

Evaluating the Stages of Behavior Change Model for Use in Diverse Cultures:

Hong Kong versus the United States

by

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A Dissertation submitted to the Faculty of

Virginia Polytechnic Institute and State University

in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

IN PSYCHOLOGY

APPROVED:



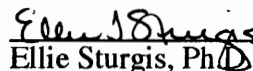
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May 1995

Blacksburg, Virginia

Key Words: Cross-cultural, Health, Hong Kong, Stages of Behavior Change Model

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ABSTRACT

This study evaluated the efficacy of the Stages of Behavior Change (SBC) Model for use with Hong Kong Chinese. The SBC Model has demonstrated empirical support in a variety of health behaviors and across diverse populations. Further, the SBC has implications for the development of behavior change interventions. The SBC is composed of three components: stages of change, self-efficacy, and decisional balance. The stages of change are used to determine intention and time frames for behavior change. The SBC model applies Bandura's (1977) definition of self-efficacy and Janis and Manns' (1968, 1977) conflict theory of decision making. The surveys used to measure these components have been validated and are predictive for condom acquisition. Survey data related to HIV/AIDS prevention (condom use) were collected from university students in Hong Kong and the United States. Comparisons were made across cultures (Hong Kong and the United States) and within the two cultural groups. Exploratory factor analyses using Principal Components Analysis revealed a single-factor model for self-efficacy and a 4-factor model for decisional balance (2 factors for advantages and 2 factors for disadvantages) concerning self (I) and others (we). Main effects for culture and staging were found for self-efficacy and the disadvantage

component of decisional balance. Main effects for stage were found for advantages with a significant interaction. These data described an increase in self-efficacy across the stages of change for condom use and greater self-efficacy in HK than the US. The hypotheses for this study were supported with the exception of the advantages component of decisional balance within Hong Kong. Post hoc tests found no difference in self-efficacy in sexually active versus sexually non-active subjects in HK and the US and demonstrated differences in sexually active versus sexually non-active subjects in HK for advantages and disadvantages. Results offer support for using this model with Hong Kong Chinese as the data suggest more similarities than differences across two diverse cultures. These results have important implications for understanding behavior change mechanisms in diverse cultural groups and have significance for intervention planning in Hong Kong for AIDS risk reduction.

As the journey is never without its more challenging moments, it is with honor that this  
dissertation is dedicated to the memory of

Jeffery Piston

1961-1991

## ACKNOWLEDGMENTS

No project of this magnitude could be completed without support and encouragement from a variety of sources. Throughout the three years of this project (including field work, data collection, multiple drafts, international travel), different individuals have provided the necessary impetus and feedback for continuing this important cross-cultural study. Not often enough do we have an opportunity to appreciate the impact others have on our lives, thus I would like to thank the many people who assisted me in the journey. My committee consisted of five unique individuals: my advisor, E. Scott Geller, encouraged me to persevere and to complete a project that would "Make a Difference." He gave me both freedom and guidance throughout all phases of the journey. He continually shaped my behavior in a positive direction, provided me with honest, open, and caring feedback, modified my writing behavior (through his editorial wizardry), taught me to focus, inspired a sense of adventure and helped me to maintain a sense of joy and enthusiasm throughout this journey; Richard A. Winett gently instilled in me a sense of confidence which enabled me to strive for excellence (as well as taught me how to present without the assistance of notes); Laurie Desiderato reminded me to "keep it simple" without compromising quality; Roseanne Foti challenged me to think critically and to support my ideas carefully; Ellie Sturgis generously shared her time and stepped in at a critical juncture in my graduate studies and finally, Arnold Schuetz believed in the merit of this Fulbright research and graciously served as a valuable committee member.

Jane Abraham, my dear friend and co-conspirator, strongly encouraged and believed in me throughout all phases of this project, providing me with valuable feedback for continuous improvement. Heartfelt gratitude is given to J. O. Prochaska, Ph.D. and Colleen Redding, Ph.D. at the University of Rhode Island, Cancer Prevention Program, for their generously sharing unpublished articles and their measurement instruments.

Special thanks are given to my statistical consultants, Quinton Nottingham, Chuck Pettinger, and Lorraine Taylor for their time and patience. Further, this project could not have been possible without the secretarial support (and friendships) of Cindy Koziol, Susan Jenkins, Helen Salmon, and Gayle Kennedy. Additionally, early input from the members of the Center for Applied Behavior Systems as well as several of the faculty in the psychology department especially Danny Axsom, Russell Jones, and Helen Crawford assisted me in formulating my research ideas.

Moreover, this research could not have been accomplished without the generous support of The Chinese University of Hong Kong, the Psychology Department and professors Jin Pang Leung, Michael H. Bond, Leung Kwok, and Katherine Tang who gave of their ideas, time, and undergraduate subject hours. Many graduate students, especially Ruth Fan and Josephine Law, assisted me in the challenge of living in Hong Kong and gave freely of their time and spirit (also introducing me to translators and typists, without whose assistance this project could not have been possible). Samson Chan of The Hong Kong AIDS Foundation and Peter Moss of the Hong Kong Government Committee on AIDS Prevention, Jenny Chow and Dr. S. S. Lee of the AIDS Prevention Unit of Queen Elizabeth Hospital offered much in the way of information exchange and friendship.

This research was supported by a Fulbright Scholarship which provided the necessary professional contacts in Hong Kong and monetary support during my year abroad. Portions of this research were presented at Psychotherapy for the Chinese: An International Conference, in Hong Kong, November 1992, and the Eco-Community Conference in Georgia, September 1993. A general presentation of this research was given at the 23rd Congress of International Association of Applied Psychology in Madrid, Spain, July 1994.

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### Background and Significance

Culture is an important variable in psychology. Unfortunately, as many have indicated, culture is frequently absent from much of the theory and research in psychology. This has resulted in gaps in our understanding of individual and group behavioral phenomena (Bond, 1988; Dasen, Berry, & Sartorius, 1988; Lonner & Berry, 1986; Triandis & Lambert, 1980). Until recently, scientific psychology has been essentially a Euro-American enterprise, enculturated in the societies in which it arose. As a result, its findings and theories have been established in only a minute proportion of the world's population, excluding such diverse cultures as found in Asia, Africa, and South America (Dasen, Berry, & Sartorius, 1988). Sants (1980) indicated there is an absence of generally acceptable theories which "translate" from culture to culture. And, until shown otherwise, theories have only limited validity in diverse cultures (Dasen, Berry, & Satorius, 1988).

