

The Role of Planning and Self-Efficacy in Condom Use Among Men Who Have Sex With Men: An Application of the Health Action Process Approach Model

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Objective: In Hong Kong, men who have sex with men (MSM) remain a high risk group for HIV infection. This study applied the Health Action Process Approach (HAPA) to study the motivational and behavioral patterns of local MSM in condom use. **Design:** Four hundred ten sexually active MSM completed the questionnaire on site at Time 1; 217 who remained sexually active were interviewed during a 1-month follow-up. **Main Outcome Measures:** Risk perception, outcome expectancy, action self-efficacy, intention, planning, maintenance self-efficacy, and recovery self-efficacy were measured at Time 1. Actual condom use was measured at both time points. **Results:** The HAPA model had a good fit to the data ($\chi^2 = 300.71$, $df = 111$, $p < .001$, CFI = .95, NNFI = .93, RMSEA = .065). Time 2 condom use was predicted by Time 1 planning, maintenance self-efficacy, and intention, which, in turn, was predicted by action self-efficacy, outcome expectancy, and risk perception. Planning mediated the association between intention and actual condom use. No group difference between MSM partners of different sex roles was found. **Conclusion:** It is demonstrated that the HAPA model could be applied to understand safer sex behavior among Chinese MSM. Its principles can help develop HIV prevention programs targeting safer sex practices by MSM.

Keywords: Health Action Process Approach (HAPA), condom use, men who have sex with men (MSM)

As a group, men who have sex with men (MSM) is the most at-risk population for HIV infection in Hong Kong. According to the Centre for Health Protection (2009), the prevalence of HIV infection among MSM (4.05%) is 40 times higher than that of the general population (less than 0.1%). Having multiple sexual partners and using the Internet for sexual networking are factors that contribute to the higher infection rate among MSM (Lau, Kim, Lau, & Tsui, 2003; Lau, Siah, & Tsui, 2002). Moreover, engaging in unprotected anal intercourse (UAI) is identified as the major reason behind the higher rates of HIV among MSM (Virtual AIDS Office of Hong Kong, 2009). In a local survey study of 85 MSM participants, two thirds (67%) were inconsistent condom users and only 44.1% reported using condoms for their last anal sex encounter (Lau, Siah, & Tsui, 2002). A recent Internet survey study of 13,882 MSM over 17 countries of East and Southeast Asia showed that 41% of them reported having UAI with either a regular or casual partner in the past 6 months (Koe, 2010).

Increasing condom use is key in helping to protect MSM from HIV infection. Several behavioral change models have been found to produce meaningful results in the area of HIV prevention. In their review article, Albarracín, Durantini, and Earl (2006) reported that among the behavioral change theories, the Theory of Planned Behavior (Ajzen & Fishbein, 2005), self-efficacy models (Bandura, 1994), and the Information-Motivation-Behavioral-Skills (IMB) model (Fisher & Fisher, 1992) were generally supported in the HIV intervention literature. In addition to the motivational antecedents emphasized by these models (e.g., attitudes, social norms, and self-efficacy), behavioral scripts of strategies were demonstrated to help yield successful behaviors (e.g., Cornman et al., 2007; Fisher, Misovich, Kimble, Fisher, & Malloy, 1996; Knauz et al., 2007). Such findings pointed to the importance of behavioral preparation after intention formation for successful implementation of the behavioral change. Under this light, the current study attempted to apply the Health Action Process Approach (HAPA; Schwarzer, 1992, 2008)—a theoretical framework that explicitly addresses postintentional factors, such as planning and volitional self-efficacies, but has never been tested on safer sex behavior—in the study of the motivational and behavioral factors that may be related to condom use among Hong Kong MSM.

HAPA Model of Behavioral Change

The HAPA model shares the basic concepts of most intention-formation models and extends them by including an additional postintentional phase in which intentions are translated into actions. By dividing the behavioral change process into two phases (preintentional phase and postintentional phase), HAPA also in-

Accepted under the editorial term of Robert M. Kaplan.

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This study was supported by the Special Project Fund (SPF) under the AIDS Trust Fund (ATF) for HIV Prevention in MSM (ATF SPF 071). The authors would like to express their heartfelt thanks to Prof. Ralf Schwarzer and Prof. Charles Abraham for their valuable input to the research design, and AIDS Concern, Connie Ho, Terence Tam, and Johnny Lau for their support and assistance in data collection.

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corporates the basic idea of stage models (i.e., Transtheoretical Model; Prochaska & Velicer, 1997) and may therefore be considered an integration of current social-cognitive health behavior models (Renner, Spivak, Kwon, & Schwarzer, 2007).

As a theoretical framework that explicitly examines both the motivational (preintentional) and the volitional (postintentional) phases of behavior change, HAPA tries to explain the mechanisms that operate after people have the intention to change their behaviors and before they finally establish a new health habit. In the preintentional motivation phase, risk perception, outcome expectancy, and action self-efficacy are viewed as antecedents for intention formation. *Risk perception* addresses the perceived vulnerability for certain diseases such as, in the present study, HIV infection. It may set the stage for a contemplation process and further elaboration of thoughts about consequences of unprotected anal sex and one's competence to overcome them. *Outcome expectancy* is considered influential primarily in the motivation phase, when a person balances the pros and cons of using a condom. Finally, perceived *action self-efficacy*, or the belief in one's capability to successfully using a condom, is conceptualized as another determinant of intention formation.

