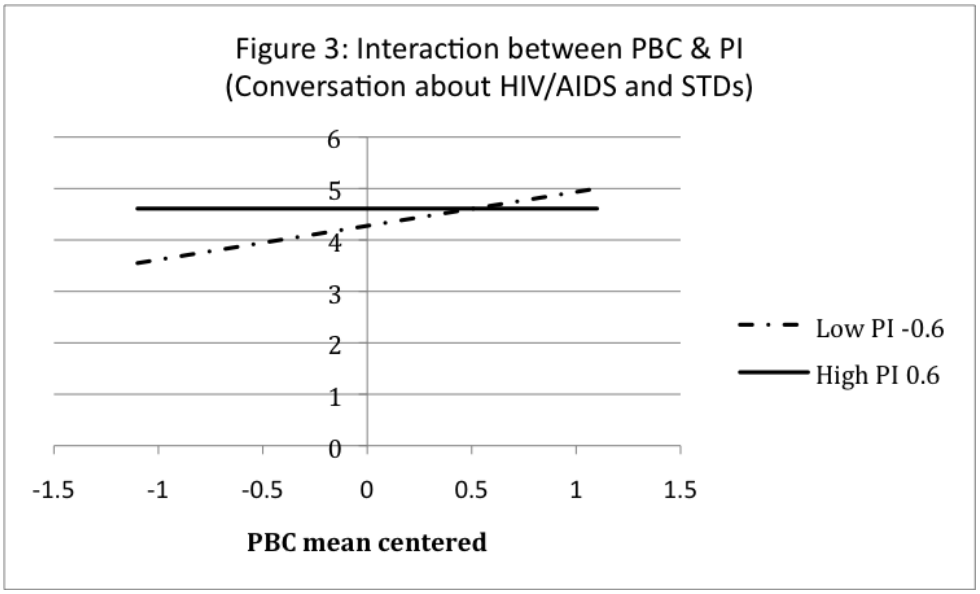


Figure 3: Interaction between PBC & PI
(Conversation about HIV/AIDS and STDs)
6
5
4
3
2
1
0
-1.5
-1
-0.5
0
0.5
1
1.5
PBC mean centered
Low PI -0.6
High PI 0.6

Figure 4: Scatter Plot for Flu shot (SI & Subjective norm)

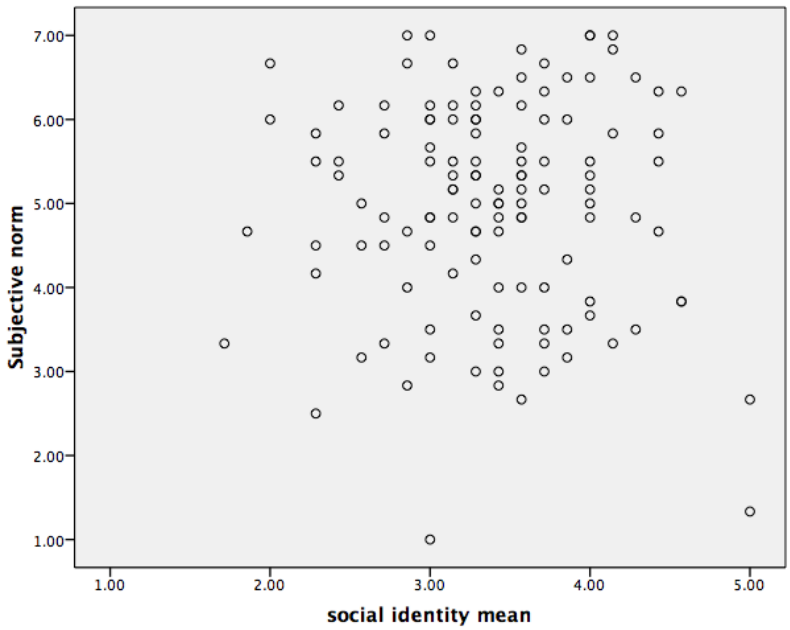


Figure 5: Scatter Plot for Conversation about HIV/AIDS and STDs (SI & Subjective norm)

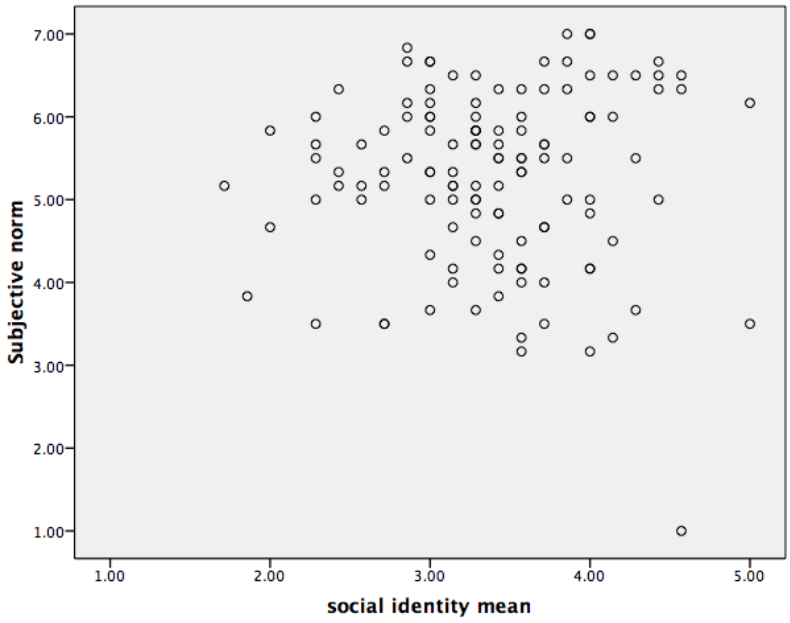


Figure 6: Scatter Plot for Dieting (SI & Subjective norm)