Research focusing on health behavior has occurred worldwide. Unfortunately, public health programs, not unlike general psychology, have often failed to take into account cultural and psychosocial factors in determining people's health-related behavior. This omission has resulted in unsuccessful programs for health promotion and disease prevention (Dasen, Berry, & Sartorius, 1988; Harkness, Wyon, & Super, 1988; Ilola, 1988; Flora & Thoreson, 1988; Silverman, 1992; Silverman & Law, 1994). Researchers, however, embrace some universalistic notions which accept there are basic psychological processes and functions shared by all people (Dasen, Berry, & Sartorius, 1988). Therefore, it is essential for health projects with a sound theoretical base to be conducted in diverse cultures in order to test the applicability and universality of various theories.

This dissertation research used the Stages of Behavior Change (SBC) model (Prochaska & DiClemente, 1982) to compare Asian and American cultures. The SBC model contains three important aspects of health behavior change: staging for change,

self-efficacy and decisional balance. The prevention of the spread of human immunodeficiency virus (HIV) which causes acquired immune deficiency syndrome (AIDS) was explored because this is a problem of significant international concern (World Health Organization, 1992). Further, there is evidence indicating Hong Kong Chinese are at special risk for acquiring HIV due to various sexual practices found within this culture (Hong Kong Government Committee on AIDS Prevention, 1992). The literature review consists of a general discussion of health, culture and health models and a thorough discussion of the Stages of Behavior Change model.

### Culture and Health

Health and community psychology are concerned with improving the health among all people. This means all humankind, including people of all countries and cultures. Culture has been defined in a variety ways including:

a shared set of beliefs, assumptions, values, and practices; it determines how we interpret and interact with the world, and it structures [our] behavior and attitude throughout our lives. An individual's or group's culture can have a profound effect on the way they define and experience health (Gonzalez, Gonzalez, Freeman, & Howard-Pitney, 1991).

Although cultural definitions of health vary, and levels of tolerance for not attaining the culturally-defined ideal are culturally relative, the fundamental desire for good health is likely shared by all people (Berry, Dasen, & Satorius, 1988). Thus, researchers have emphasized the importance of understanding culture when developing programs for disease prevention and health promotion (Bracht, 1990; Gonzalez, Gonzalez, Freeman, & Howard-Pitney, 1991; Harkness, Wyon, & Super, 1988; Iola, 1990; Locke, 1992; Manoff, 1988; Raymond, Chung, & Wood, 1991; Winett, King & Altman, 1989; Winett, Moore, & Anderson, 1991). Some examples of disease prevention and health promotion which have included an understanding of culture are drug abuse prevention (Orlandi,

1986), malnutrition (Dasen & Super, 1988), poverty (Sinha, 1990), psychotherapy (Banchs, 1994; Draguns, 1990; Lopez & Hernandez, 1986; Marsella & Dash-Scheuer, 1988; Weiss & Kleinman, 1988), and smoking cessation (Amezcuca, McAlister, Ramirez, & Espinoza, 1990; Hunkeler, Davis, McNeil, Powell, & Polen, 1990). Literacy, though not apparently linked to health, has been deemed the single most important predictor of health outcomes, especially in undeveloped countries (WHO, 1992). Bhandari (1994) and Wagner (1988) have stressed understanding the target culture in order to plan culturally-relevant and effective intervention programs.

In the above studies, the importance of culture was explored by examining the problem as it specifically relates to the population in which it was embedded. For example, Draguns (1990) examined schizophrenia in diverse cultures and determined the illness is a universal problem and is diagnostically similar across various cultures. However, Draguns maintained that each culture has diverse strategies for dealing with such an illness and, as a result, individuals with schizophrenia may experience vast differences in the course of treatment and outcome. Definitions and diagnoses of depression, in contrast, have been less amenable to universal classification. For example, mainland (Kleinman, 1982) and Hong Kong Chinese manifest depression through somatization (reporting of psychological problems in terms of bodily symptoms such as headaches, back problems and stomach ailments). In the United States, such somatization in the presence of depression is associated with limited intelligence, low occupational status, and lack of motivation to engage in psychological self-exploration (Kleinman, 1982).

Malnutrition, on the other hand, appears to be a relatively "culture-free" problem, though in reality it is not. Dasen and Super (1988) stress interventions need to address the causes of malnutrition in each country, for example, lack of food, or as recently found in the United States, poor nutritional intake in the presence of an abundant food supply.

Further, research tools identifying nutritional deprivation need to reflect relevant cross-cultural differences. Some examples include height and weight charts, culture-free intelligence tests, bone density measurements and appropriate blood tests. Literacy, as discussed by Bhandari (1994), stressed the importance of understanding the various cultural constraints in basic education among rural women in India. Wagner (1988) examined various cultures and suggested literacy needs to be addressed within the context of the individuals receiving the intervention.

### AIDS Prevention

HIV/AIDS prevention provides an excellent illustration for emphasizing the importance of culture in interventions and research, since all countries have reported cases of HIV (WHO, 1994). To illustrate, numerous intervention projects have been developed to fight the battle to prevent HIV. Initial battles were generic and predetermined intervention packages from organizations such as the World Health Organization (WHO) and governmental organizations such as Centers for Disease Control and United States Association for International Development. However, as new HIV infections soared to unprecedented rates, intervention agents and public health experts acknowledged that population-specific countermeasures are needed.

Some examples of HIV/AIDS prevention programs and studies which have considered cultural issues are as follows. Abraham, Sheeran, Spears, and Abrahms (1992) determined attitudes towards condoms to be important predictors of intention to use condoms and reported condom use in different populations. Abramson and Herdt (1990) focused on the cultural and geographic variations in the transmission dynamics of HIV infection and AIDS. Boulos, Boulos, and Nichols (1991) found that women in their investigation in Cité Soleil Haiti bore the burden of birth control and sexually-transmitted disease (STD) prevention, and condoms were rarely used because of male resistance. As a result of their study, interventions were developed targeting males and stressing the

acceptability of using condoms. Additionally, men were included in family planning and STD prevention at the local clinic.

Erben (1991) urged that AIDS prevention programs be culturally sensitive. Fishbein et al. (1993) studied knowledge, beliefs and practices in the Caribbean, and determined social norms were the greatest predictor of condom use. Gil (1991) explored HIV and AIDS in China through the use of ethnography of sexual behavior and was able to understand the complex set of values and beliefs regulating sexual behavior which differ from Western belief systems. Johnson, Ostrow, and Joseph (1990) stressed the importance of developing specific educational strategies which are best suited for the population receiving the intervention.