After a person develops an inclination toward using condoms, the intention has to be transformed into detailed instructions on how to perform the desired action. *Action planning* captures such preparation processes. It includes specific situation parameters (when and where) and a sequence of action (how). Such planning helps implementation of condom use because behaviors can be elicited "automatically" when the relevant situational cues are encountered, and individuals remember their intentions better when they plan them out in detail (for an overview and meta-analysis, see Gollwitzer & Sheeran, 2006). Another way of planning is the anticipation of barriers and the generation of alternative behaviors to overcome them, which is termed *coping planning*. After individuals contemplate the when, where, and how of an action, they imagine possible barriers and generate coping strategies. In the complete model, planning is assumed to act as the mediator between the intention and actual behavior.

During the volitional phase, different self-efficacy beliefs are also required to master the behavioral tasks successfully. *Maintenance self-efficacy* (also called *coping self-efficacy*) represents optimistic beliefs about one's capability to deal with barriers that arise during the maintenance period. Using a condom with a partner might turn out to be much more difficult to adhere to than expected, but a self-efficacious person may invest more effort and persist longer than those who are less self-efficacious. *Recovery self-efficacy* addresses the experience of failure, lapses, and setbacks. Self-efficacious individuals are optimistic to get back to condom use after disruption. In the complete model, volitional self-efficacies are hypothesized to facilitate the planning procedures, which then predict behavior.

As a generic health behavior change model, the HAPA model explains many health behaviors well, including physical exercise adherence after cardiac rehabilitation (Scholz, Sniehotta, & Schwarzer, 2005; Sniehotta, Scholz, & Schwarzer, 2005), breast self-examination (Luszczynska & Schwarzer, 2003), seat belt use of adolescent car passengers (Schwarzer et al., 2007), dietary behaviors (Gutierrez-Dona, Lippke, Renner, Kwon, & Schwarzer, 2009; Renner & Schwarzer, 2005; Schwarzer & Luszczynska, 2008; Schwarzer & Renner, 2000), dental flossing (Schuz,

Sniehotta, Mallach, Wiedemann, & Schwarzer, 2009), and physical activity (Lippke, Ziegelmann, & Schwarzer, 2005). Despite its wide application in health behavior research, the HAPA model has never been empirically tested on safer sex behavior. One study (Abraham et al., 1999), using discriminant analysis, demonstrated the usefulness of variables such as planning and action-specific self-efficacy in distinguishing intenders who did or did not use a condom. The current study therefore attempted to apply the HAPA model to condom use behavior among Chinese MSM and to examine the value of volitional factors in predicting actual condom use behavior.

As in the general HAPA model, we propose that risk perception, outcome expectancy, and action self-efficacy would predict condom use intention, and that planning and phase-specific self-efficacies would facilitate the postintentional process of behavior change, resulting in successful condom use. To demonstrate that the intentional and volitional factors help realize behavior change but are not consequences of the behavior, we adopted a longitudinal design with two time points (similar to the design of Schwarzer & Luszczynska's [2008] study) and measured the facilitating variables at Time 1 and actual behaviors at Time 2. The HAPA model was tested using the two-time data, which is an advantage over past studies using only concurrent data. Behaviors at Time 1 were also measured and used as a cross-validation of the model. The application of the model to MSM with different sex roles (e.g., being the insertive/receptive/versatile partner during sex) was also tested using multigroup structural equation modeling (SEM) to reveal any group difference in the mechanism of the association between the variables.

Method

Participants

A total of 410 MSM were recruited by peer recruiters at different gay venues in Hong Kong at Time 1. To be eligible, the participant needed to be 16 years old or above and had at least one anal intercourse in the past 3 months. The demographic information of the participants is presented in Table 1. The average age of the sample was 28.49 years ($SD = 8.19$). The majority (86.3%) labeled themselves as homosexual, and about 11% self-identified as bisexual. They were about evenly divided into three groups in terms of sexual roles (in regard to sexual behaviors with a specific partner or type of partner), with 29.8% self-labeled as insertive, 32.4% receptive, and 35.4% versatile. Of this sample, 48.3% of the participants reported a negative HIV status, 47.1% were uncertain about their HIV status, and two participants reported a positive HIV status. One month later, the same participants were reached again by phone for a brief interview about their sexual behavior during the past month (average length = 35.5 days, $SD = 7.2$). Among the 276 (67.3%) participants successfully reached, 217 (78.6%) were sexually active during the past 30 days. Attrition analyses showed no significant differences in demographic variables and sexual behavioral measures between those retained in the sample and those who could not be reached or those were not sexually active at Time 2.

Procedure

MSM peer recruiters who were well-adjusted members of the local gay community and who were familiar with the culture of local gay entertainment venues were hired to recruit participants for the present study. This is a common practice in MSM research in order to more easily establish rapport with the participants. A briefing on the study and training on how to approach and interview participants at different venues were provided before the peer recruiters started to work independently.

MSM participants were approached at various local gay venues by the MSM peer recruiters and were invited to participate by completing a questionnaire on site. The questionnaire was approved by The Chinese University of Hong Kong's Survey and Behavioral Research Ethics Committee. Informed consent was obtained from all participants. The Time 1 questionnaire measured all cognitive and sexual behavioral variables and took about 45 minutes to complete. Participants received an incentive of HK\$100 (about US\$12) for their participation. The same participants were contacted again 1 month later; at this time, they were interviewed shortly over the phone (the call took about 10 minutes) and were mailed another incentive of HK\$50 (about US\$ 6) afterward.

Measures

Because of the complexity of sexual relationships and behaviors, people can have multiple partners and have different practices with different partners. To make the information collected meaningful, participants were asked to answer the questions according to situations pertaining to a specific partner or a type of partner, which should be the same for both time points.

Demographic information. Information about the participant's age, educational level, past sexual experience, role preference (i.e., being insertive, receptive, or versatile partner during sex), and relationship type (e.g., long-term or casual relationship) was collected.

Risk perception. Adopted from Schwarzer's (2008) generic HAPA model measures, risk perception consisted of three components: *perceived severity* (i.e., How serious do you think HIV infection is?), *absolute risk perception for the self* (i.e., How likely is it that you will have HIV sometime in your life if you don't use a condom during anal sex?), and *relative vulnerability* (i.e., Compared to an average person of MSM of your lifestyle, your chance of getting HIV is. . .?). All answers were based on 7-point Likert scale ranging from (1) *not at all severe* to (7) *very severe* for perceived severity, and (1) *much below average* to (7) *much above average* for absolute risk perception for the self and relative vulnerability. However, this measure resulted in a very low internal consistency in the present study (Cronbach's alpha = .22). The underlying reason maybe that people's perception of absolute risk (risk for self) was very different and uncorrelated ($r = .18$ in the present study) to relative risk (self compared to others) or perceptions of severity of the condition ($r = .06$ in the present study). Eventually, the item measuring absolute risk (risk for self) was used as the indicator of risk perception.

Outcome expectancy. The measures of Cost and Benefits for Condom Use in White, Terry, and Hogg's (1994) study was adopted here to measure the perceived balance of the pros and cons of condom use. Given that the original scale was used on heterosexual college students, a pilot test was conducted to make sure

that this measure was suitable for the present study. It was found to be pertinent to the present sample. Irrelevant items (e.g., pregnancy related) were deleted, and one item on reducing trust was added. The final scale consisted of nine items (see Table 3) tapping a range of different consequences that could occur if people use condoms with their partner. The items were rated on a 6-point Likert scale, from (1) *extremely unlikely* to (6) *extremely likely*. The total score was the mean of the items after recoding the reversely phrased ones, so a higher score indicated a more positive attitude toward condom use. The internal consistency for this measure in the present study was .79.

Action self-efficacy. Brien, Thombs, Mahoney, and Wall-nau's (1994) four-dimensional measure of the Condom Use Self-Efficacy Scale (CUSES) was adopted here to measure the confidence in carrying out condom use in general. The measure consists of 17 items (after deleting some items that are similar in meaning and adding new items such as the self-efficacy to use condom under negative mood after pilot testing) measuring mechanics (putting a condom on self or other), partner disapproval (use of a condom without a partner's approval), assertiveness (ability to persuade a partner to use a condom), and intoxicants (ability to use condoms while under substance influence or negative mood). These items are shown in Table 4. Answers were based on 6-point Likert scale ranging from (1) *strongly disagree* to (6) *strongly agree*. The total score was the mean of the items after the reversely phrased items were recoded. A higher score indicated stronger self-efficacy to use a condom. The internal consistency for this whole measure in the present study was .91.

Intention. Intention was measured by two items: "During the past 3 months, did you have the thought that you wanted to use a condom when you have anal sex?" and "In the coming month, do you have the intention to use a condom when you have anal sex?" All responses were rated on a 6-point Likert scale ranging from (1) *not at all* to (6) *very much*. The correlation between the two items was .80 in the present study. The first item was used in the model for Time 1 only data, and the second item was used in the model for both Time 1 and Time 2 data.

Action planning. Adapted from the original HAPA model (Schwarzer, 2008), action planning included three items measuring the plan of when, where, and how to carry out the behavioral goal. The participants were asked whether they, during the past three months, had concrete plans for when and how they would carry condoms and suggest using it to their partners, and where they would use condoms (e.g., at home, at parties, and at bars). Answers were based on a 4-point Likert scale ranging from (1) *no plan at all* to (4) *very concrete plan*. The total score was the mean of the items. The internal consistency for this measure in the present study was .89.

Coping planning. The measure of coping planning was based on the extent of planning for possible situations that can dissuade or prevent a person from using a condom. It was the anticipation of barriers and generating of strategies to overcome them. Twelve possible barrier situations were summarized from the most mentioned situations in the literature that would cause failure in condom use and from people's suggestions during the pilot test. The participants were asked to judge whether a situation appeared to be a barrier for them (*Yes/No*), and if it was endorsed as a barrier, how detailed their plans were for that situation on a 4-point Likert scale ranging from (1) *no plan at all* to (4) *very detailed plans*. Sample

items are “Do you have a concrete plan on sticking to condom use when your partner wouldn’t use a condom?” and “Do you have a concrete plan on sticking to condom use when there is no condom at hand?” The total score was the average of scores for situations perceived as potential barriers. The internal consistency for this measure in the present study was .95.