Kalichman, Kelly, Hunter, Murphy, and Tyler (1993) developed culturally tailored HIV/AIDS risk-reduction messages and found the messages to have a significant impact on reported AIDS preventive behavior. Vega (1990) closely examined the sexual attitudes and reported behavior among the Latino population which relate to the high rate of HIV/AIDS in this population, especially in urban centers. Mason et al. (1995) determined there were real problems with self-disclosure of HIV status within the Latino population. Lee and Fong (1990) stressed the importance of identifying cultural practices within the Asian/Pacific Islander (API) population. They further identified barriers to change within the API population, and raised specific epidemiological issues such as low incidence and prevalence rates. Misztal and Moss (1990) examined policy development for the containment of HIV. Parker, Herdt, and Carballo (1991) examined differences among sexual beliefs across cultures which impact on programs for HIV/AIDS prevention. They found that the lack of theory and method for conducting research on human sexuality focusing on patterns of sexual relationships, number of partners and condom use in diverse cultural groups had significantly hampered AIDS prevention efforts. Raymond, Chung, and Wood (1991) examined issues related to the Asian-Pacific

population. Schinke, Gordon, and Weston (1990) focused on prevention among African-American and Hispanic-American adolescents. These aforementioned studies and interventions were aimed at a problem considered especially important to the target population and were developed and approved by the population receiving the intervention. As a result, these interventions have substantially reduced the number of new cases of HIV in the target populations. Unfortunately, the above illustrations lack a unifying theoretical framework.

### In Search of Theory

Currently, in the battle against HIV infection and AIDS there is a lack of a generally acceptable unifying theory to guide intervention and evaluation around the world (Flora & Thoreson, 1988; Raymond, Chung, & Wood, 1991). The WHO explored numerous theories in their knowledge, attitude, beliefs and practices (KABP) HIV/AIDS prevention study. Some theories in the KABP survey included locus of control, the Health Belief Model (Becker, 1974), and the Theory of Reasoned Action (Ajzen & Fishbein, 1980). In the interview-based KABP study there was no consistent, standard conceptual basis for the information gathered. Additionally, the questionnaires from the KABP survey have limited usefulness for the development of future intervention development and evaluation. Other research has demonstrated that these three theories do not generalize from culture to culture. The Health Belief Model has been used with some success in such diverse cultures as Africa (Wilson, Lavelle, & Hood, 1990; Wilson, Manual, & Lavelle, 1991), but not in Hong Kong (Silverman, 1992).

Locus of control (LOC) has been studied extensively as a predictor of health-related behavior. According to the research, those individuals who have high internal LOC may be said to have better health outcomes than those who have high external LOC (Yang & Ho, 1988). Unfortunately, this does not apply cross-culturally, as researchers have not taken into consideration the extent to which a person's belief in LOC is based on

his/her particular social or cultural reality (Furby, 1979). Given a situation where contingencies are actually dependent on external forces, it could be argued a belief in external LOC is an accurate perception and is in fact, adaptive (Yang & Ho, 1988). Another popular model, the Theory of Reasoned Action (Fishbein, 1979), has been used to predict reported condom use in St. Vincent and St. Lucia, two Caribbean countries (Fishbein, Trafimow, Francis, Helquist, Eustace, Ooms, & Middlestadt, 1993), but failed to translate into Asian culture in Hong Kong since the social norms regarding condom use are quite different (S.S. Lee, personal communication, Feb. 1992; S. Chan, personal communication, April, 1992; Silverman, 1992).

Numerous models and theories have been offered for health promotion and disease prevention such as the Health Belief Model (Janz & Becker, 1984), the Theory of Reasoned Action (Ajzen & Fishbein, 1980), the PRECEDE (predisposing, reinforcing, and enabling causes in educational diagnosis and evaluation) model for health education and promotion (Green, 1976; Green, Krueter, Deeds, & Partridge, 1980), and the Stages of Behavior Change model (Prochaska & DiClemente, 1983). Other models have been designed specifically for AIDS prevention such as Bruhn's (1990) Four-Dimensional model for AIDS prevention and the AIDS risk reduction model (ARRM) (Catania, Kegeles, & Coates, 1990).

With the exception of the Stages of Behavior Change model, these models have many pitfalls, such as inadequate explanation of the behavior change, cultural specificity, inadequate assessment of the internal consistency and reliability of items assumed to represent the model, and failure to examine the process of change. These problems have made it difficult to apply these models across different cultures. However, the Stages of Behavior Change (SBC) model represents an appropriate model for use in diverse cultures. Research using the SBC model has primarily occurred within the United States with diverse cultural groups. However, there has been research in a Mexican-American



population (Gottlieb, Galavotti, McCuan, & McAlister, 1991) and a Finnish population (Pallonen, Fava, Salonen, & Prochaska, 1992). Other research has been conducted in diverse cultures and "subcultures" such as intravenous drug users and prostitutes in the United States and is discussed below.

In 1992, elicitation research (front-end analysis) was conducted in Hong Kong (Silverman, 1992; Silverman & Law, 1994). The aims of this research were: 1) to gain a better understanding of the perceptions of HIV/AIDS in the university population, 2) to evaluate existing HIV/AIDS materials (written and video) in order to assist the government committee on AIDS prevention in planning more appropriate AIDS reduction strategies, and 3) to generate research ideas. This research, which included interviews, focus groups, and survey research, determined the SBC model was the most relevant model to test in diverse populations. The reasons are as follows. The constructs in the SBC model were relevant since Hong Kong residents indicated that concerns such as self-efficacy to engage in preventive behavior were similar to those found in the United States regarding HIV/AIDS prevention. Further, participants in focus groups openly discussed advantages and disadvantages of engaging in preventive strategies, an important component of the SBC model. Further, the SBC model has reliable and well-validated surveys which have predictive utility across a variety of behaviors including HIV/AIDS prevention.

### Comparing Theories Across Cultures

Cultural researchers should follow the methodological guidelines and considerations outlined by such texts as Lonner and Berry's Field methods in cross-cultural psychology (1986). Such guidelines include but are not limited to:

a) identification of an issue of concern or relevance for the culture by way of focus groups, interviews, and appropriate epidemiological statistics, b) use of well validated surveys, c) adaptation of procedures to local circumstances, d) translation procedures

such as back translation or decentering, and e) avoidance of ethnocentric bias.