Maintenance self-efficacy. Maintenance self-efficacy refers to the confidence of the participant in dealing with difficult situations arising during the planning, initiation, or maintenance phases. It was measured by asking the participants to rate their confidence in sticking to condom use when faced with each of the barrier situations endorsed in the coping planning section. Sample items are “How confident are you in sticking to condom use when your partner doesn’t want to use a condom?” and “How confident are you in sticking to condom use when there is no condom at hand?” Answers were rated on a 4-point Likert scale ranging from (1) *not at all confident* to (4) *very much confident*. The total score was the mean of the items. The internal consistency for this measure in the present study was .92.

Recovery self-efficacy. Recovery self-efficacy refers to one’s confidence in being able to resume condom use after a lapse. It was measured by three items: “Suppose you somehow have had a lapse in condom use. How certain are you that you can resume condom use even if you have had unprotected anal intercourse (UAI) for only one time/several times already/quite a lot of times?” Answers were rated on a 4-point Likert scale ranging from (1) *not at all certain* to (4) *very certain*. The total score was the mean of the items. The internal consistency for this measure in the present study was .88.

Condom use. Condom use was measured at both Time 1 and Time 2. The number of anal sex encounters with condom use and the total number of anal sex encounters was measured. Specifically, the behavioral outcome was calculated as the ratio of anal sex with a condom to the total number of anal sex encounters during the time interval.

Social desirability. Given the sensitivity of the studied subject, social desirability was measured and used to inspect whether data collected on the behavioral measures was strongly associated with the participants’ level of social desirability. The five-item Socially Desirable Response Set Survey (SDRS-5; Hays, Hayashi, & Stewart, 1989) was used in the current study. SDRS-5 assesses the tendency to describe oneself in favorable terms. Adoption of extreme responses indicates problematic social desirability in answering the questionnaire.

Results

Risk perception, outcome expectancy, action self-efficacy, intention, maintenance self-efficacy, planning, and recovery self-efficacy were measured at Time 1, and sexual behaviors were measured both at Time 1 and Time 2. Overall, the current sample was relatively young and well educated, with a monthly income (HK\$16,000) well above the Hong Kong median (HK\$10,000; Census and Statistics Department, 2007). Most of the participants (60.4%) were in a stable, long-term relationship. The remaining participants were either in a casual or noncommitted relationship, with an average of 3 ($SD = 2.84$) sexual partners and an average length of relationship being 7 ($SD = 9.50$) months. The average total number of anal sex encounters was 6.9 ($SD = 7.2$) times at Time 1 (during the past 3 months), and 3.1 ($SD = 3.5$) times at Time 2 (during the past 1 month). The demographic information of the participants can be found in Table 1.

Correlations Among HAPA Variables and Condom Use

The result of correlation analysis is presented in Table 2. Correlations among the variables showed that intention in the future was positively related to action self-efficacy, outcome expectancy, and risk perception ($r_s = .26$ to $.37$, $p_s < .01$). Action planning

Table 1
Demographic Data of the Full Sample ($n = 410$) and the Retained Sample ($n = 217$)

Measure	Full sample in Time 1 ($n = 410$)		Retained sample in Time 2 ($n = 217$)		Group difference t -value/ chi-square (df)
	Mean	SD	Mean	SD	
Age	28.49	8.19	28.17	8.50	.46
Monthly income (in Hong Kong dollars)	19,300	13,250	18,600	13,150	.63
Number of sex partners in the past 3 months	2.39	3.92	2.28	2.28	.38
Number of anal sex during the past 3 and past 1 month(s)	6.9	7.2	3.1	3.5	—
Education (%)					1.02 (4)
Below high school	7.3	—	10.6	—	
High school graduate	28.6	—	28.1	—	
Some college	25.1	—	24.0	—	
College graduate	30.6	—	31.3	—	
Graduate school and above	8.3	—	6.0	—	
Relationship type (%)					.91 (3)
Committed stable partner	61.2	—	60.4	—	
Uncommitted stable partner	10.0	—	6.9	—	
Casual partner	21.0	—	24.9	—	
Short-term partner	7.8	—	7.8	—	
Sex role					
Insertive partner	122		80		
Receptive partner	133		92		
Versatile	146		96		

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

Table 2
Intercorrelations Between Predictor and Criterion Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Action self-efficacy	—	.55**	.31**	.41**	.37**	.34**	.37**	.34**	.38**	.39**	.30**	.10	.12*
2. Outcome expectancy		—	.31**	.40**	.35**	.32**	.37**	.29**	.37**	.26**	.33**	.16*	.09
3. Risk perception			—	.25**	.26**	.15**	.31**	.21**	.24**	.13**	.16**	.01	.09
4. Intention in the past				—	.80**	.45**	.40**	.41**	.31**	.22**	.48**	.37**	.01
5. Intention in the future					—	.44**	.33**	.38**	.25**	.20**	.45**	.37**	-.02
6. Action planning						—	.51**	.75**	.22**	.16**	.39**	.30**	.06
7. Coping planning							—	.82**	.59**	.18**	.25**	.22*	.03
8. Planning								—	.39**	.29**	.32**	.28**	.12*
9. Maintenance self-efficacy									—	.31**	.12	.10	.12*
10. Recovery self-efficacy										—	.11*	.03	.09
11. Time 1 condom use											—	.44*	-.05
12. Time 2 condom use												—	-.04
13. Social desirability													—
Mean	4.78	4.01	5.06	4.63	4.61	2.76	2.49	2.71	2.69	2.85	.78	.82	4.10
SD	.80	.81	1.55	1.54	1.57	.96	.94	.84	.83	.89	.40	.37	.46

* $p < .05$. ** $p < .01$.