Ultimately, individual cultures need specific tailoring of health theories and interventions which translate across cultures. As psychologists, we have begun to assemble our information into a panhuman position of universalism. The working assumption is there are basic psychological processes and functions shared by all people. Although these are developed, deployed, disseminated, and displayed differently across diverse cultures, there is a basic psychic unity of humankind on which culture plays a set of variations (Berry, Dasen, & Satorius, 1988). The present study attempted to validate the psychological processes addressed in the Stages of Behavior Change (SBC) model across two diverse cultural groups - Hong Kong and the United States.

The Chinese culture in Hong Kong presents a unique opportunity for cross-cultural comparison. According to previous research (Kleinhesselink & Rosa, 1991), key criteria for cross-cultural comparisons are as follows: first, like the United States, Hong Kong has reached a stage of advanced industrialization with the consequence that its citizens are exposed to many of the same risks as Americans; second, despite being relatively small geographically, it has a substantial population for its size (approximately 6 million in 490 square miles); and third, it is an Eastern culture rich in tradition and values quite different from those of the West.

Thus, a comparison between cultures with such distinct cultural traditions, between Eastern (Oriental) and Western (Occidental), may be a more stringent test of the universality of psychological theory than, for example, a comparison between two Western cultures (e.g., Finland and the United States). It is interesting to note the emergence of psychology in both China and Hong Kong. For example, early works in psychology in China were imported from Europe and the United States. However, with the political climate, Russian psychology was imported into China, and thus, a Marxist-Leninist flavor can be seen in the examination of the psychological literature in China. In

contrast, Hong Kong psychology has been essentially a British endeavor with access to the international community. As such, the research occurring in Hong Kong may be more universally relevant (Spinks, 1990).

### Stages of Behavior Change Model

The SBC model, also known as the transtheoretical model (Prochaska & DiClemente, 1982, 1984, 1986), is a general model of health behavior change. The model defines behavior change as a series of movements through discrete stages in order to achieve either cessation of an undesired behavior or initiation of a new and healthy behavior. As stated so eloquently by Mark Twain, "Habit is habit, and not to be flung out of the window but coaxed downstairs one step at a time" (1894, p. 90). Thus, the model endorses a stage of change perspective. The stages which have been identified are precontemplation, contemplation, preparation, action, and maintenance (Prochaska et al., 1991) and are discussed in detail below. The other components of the SBC model are self-efficacy and decisional balance. Basically, self-efficacy refers to beliefs about one's ability to enact certain behaviors under specific conditions and was coined initially by Bandura (1977) as part of his social learning theory. Decisional balance assesses an individual's perception of advantages versus disadvantages with reference to a given behavior change. These two components are also detailed later.

Research has determined the SBC model to be both comprehensive and integrative (Prochaska et al., 1994). Initially, the SBC model was developed within the context of psychotherapy (Prochaska & DiClemente, 1982; 1984). Prochaska and DiClemente (1992) indicated the SBC model has enabled researchers to understand and intervene more effectively in the complete cycle of behavior change. As such, the SBC model incorporates constructs to explain mechanisms that individuals employ when changing their behavior. It is comprehensive and integrates aspects of several other major theories, drawing from social learning theory (Bandura, 1977, 1986), the Health

Belief Model (Becker, 1974), the Theory of Reasoned Action (Fishbein, 1979), and Janis and Manns' (1977) model of decision making (Prochaska & DiClemente, 1992). The SBC model has been successfully applied to a broad range of health-related behaviors across diverse populations such as African, Asian, and Hispanic groups, adolescents and adults, prostitutes and drug abusers within the United States. The SBC model incorporates a number of features to explain the processes by which individuals initiate and maintain behavior change (Prochaska, 1992, 1994; Prochaska, DiClemente, & Norcross, 1992).

There are several reasons why the SBC model is useful. The SBC has successfully predicted changes across actual and reported health behaviors such as AIDS prevention (Grimely, Riley, Bellis, & Prochaska, 1993; Prochaska, Redding, Harlow, Rossi, & Velicer, 1992; Prochaska et al. 1994; Redding, 1993), exercise acquisition (Markus, Rakowski, & Rossi, 1992), mammography screening (Rakowski et al., 1992; Rakowski, Fulton, & Feldman, 1993), psychotherapy (Prochaska, Rossi, & Wilcox, 1991; Prochaska & DiClemente, 1982), radon testing (Rossi, 1990), and sunscreen use (Rossi, 1989; 1990). The SBC has been tested in both the laboratory and in naturalistic settings (O'Connell & Velicer, 1988; Guadagnoli, Rice, & Mor, 1991; Marcus et al., 1992; Prochaska, Norcross, Fowler, Follick, & Abrams, 1992; Redding, 1993).

The SBC model has also successfully predicted behavior change among diverse populations in the United States, such as clinic patients, college students, juvenile delinquents, prostitutes, and men engaging in high-risk sexual behavior (Begin, 1989; Curry & Marlatt, 1987; DiClemente & Hughes, 1990; Grimely, Riley, Bellis, & Prochaska, 1993; Norcross, Prochaska, & Hambrecht, 1991; Prochaska, Redding, Harlow, Rossi, & Velicer, 1992; Prochaska et al. 1994) as well as a Mexican-American population (Gottlieb, Galavotti, McCuan, & McAlister, 1991), a Finnish population (Pallonen, Fava, Salonen, & Prochaska, 1992) and in subcultures such as prostitutes and

drug addicts (DiClemente, 1993a; 1993b; Prochaska, DiClemente, & Norcross, 1992). The prediction of actual and reported behaviors comes from interventions studies which assist individuals in the movement from one stage of change to another. Also, the different stages of change also predict self-efficacy and advantage and disadvantage scores on both an individual and group level. Additionally, identifying stage of change by itself or in conjunction with self-efficacy and decisional balance assists researchers and intervention agents' ability to predict future behavior and plan appropriate interventions.

The model has been used to understand the process of change in cessation of a specific behavior such as dieting (Rossi, Rossi, & Prochaska, 1990; Rossi, 1993) and smoking reduction (Ahijevych & Wewers, 1992; DiClemente et al., 1991; Eaton et al., 1992; Gottleib et al., 1991; Pallonen et al., 1992; Prochaska, DiClemente, & Norcross, 1992; Prochaska, Velicer, DiClemente, & Fava, 1988; Wilcox, Prochaska, Velicer, & DiClemente, 1985). Acquisition behaviors such as exercise (Dishman, 1991; Lee, 1993; Marcus, 1990; Marcus, Rakowski, & Rossi, 1992; Marcus et al., 1992; Rossi, 1989; Selby, 1990; Sonstroem, 1987; 1988), and safer-sex practice (Grimely et al., 1993; Redding, 1993) have also been studied using the SBC model. Additionally, AIDS prevention researchers have cited the SBC model as useful for understanding health behavior with implications for AIDS prevention (Centers for Disease Control, 1992; Fisher & Fisher, 1992; Kelly & Murphy, 1992).

The SBC model uses assessment instruments which have adequately predicted behavior change, as well as identified where individuals are in the process of change (Prochaska & DiClemente, 1992). It has been used to predict the use of community-based resources such as health clinics (Guadagnoli, Rice, & Mor, 1991). Research has demonstrated predictive validity of the model when static variables such as demographics and problem history are compared with dynamic variables such as the SBC stages and

processes (Lam, McMahon, Priddy, & Gehred-Schultz, 1988; Marcus, Rossi, Selby, Niaura, & Abrahams, 1992; Prochaska, DiClemente, Velicer, Ginpil, & Norcross, 1985; Prochaska, Norcross, Fowler, Follick, & Abrams, 1992; Wilcox, Prochaska, Velicer, & DiClemente, 1985). Finally, the SBC model is useful in planning, developing, and evaluating interventions (Lombard, 1991), because interventions can be designed to move individuals through the discrete stages of change. Thus, the SBC model can serve to integrate approaches for facilitating change across a wide variety of target behaviors and populations. Hence there are theoretical, empirical, and practical reasons for using the SBC model. However, further testing is warranted in cultures other than those with American and European influence, and this provides the impetus for this cross-cultural study. The objective of the proposed project was to extend and validate the SBC model with Chinese students living in Hong Kong on the problem of condom use for AIDS prevention. However, in order to understand the model and its utility more fully, it is useful to discuss the three components of the model: stages of change, self-efficacy and decisional-balance.

The Process and Stages of Change. Early research examining integrative dimensions of the process of change indicated change can be subdivided into meaningful segments. Prochaska and DiClemente (1983; 1992) determined individuals moved through discrete stages of change, endorsing a process of change. The process of change is also called a segmented prospective across time (DiClemente, 1978). Initially called periods of change, Prochaska and DiClemente determined these periods were related to other stage models which focused on decision making (Janis & Mann, 1968; 1977) and personal choice behavior (Horn, 1976). Basically, the stages of change are a developmental sequence of motivational readiness or intention to modify problematic behavior or adopt new desirable behaviors. As shown in Table 1 in order of occurrence,

the stages of change are precontemplation, contemplation, preparation, action, and maintenance (Prochaska et al., 1991).

Table 1

Definitions of Different Stages of Behavior Change (adapted from Prochaska & DiClemente (1992).

Stage	Definition of Stages of Change
Precontemplation	Individuals are not considering change in target behavior and have no plans to change within the next 6 months; some reasons include being uninformed about the consequences of their behavior, demoralized about their ability to change, or simply not wanting to think about change.
Contemplation	Individuals are considering change in target behavior and seriously considering change within the next 6 months; they are ambivalent about costs and benefits.
Preparation	Individuals are ready to take action and are seriously planning to change within the next month; for example, they want to reduce the frequency of the problem behavior or try on a new behavior to see how it fits; this stage lasts about 2 weeks to 30 days.
Action	Individuals are actively, overtly modifying their habits or environment (e.g., have condoms available and are actually using condoms); this stage lasts up to six months.
Maintenance	Individuals continue to maintain the target behavior after six months of continuous successful behavior (e.g., always using condoms); this stage lasts indefinitely unless an individual relapses.

The most commonly used method of identifying an individual's current stage in a behavior change process has been through the use of a time sequence procedure developed from the stage definitions. The individual responds to a set of questions that probe his or her current attitudes and recent behavior with regard to the target behavior. The questions are tailored for the specific behavior and represent the criterion for each stage. For example, preparation has been operationally defined as planning to alter the target behavior within two weeks to thirty days, whereas maintenance has been operationalized as engagement or cessation of a particular target behavior for six months or longer. As such, these time criteria provide for meaningful comparisons across behaviors. An example for condom use is as follows. Do you always use condoms when you have sex? a) No, and I am not thinking about starting within the next six months (precontemplation); b) No, but I am planning to start using them within the next 6 months (contemplation); c) No, but I am planning to start using them within the next 30 days (preparation); d) Yes, and I have doing so for 6 months or less (action); and e) Yes, and I have been doing so for 6 months or longer (maintenance).

The validity of this classification scheme has been established for a variety of intentions and behaviors. Some examples include smoking (Prochaska & DiClemente, 1993), exercise (Marcus et al., 1985), weight loss (O'Connell & Velicer, 1988), AIDS-preventive behaviors such as condom use (Prochaska et al., 1990), sexual activity (Redding, 1993) and health behaviors discussed above such as mammography screenings, exercise, and smoking cessation.

Stages of change and intervention strategies. The SBC model describes a developmental sequence of readiness to modify problem behaviors (Prochaska, Redding, Harlow, Rossi, & Velicer, 1992). The primary tenet is that an individual proceeds through the stages of change with increasing readiness to change, and corresponding interventions should match the particular decision stage of an individual. Research has



validated the utility of identifying the stage of change an individual is in and planning interventions accordingly in order to facilitate change (O'Connell & Velicer, 1988). The intervention techniques identified to move individuals through the various stages of change are: informational campaigns, environmental changes, supportive relationships, and reinforcement contingencies (Prochaska & DiClemente, 1983; Prochaska, Velicer, DiClemente, & Fava, 1988). Examples of these strategies are depicted in Table 2 in relationship to each stage. These strategies for change have been researched across diverse behaviors such as smoking, substance abuse, AIDS prevention, weight control, eating disorders, and exercise (Prochaska et al., 1994).

Table 2

Interventions Matching the Stages of Behavior Change (adapted from Prochaska & DiClemente (1992)).