($r = .44$) and coping planning ($r = .33$) were positively associated with future intention and also positively correlated with Time 2 condom use ($r = .30$ and $r = .22$, $ps < .01$). Social desirability was not significantly related to most of the independent variables except for action self-efficacy ($r = .12$) and maintenance self-efficacy ($r = .12$; $ps < .05$). Given the small magnitude of the correlations, it is considered that social desirability was not a confounder on the modeled variables.

Factor Analyses of the Constructs

Given the high correlation ($r = .51$) between action planning and coping planning, the items were collapsed into a single factor indicating planning process of the individual. Subsequent factor analysis on action planning and coping planning items showed that the one-factor structure could account for 60.2% of the total variance, and the factor loadings ranged from .67 to .83. Factor analyses were also conducted to obtain more nuanced information regarding the factor structure of the multifaceted constructs of outcome expectancy and action self-efficacy. For action self-efficacy, three factors with eigenvalues greater than unity were obtained using

principal component extraction with oblique rotation. Factor 1, accounting for 43.7% of the variance, was labeled *generic and situational self-efficacy of condom use*. Factor 2, accounting for 11.3% of the variance, was labeled *partner-oriented uncertainties over condom use*. Factor 3, accounting 6.9% of the variance, was labeled *condom use negotiation and behavioral skills*. For outcome expectancy, two factors were obtained using the same method. Factor 1, accounting for 40.4% of the variance, was labeled *perceived costs of condom use*. Factor 2, accounting for 19.9% of the variance, was labeled *perceived benefits of condom use*. Tables 3 and 4 show the factor loadings and internal reliabilities. Maintenance self-efficacy was treated as a single construct, as factor analysis showed that a single-factor structure could account for 52.9% of the total variance, and the factor loadings ranged from .64 to .80. The resulted factor structures were later used in the SEM model testing.

Fit of HAPA on MSM Condom Use Behaviors

Structural equation modeling with latent variables and with maximum likelihood estimation (see Arbuckle, 2003) was employed to examine the longitudinal associations between HAPA

Table 3
Pattern Matrix of the Factor Structure on Outcome Expectancy Using Principal-Component Analysis With Oblimin Rotation

Items	Factor 1 Perceived costs of condom use (Cronbach's $\alpha = .86$)	Factor 2 Perceived benefits of condom use (Cronbach's $\alpha = .63$)
How likely do you think condom use can . . .		
1. protect both of you against HIV?	-.070	.823
2. show your concern for his well-being?	.053	.859
3. get him offended?*	.637	-.228
4. provide variety in your sex life?	.042	.591
5. reduce sexual pleasure?*	.778	-.042
6. interrupt foreplay?*	.764	.033
7. reduce the intimacy of sex?*	.855	.057
8. destroy the spontaneity of sex?*	.841	.055
9. reduce trust between you and your partner?*	.692	.228

Note. Primary factor loadings are shown in bold.
* Reversely phrased items have been recoded.

Table 4
 Pattern Matrix of the Factor Structure of Action Self-Efficacy Using Principal-Component Analysis With Oblimin Rotation

Items	Factor 1	Factor 2	Factor 3
1. I feel confident in my ability to put a condom on myself or my partner.	.255	.088	.627
2. I feel confident in my ability to discuss condom usage with any partner I might have.	.518	.041	.441
3. I feel confident in my ability to suggest using condoms with a new partner.	.393	.163	.471
4. I feel confident I could suggest using a condom without my partner feeling "diseased."	.135	.308	.550
5. If I were to suggest using a condom to a partner, I would feel afraid that he would reject me.*	-.131	.798	.041
6. If I were unsure of my partner's feelings about using condoms, I would not suggest using one.*	.057	.719	-.170
7. I feel confident in my ability to insist on using a condom even when I'm in a low mood.	.655	-.008	.127
8. I feel confident I could gracefully remove and dispose a condom after we have an intercourse.	-.111	-.111	.726
9. I feel confident in my ability to insist on using a condom even when I feel lonely.	.508	.128	.285
10. I would not feel confident suggesting using condoms with a new partner because I would be afraid he would think I have a sexually transmitted disease.*	.029	.830	.118
11. I would not feel confident suggesting using condoms with a new partner because I would be afraid he would think I thought he has a sexually transmitted disease.*	.051	.879	-.015
12. I feel confident I could stop to put a condom on myself or my partner even in the heat of passion.	.769	.103	.019
13. I feel confident in my ability to put a condom on myself or my partner quickly.	.779	-.066	.057
14. I feel confident that I could use a condom successfully.	.757	.047	-.061
15. I feel confident that I would remember to use a condom even after I have been drinking.	.763	.001	-.134
16. I feel confident that I would remember to use a condom even if I were high.	.917	-.027	-.079
17. I feel confident in my ability to insist on using a condom even when I want intimacy with my partner.	.812	-.037	.024

Note. Primary factor loadings are shown in bold. Factor 1 = Generic and situational self-efficacy of condom use (Cronbach's $\alpha = .92$); Factor 2 = Partner-oriented uncertainties over condom use (Cronbach's $\alpha = .60$); Factor 3 = Condom use negotiation and behavioral skills (Cronbach's $\alpha = .68$). * Reversely phrased items have been recoded.

variables. AMOS 7.0 was used. Action self-efficacy was indicated by the three factors obtained in the exploratory factor analysis. The two factors of outcome expectancy were put into the model as observed variables. Recovery self-efficacy was indicated by the aforementioned three items as a latent factor. Planning and maintenance self-efficacy were treated as a single construct based on previous factor analysis results, with their items parceled into three indicators according to their loading to the latent factor.

In the hypothesized model (see Figure 1), action self-efficacy, risk perception and factors of outcome expectancy were specified as predictors of intention. Intention and maintenance self-efficacy were specified as predictors of planning. Recovery self-efficacy and planning were specified as predictors of behavior. Action self-efficacy and outcome expectancy factors were allowed to correlate given the strong and positive correlations ($r = .55$)

between the constructs. With condom use behaviors measured at Time 2 (recall of the behaviors in the past 1 month), the measurement model had a good fit with the data, $\chi^2 = 192.74$, $df = 88$, $p < .001$, CFI = .97, NNFI = .95, RMSEA = .054, 90% CI [.044, .064].

As for the structural model, with condom use behaviors measured at Time 2 (recall of the behaviors in the past 1 month), the hypothesized model fit the data well, $\chi^2 = 300.71$, $df = 111$, $p < .001$, CFI = .95, NNFI = .93, RMSEA = .065, 90% CI [.056, .073]. The parameter estimates (with standardized solution) were displayed in Figure 1. As hypothesized, action self-efficacy, both factors of outcome expectancy, and risk perception positively predicted intention to use a condom. Among them, action self-efficacy and the second factor of outcome expectancy (perceived benefits of condom use) appeared to have the strongest influence

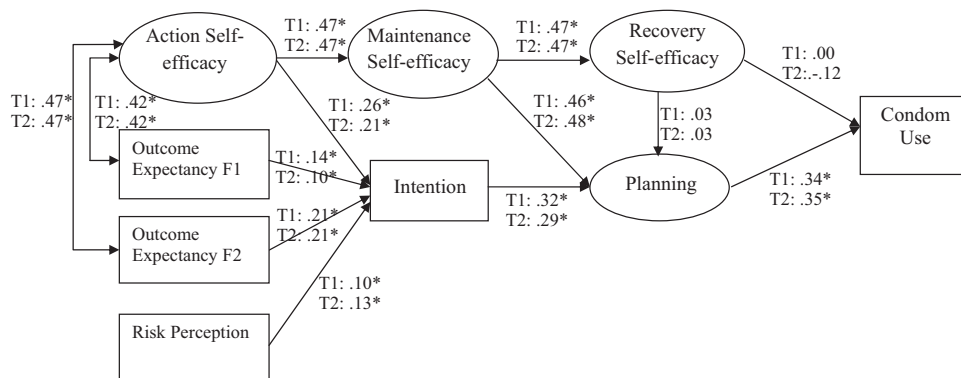


Figure 1. Structural equation model for condom use among MSM. Factor loadings and measurement errors are omitted for clarity. T1 = model with Time 1 condom use outcome and intention in the past; T2 = model with Time 2 condom use outcome and intention in the future; Outcome Expectancy F1 = perceived costs of condom use; Outcome Expectancy F2 = perceived benefits of condom use. * $p < .05$.

on intention ($\beta = .21$). These predictors together could explain 17.7% of the variance of intention. Action self-efficacy was positively associated with maintenance self-efficacy ($\beta = .47$), and intention could positively predict planning ($\beta = .29$). Maintenance self-efficacy had a positive influence on planning ($\beta = .48$), which then positively predicted condom use ($\beta = .35$). Maintenance self-efficacy was strongly and positively associated with recovery self-efficacy ($\beta = .47$). The indirect effects of intention and maintenance self-efficacy on condom use were both significant, with a standardized indirect effect coefficient of .12 for both intention and maintenance self-efficacy ($ps < .05$). However, no significant relationship between recovery self-efficacy with planning was found ($\beta = .03$). Condom use was negatively associated with recovery self-efficacy ($\beta = -.12$), but this association was not significant. The total variance explained for the condom use was 11.6%.

We used the data of condom use measured at Time 1 (recall of the condom use behavior in the past 3 months) as a cross-validation of the model. The model fit was similar to that of the model with Time 2 behavioral measures, $\chi^2 = 202.12$, $df = 88$, $p < .001$, CFI = .97, NNFI = .95, RMSEA = .056, 90% CI [.046, .067], for the measurement model, and $\chi^2 = 370.27$, $df = 111$, $p < .001$, CFI = .93, NNFI = .91, RMSEA = .076, 90% CI [.067, .084] for the structural model. The parameter estimates were also presented in Figure 1. The nonsignificant relationship between recovery self-efficacy and condom use became almost nonexistent ($\beta = .00$).