Stage	Intervention Strategies
Precontemplation	Providing information
Contemplation	Giving feedback by providing more information about the problem and how to change, cost and benefit information (stressing advantages over disadvantages)
Preparation	Educating small step-by-step changes and encouraging trying out new behavior; skill building.
Action	Manipulating the environment so there are opportunities to engage in new behavior (e.g., having condoms available); Contingencies for the new behavior (external and internal reinforcement)
Maintenance	Continuing education aimed at countering disadvantages of behavior change through group and individual support

Exercise-adoption and smoking-cessation programs been developed using stage-matching interventions have demonstrated greater effectiveness than those mismatched or those which did not consider the stage of behavior change for the target population (Fitzgerald & Prochaska, 1990; Marcus et al., 1985). It is postulated the degree of progress an individual makes may be a function of the stage s/he is in at the beginning of an intervention. According to Prochaska (1994), programs which assist individuals' movement from one stage to the next essentially double the probability they will take action on their own in the near future.

In addition to the intervention techniques, two variables, self-efficacy and decisional balance, are important predictors of movement from precontemplation to contemplation, and from contemplation to action stages of change (Prochaska & DiClemente, 1992). The combination of self-efficacy and decisional balance and the stages of change offers a powerful tool for understanding the process of change and how change can be augmented through appropriate interventions (Prochaska & DiClemente, 1992; O'Connell & Velicer, 1988). A number of studies have provided strong support for the validity and utility of the two other components of the SBC model, self-efficacy and decisional balance.

Self-Efficacy. Self-efficacy refers to beliefs about one's ability to enact certain behaviors under specific conditions (Bandura, 1977; Winett, King, & Altman, 1988). Self-efficacy was coined initially by Bandura (1977), as part of his social learning theory. It has almost become a standard variable in the prediction of behavior. Theoretical work by Bandura (1977, 1986) postulated an individual's feelings of self-efficacy for engaging in certain behaviors is highly predictive of actual behavior (Prochaska, Harlow, Snow, Rossi, & Velicer, 1992).

Self-efficacy theory suggests people's beliefs in their abilities to perform specific behaviors influence: 1) their choice of behavior in terms of avoiding situations which

might lead to using drugs, alcohol, cigarettes (Lawrance & McLeroy, 1986), or unsafe sexual behavior (Freeman, Cohn, Corby, & Wood, 1991; Redding, 1992); 2) amount of effort an individual will expend in attempting a specific task (Lawrance & McLeroy, 1986); 3) amount of persistence with a task, even when facing barriers (Lawrance & McLeroy, 1986); and 4) emotional reactions such as anxiety, depression, and hopelessness, since cognitions leading to negative emotions may occur when an individual is faced with the threat of failure (Lawrance & McLeroy, 1986). A multitude of studies have demonstrated perceived self-efficacy to be a significant predictor of behavior change in the areas of smoking cessation (DiClemente, 1981; DiClemente, Prochaska, & Gibertini, 1985; Velicer, DiClemente, Rossi, & Prochaska, 1990), alcohol relapse (DiClemente, Gordon, & Gibertini, 1983), and AIDS prevention (Freeman, Cohn, Corby, & Wood, 1991; Redding, 1992).

Self-efficacy is an important mediating variable within the SBC model where it has been operationalized as both confidence in the new healthy behavior and the temptation to engage in the undesirable behavior across a variety of problematic situations (Redding, 1992). Research has found that both self-efficacy and temptation vary across the stages of change. Self-efficacy has been found to rise and temptation to diminish across longitudinal profiles of smokers attempting to quit (DiClemente, 1986; Prochaska, Velicer, Guadagnoli, Rossi, & DiClemente, 1991). Moreover, research has demonstrated as individuals move into the action stage, there is a precarious balance between these constructs as efficacy increases rather dramatically and temptation decreases quite slowly. In the maintenance stage, the precontemplation pattern is reversed with temptation extinguishing and efficacy reaching its apex and remaining (DiClemente, 1986; Prochaska et al., 1991). This, of course, depends on the supportive contingencies and natural consequences within the individual's life space. If absent, individuals may experience relapse.

Efficacy evaluations have different implications in earlier stages of change because individuals have not made a commitment to change. Self-efficacy is typically lowest in the precontemplation stage of change, since individuals have had little or no feedback and possibly little or no interest in change. Also, low self-efficacy scores can be due to perceived inability, lack of self-confidence and unwillingness to change behavior. Self-efficacy is higher during contemplation and has been found to outperform demographic variables in its ability to predict movement into preparation and action stage (DiClemente et al., 1991). Self-efficacy and temptation function inversely across the stages of change, although temptation has been found to more strongly predict relapse (DiClemente et al., 1991).

Self-efficacy, as operationalized by the SBC model, is typically measured by a survey which use a five-point Likert response scale ranging from not at all confident (1) to very confident (5) to engage in the identified desired behavior or stop the target undesirable behavior. Survey items are developed using the sequential method of scale development (Jackson, 1970; 1971) and receive the following statistical treatments. Items are factor analyzed using a varimax rotation and generally reveal a single general self-efficacy factor (Prochaska & DiClemente, 1992; Redding, 1993). Each individual's scale is summed to form a total score which is then converted to a T-score ( $M = 50$ ,  $SD = 10$ ). Next, the data are divided according to the individual's endorsed stage of change for the target behavior, i.e., precontemplation, contemplation, preparation, action, and maintenance, which the individual has identified using the procedure discussed above. The data are compared across these stages using one-way ANOVA with follow-up tests such as Tukey,  $t$ -tests, Fisher's Protected Least Significant Difference (PLSD), or Scheffés F-test when there are unequal sample sizes. Typically, self-efficacy has been reported to be lowest in the precontemplation stage and highest in the action stage of change, and such differences, especially in the area of condom use, have been statistically

significant (Prochaska & DiClemente, 1992; Redding, 1993). Further, the greatest increase in self-efficacy scores is found between contemplation and action (Prochaska & DiClemente, 1992; Redding, 1993).

Research examining the SBC model also traditionally uses graphs to examine the pattern of data across the stages of change. When the self-efficacy scores are graphed across the stages of change, a sharp significant increase is generally seen after the contemplation stage. It has been suggested that individuals just considering using condoms (contemplation stage) may actually have enhanced feelings of self-efficacy for condom use, especially considering the low levels of self-efficacy for individuals in the precontemplation stage (Prochaska & DiClemente, 1992; Redding, 1993). Other studies have demonstrated a steady increase in self-efficacy after the precontemplation stage with a slight drop off at the maintenance stage of change. This result suggests individuals just considering using condoms (contemplation stage) have low levels of self-efficacy for condom use until they have had experience with condoms (action and maintenance). These results have been reported for both cross-sectional and longitudinal studies.