To further test potential difference in the relationships between variables for MSM of different sex roles (i.e., insertive, receptive, and versatile), multisample SEM was conducted. The Time 1 sample was first split into three groups according to sex role, and then the three groups of data were fit to the hypothetical model at the same time, leaving all the paths to be freely estimated. The overall model fit was acceptable, $\chi^2 = 401.66$, $df = 264$, $p < .001$, CFI = .96, NNFI = .94, RMSEA = .036, 90% CI [.029, .043], for the measurement model, and $\chi^2 = 626.596$, $df = 333$, $p < .001$, CFI = .92, NNFI = .89, RMSEA = .047, 90% CI [.041 - .053] for the structural model. The fit of the overall model indicated that the three groups of data might fit to the hypothesized model in a similar pattern. To test whether there was any statistical difference among the factor loadings and path coefficients between groups, the factor loadings and path coefficient were constrained to be the same across the three groups, and the chi-square change before and after the constraint was posed were calculated to see if there was significant change in the overall model fit. The model fit after the constraints were added was $\chi^2 = 676.96$, $df = 373$, $p < .001$, CFI = .92, NNFI = .90, RMSEA = .045, 90% CI [.040 - .051], $\Delta\chi^2 = 50.36$, $\Delta df = 40$, $p > .05$. Using this method, the result showed that all the factor loadings and path coefficients were not significantly different across groups, which means that the variables were similarly related to each other across the three groups.

Discussion

Previous research has demonstrated that the HAPA model is valid for various health behaviors. The goal of the present study was to examine whether the HAPA model could also be applied successfully to safer sex behavior, specifically condom use among MSM in Hong Kong. In general, the overall model fit the data

well, replicating and extending the model previously established in other health behavior studies (e.g., Schwarzer et al., 2007). This may suggest that the HAPA model reflects a pattern of relationships that is potentially universal among health behaviors and may serve as a template for understanding condom use among MSM, which has not been studied using HAPA to date. As its first application in a Chinese sample, these results also implied that such mechanisms apply well across cultures. Further replications in cross-cultural studies, and with other health behaviors, are needed to substantiate the present results.

Extending the traditional view that intentions are the best predictors of behavior (Fishbein & Ajzen, 1975), the present results demonstrate that for condom use behavior, in accordance with previous studies, postintentional constructs seem to be appropriate to allow for a more direct prediction of behavior. Planning appeared to be the best direct predictor of condom use under the positive influence of maintenance self-efficacy. This is practically meaningful because individuals who intend to use condoms may face many unforeseen barriers, such as shortage of condoms or unwillingness of a partner. Having contemplated contingency plans for difficult scenarios is likely to help the individuals carrying out the intended behavior, or might at least make them more confident and less easily to give up when faced with barriers. Maintenance self-efficacy emphasizes the confidence in dealing with difficulties met when planning for and executing an action. High confidence in the postintentional preparations of condom use facilitates better planning and motivates people to try harder to come up with more strategies when one strategy fails.

The present study also showed the relative importance of pre- and postintentional factors. Although all preintentional factors were significantly related to condom use intention, action self-efficacy and perceived benefits of condom use played the most important role in making up one's mind. This underscored the importance of enhancing individuals' general condom use self-efficacy and emphasizing the benefits of condom use in HIV prevention campaigns. Results suggested that to successfully persuade individuals to use condoms, presenting and emphasizing the positive outcomes of safer sex may be more effective than dispelling the negative beliefs toward condom use. Nonetheless, such contemplation awaits verification from empirical studies. Risk perception was also found to be less important in determining one's intention to take action. This is consistent with previous findings about the effectiveness of fear appeal approaches alone in raising people's target health behavior (e.g., Witte & Allen, 2000). However, there may be one methodological limitation about the risk perception measure used in the present study, as it was reduced to a single-item measure due to low internal reliability. Our finding suggested that people's perception of risk is multidimensional in that their perception of risk for self could be very different and uncorrelated to their perception of risk for others or the severity of the disease. A more comprehensive measure with multiple items tapping each of the subdomains of risk perception may yield a more well-rounded estimate of individuals' risk perception and shed light on how the different factors of risk perception may contribute to intention formation.

Significantly predicted by condom use intention, planning (incorporating action and coping planning) appeared to be the most important predictor for behavior. Our study also found that different self-efficacies had different effects on condom use behavior.

Maintenance self-efficacy, which was the confidence that one can use a condom in face of barriers and unexpected difficulties, positively predicted individuals' planning process and indirectly influenced people's condom use. Such results are in line with previous studies (e.g., Kok, de Vries, Mudde, & Strecher, 1991; Luszczynska, Tryburcy, & Schwarzer, 2007). In contrast, recovery self-efficacy was not so helpful in prompting condom use among MSM. It was not associated with planning as well as actual condom use. One possible explanation could be that the belief of being able to resume condom use after one or several lapses may actually backfire, as it may mislead people into believing that not using a condom one time is acceptable since they can always use a condom the next time.

The finding that MSM of different sex roles all have the same patterns of sociocognitive predictors for condom use supported a universal model for condom use predeterminants. Although different sex roles may involve different levels of control over condom use behavior (e.g., it may be easier for an insertive partner than a receptive partner to use a condom, as the former is the person who will actually carry out the behavior and thus may be more in control), we did not find any difference in the mechanism of associations between the modeled variables. This may be due to the relatively equal role or status between MSM partners as compared to heterosexual partners (Marecek, Finn, & Cardell, 1982). Such results also indicated that the same constructs might work in the same way for MSM partners of different sex roles at any given time. For example, the content of plans for condom use may be different for insertive/receptive partners, but they both need to be well planned to successfully carry out the behavior when met with difficulties. Intervention programs should address the same factors to all individuals but with different strategies for different sex role partners. For example, for insertive partners, action self-efficacy and planning on when, where, and how to use a condom should be emphasized, whereas for receptive partners, condom negotiation self-efficacy and planning on how to persuade an unwilling partner would be more relevant. To be more valid, this finding also awaits future replications.

Implications for HIV Prevention Programs

The findings of the present study also have empirical implications for local HIV prevention campaigns and related programs. The results of the present study emphasized the role of volitional processes in adopting and maintaining safer sex behavior after the intentional phase. Action planning and coping planning in combination have been demonstrated to facilitate condom use behavior. These findings suggest that in addition to persuading people into having the intention to use condoms, intervention should also take into account volitional factors that facilitate real behaviors, such as leading people to consciously make behavioral plans and teaching skills of more effective plan making. Specifically, participants can be asked to write out their plan of condom use on work sheets so that they will have a more concrete plan in mind for real scenarios. Common examples of such plans and skills can also be explicitly taught to the participants. As maintenance self-efficacy was also demonstrated to be important for behavioral change, intervention programs could emphasize empowerment and personal responsibility in safer sex contexts and try to raise people's sense of control to facilitate their own behavioral change. There have already been

successes in intervention programs targeted at increasing people's self-efficacy in order to change risky sexual behaviors (e.g., Bryan, Robbins, Ruiz, & O'Neill, 2006; O'Leary, Jemmott, & Jemmott, 2008; Schmiede, Broaddus, Levin, & Bryan, 2009).

Limitations of the Study

Some limitations of the present study also need to be addressed. First, the time interval between the two time points (1 month) was suspected to be a little too short, which may have reduced the variance of the behavioral outcome. Future studies could possibly employ longer time intervals (e.g., 3–6 months) to allow for better variance of the outcome.

Moreover, the items of the planning measure may be modified in the future to better capture the realities of MSM sexual practices. As situational factors can be quite complex for sexual behaviors, even with a particular partner or type of partners, there are still multiple situation-dependent factors and interpersonal dynamics that are not under the sole control of the intending person. As a result, the individual may not conclude that he has a "concrete plan" or think it is necessary to have a specific plan in order to use condoms—for example, an individual may have a firm stance of "no condom, no sex," which will lead to a high score on condom use outcome, but such a belief may not necessarily be regarded as a plan. This could have resulted in the only moderate correlation ($r = .28$) between the planning and condom use measures in the current study. Instead of directly asking participants whether they have concrete plans for a variety of situations, it is possible to improve the planning measures in the future. Action planning could be assessed by asking whether participants have thought carefully about when/where/how to use a condom. Coping planning could be addressed by asking whether the participants know what to do in various situations to cope with the barrier in using a condom. With more accurate measures of planning, future studies could better examine the mechanism through which planning enhance the implementation of intention.

One more limitation may lie in the external validity of the present study as concerns the general MSM population. Participants of the current sample were relatively more sexually active and open about their sexual identity, as they were recruited at various entertainment spots. The degree to which the findings generalize to average MSM who do not frequent gay venues may be limited. However, compared with previous studies in Hong Kong on MSM risky sexual behavior (e.g., Virtual AIDS Office of Hong Kong, 2009; Lau, Siah, & Tsui, 2002; Lau & Wong, 2002), the present sample was younger and more sexually active (i.e., having more sexual partners, engaging in more sexual behaviors). Thus, they are more at risk than the average MSM and warrant studies and intervention programs specific to their needs. Moreover, the attested mechanism among the social-cognitive and behavior variables may prevail over different subgroups of MSM, as the process depicted by the HAPA model is universal across different types of health behavior change. Nonetheless, future studies with more representative samples of the general MSM population or other focused groups (e.g., MSM using the Internet for sex networking) might provide a more comprehensive understanding of the situation.

Notwithstanding these limitations, the present study supported the applicability of the HAPA model in predicting condom use behavior in a MSM sample in Hong Kong. The findings bear

implications for both theory building and health interventions. As a type of health behavior, condom use was shown to be similar to other health behaviors in their cognitive and behavioral predictors and could be intervened through changing the mediating variables. Moreover, the HAPA model can be applied to safer sex behavior and Hong Kong Chinese MSM. As in health interventions for other behaviors (e.g., physical activity, Luszczynska, 2006; physical exercise, Sniehotta, Scholz, & Schwarzer, 2006), condom use promotion could focus on improving people's planning and self-efficacy to achieve optimal effectiveness.

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