Decisional balance. Decisional balance assesses an individual's perception of advantages versus disadvantages with reference to a given behavior change. The decision-making component of the SBC model is conceptualized in terms of Janis and Mann's (1968, 1977) conflict theory of decision making. Conflict theory postulates that sound decision making involves careful scanning of relevant considerations entering into a decisional balance sheet of comparing potential gains and losses (Mann, 1972). Janis and Mann (1968, 1977) suggested the anticipated gains (advantages) and the anticipated losses (disadvantages) can be exhaustively categorized into four major types of consequences: 1) utilitarian gains or losses for self, 2) utilitarian gains or losses for others, 3) approval or disapproval from significant others, and 4) self-approval or

disapproval. Thus, there are generally both self- and reference-group impact upon the decision.

Presumably, part of the decision which provides movement across the stages of change is based on the relative weight of the advantages versus the disadvantages of changing the target behavior. The advantages represent the positive aspects of changing a target behavior and are considered to be facilitators of change. Disadvantages are the negative aspects of change, also known as barriers. On surveys designed for the target behavior, each individual rates these advantages and disadvantages in terms of their importance. Previous research has found that decisional balance has successfully assessed and predicted reported and actual exercise adoption (Marcus et al., 1992), smoking cessation (Velicer, DiClemente, Prochaska, & Brandenburg, 1985), and weight loss (O'Connell & Velicer, 1988). With regard to HIV prevention, assessing advantages versus disadvantages of using condoms is important since most individuals are not currently using condoms (e.g., Kegeles, Alder, & Irwin, 1988; Moatti et al., 1991), but rather are in one of the earlier stages of behavior change (e.g., precontemplation, contemplation, or preparation).

Decisional balance is typically measured through self-report instruments using a 5-point Likert scale ranging from not at all important (1) to very important (5), developed with the sequential method of scale development (Jackson, 1970, 1971; Velicer et al., 1985). Items are written to represent the 4 categories, i.e., advantages and disadvantages in each of the four areas for the decision to change the behavior: 1) gains or losses for self, 2) gains or losses for others, 3) self-approval or self-disapproval, 4) approval or disapproval from others. Items are judged, tested on a large subject pool, and factor analyzed. Survey research examining decisional balance for condom use measures six areas hypothesized to be important for assessing the potential advantages for condom use: safety/prevention, responsibility, cleanliness, relationship, and enjoyment. Item content

for the disadvantages were based on six areas believed to represent potential disadvantages including: self-image, less enjoyment, partner consideration, hassles, low effectiveness, and low-risk belief. Scales developed using this procedure have demonstrated good internal consistency and reliability with Cronbach alphas of .84 and .91 for weight loss (O'Connell & Velicer, 1988) and .92 for condom use (Redding, 1993).

Factor analyses for the scales measuring decisional balance for condom use have revealed four factors, two for advantages and two for disadvantages, reflecting concern for self (I) and concern for other (we) (Redding, 1993). For comparison purposes, a total score is obtained from the completed surveys and standardized by conversion to T-scores ( $\underline{M} = 50$ ,  $\underline{SD} = 10$ ). Next, the data are divided across the stages of change according to which stage of change the individual endorses, i.e., precontemplation, contemplation, preparation, action, and maintenance, and compared across these stages using one-way ANOVA with follow-up tests such as Tukey, Fisher's PLSD, and Scheffé F-test. Decisional balance scores are also derived from subtracting the disadvantage T score from the advantage T-score and then dividing the scores according to the stages. A one-way ANOVA is then computed on these data with follow-up tests such as Scheffé.

DiClemente (1993) used the standard T-scores ( $\underline{SD} = 10$  or 10 T-points) as another way of measuring the process of decisional balance across the stages. DiClemente (1993) operationalized the process of change as either moderate or strong depending whether the change in T-scores was one-half (5 T-points) or 10 T-points, respectively, from precontemplation to maintenance. Research examining the SBC model traditionally uses graphs to examine the pattern of data across the stages of change. Graphs typically demonstrate a cross-over of the average disadvantage and advantage T-score at the preparation stage of change. Typically, in longitudinal studies, the advantages of change are less than the disadvantages of change until the contemplation or preparation stage, when the advantages and disadvantages are nearly equal. This almost

equal weighting of these two scores is indicative of ambivalence about change and is why this component is called decisional balance. As individuals prepare for action, the advantages begin to outweigh the disadvantages.

There are at least twelve validated decisional balance measures for diverse behaviors such as condom use (Prochaska et al., 1994), exercise adoption (Marcus, Rakowski, & Rossi, 1992), mammography screening (Rakowski et al., 1992), smoking cessation (Velicer et al., 1985), and weight control (O'Connell & Velicer, 1988). Redding (1993) reported there are measures currently being developed for sunscreen use, dietary fat reduction, and contraceptive behavior. The purpose of the current research was to extend the stages of change and decisional balance for condom use to another cultural group, Hong Kong Chinese.

#### Current Investigation

The East and West must unite to give one another what is lacking

Abdu'l-Baha, 1912, p. 12

The current investigation compared the SBC model across participants in Hong Kong and the United States. The purpose was to extend and validate the SBC model for Chinese students living in Hong Kong concerning the problem of condom use for AIDS prevention. This study addressed three specific questions about behavior change with regard to the SBC model (Prochaska & DiClemente, 1982). Do those individuals in an Asian culture in the action stages of change have higher self-efficacy than those in the non-action stages of change as found with participants in the United States? Do Asian individuals demonstrate changes in decisional balance across the stages of behavior change comparable with that found in previous studies? In other words, will both the Hong Kong and the United States data support an increase in advantages and a decrease in the disadvantages compared with those individuals in non-action and action stages of change.



This study compared the three components of the SBC model (stages of change, self-efficacy, and decisional balance) across university students in Hong Kong and the United States using factor analyses and a 2 culture (HK versus US) x 5 stages (PC, C, P, A, M) ANOVA for both self-efficacy and decisional balance scores treating the data as discussed above using standardized scores (T-scores). Based on prior research using the SBC model, it was hypothesized the Asian participants would demonstrate similar factor structures with regard to self-efficacy and decisional balance as well as a data pattern similar to that found in previous research for these components. In other words, it was hypothesized a graphic representation of the data will depict a steady rise in self-efficacy across the stages of change which will be statistically significant with at least one-half a standard deviation change in the self-efficacy and decisional balance scores from precontemplation to action or maintenance (i.e., between non-action and action stages of change). Also, the graphic depiction on the data will show a cross-over of the advantages and disadvantages of the new behavior at the preparation stage of change with statistical significance for both advantages and disadvantages across the stages of change.

Previous research has indicated relatively low rates (2.5% to 12%) of sexual activity among Hong Kong university students. It is hypothesized this trend will be demonstrated in this study with fewer Hong Kong subjects being active sexually compared with the United States. Participants, however, were asked to fill out the staging question for condom use "as if" they were active sexually. It is hypothesized there will be a greater number of individuals in precontemplation in Hong Kong compared with the United States and conversely, there will be a greater number of individuals in the maintenance stage in the United States.

## Method

### Participants

Participants were 460 students in a Chinese university in the New Territories of Hong Kong (HK) ( $n=229$ ) and a southwest Virginia university in the United States (US) ( $n=231$ ) recruited from the Introductory Psychology pool at both universities. The HK ages ranged from 18 to 41 ( $M = 20.41$ ;  $SD = 3.422$ ); and US ages ranged from 17 to 34 ( $M = 19.06$ ,  $SD = 1.642$ ). For the HK sample, 67.7% ( $n=155$ ) were female and 32.3% ( $n=74$ ) male. In the US sample, 59.3% ( $n=137$ ) were female and 40.7% ( $n=94$ ) male.

Participants were asked to identify their nationality as given on their passport. There was a diversity of nationalities in both populations. The HK participants were all ethnically Chinese and identified themselves as 19% Chinese ( $n=43$ ), 70% British ( $n=160$ ), 10% HK British ( $n=23$ ), and 1% gave no information ( $n=3$ ). The US participants identified themselves as 94% American ( $n=216$ ), .8% Chinese-PRC ( $n=2$ ), .8% Filipino ( $n=2$ ), .8% German ( $n=2$ ), 1.2% Korean ( $n=3$ ), .4% British ( $n=1$ ), .4% Eastern Indian ( $n=1$ ), .4% Indonesian ( $n=1$ ), .4% Palestinian ( $n=1$ ), .4% Taiwanese ( $n=1$ ), and .4% Asian ( $n=1$ ).

### Materials

Students completed a series of questionnaires addressing: 1) basic demographics; 2) personal sexual experience and stages of change for condom use; 3) self-efficacy for condom use; and 4) decisional balance for condom use. Each participant received one hour research credit for their participation in this study. See Appendix A for a complete copy of the survey.

Stages of change (P-E scale). The P-E scale was developed by Prochaska and Redding, 1993. This survey consists of two questions consisting of five items asking about staging for sexual activity and staging for condom use. These five stages were validated from previous work in smoking cessation (Prochaska & DiClemente, 1993) and

HIV prevention studies (Prochaska et al., 1990; Redding, 1993). Individuals who had never had sexual contact as based on the staging for sexual activity were asked to fill out the condom staging scale "as if" they were active sexually. Based on the response to both two these questions, participants were placed in one of the five stages of change: precontemplation, contemplation, preparation, action, and maintenance for sexual activity and for condom use (see Table 3). The validity of this classification scheme for sexual behaviors and intentions has been established in previous studies (Prochaska et al., 1990; Redding, 1993). These two surveys were obtained with permission to use from C. Redding, July, 1993. See Appendix A for a copy of this scale.

Table 3

Staging for condom use survey

Stage	Staging questions for condom use
precontemplation	a) No, and I am not thinking about starting within the next 6 months.
contemplation	b) No, but I am planning to starting to always use them within the next 6 months.
preparation	c) No, but I am planning to start within the next 30 days.
action	d) Yes, and I have been doing so for 6 months or less.
maintenance	e) Yes, and I have been doing so for 6 months or longer.

Self-efficacy for condom use (C-Scale). The C-Scale (Prochaska, 1992) is a 14-item, self-report survey and was developed to measure self-efficacy for condom use. The scale was developed using the sequential method (Jackson, 1970; 1971). The item pool was generated based on previous data investigating situational confidence for condom use using the SBC model. The scale was also considered to be appropriate for either gender

or for variation in sexual orientation. The C-scale uses a five-point Likert response scale ranging from not at all confident to very confident. A total score is generated by adding the items together and converting the data to T-scores. Cronbach's alpha coefficients ranged from .94 to .97. The survey was developed by and obtained with permission to use from J. O. Prochaska, May, 1992. See Appendix A for this scale.

Decisional balance for condom use (Adv and Disadv Scale). This instrument was developed by Prochaska (1992) using the sequential method of scale development (Jackson, 1970, 1971). Five sets of items measured six areas hypothesized to be important for assessing the potential advantages of condom use: safety/prevention, responsibility, cleanliness, relationship, and enjoyment. Item content for the disadvantages were based on six areas believed to be potential disadvantages and included: self-image, less enjoyment, partner consideration, hassles, condom effectiveness, and low-risk belief. The Adv and Disadv Scale uses a five-point Likert response scale ranging from not at all important to very important. An advantage score is generated by adding the advantage items together and converting the data to T-scores; the same procedures are followed for the disadvantages. Cronbach's alpha coefficients ranged from .80 to .92 (Prochaska, 1992). This survey was developed by and obtained with permission to use from Prochaska (1992). A copy of this scale is given in Appendix A.

#### Translation Procedure

According to Brislin, Lonner, and Thorndike (1973), translation and back-translation of instruments and preliminary try-outs with bilingual subjects are required to attain instruments which allow for valid comparisons of results collected in different cultures. All surveys administered to Chinese students in Hong Kong were translated using a back-translation procedure from English to Chinese. Briefly, back-translation is a procedure whereby independent translators are employed. The first translator translates the survey to the desired language. The second translates the survey back to the original

language without access to the original survey. The survey is then checked to see if the re-translation matches the original survey. In order to ensure adequate translations, three independent translators were hired. These translators had the following credentials: a) college degree in the social sciences and/or translation, b) bilingual speakers (Chinese and English), c) minimum of two years experience in translation in cross-cultural research, and d) experience within the social sciences. The surveys were reviewed by the third translator to assure equivalence between the translated survey and the English original. After the surveys were typed, another translator proof read the surveys and checked for readability and typographical errors.

### Procedure

Students enrolled in Introductory Psychology were asked to sign up for a study on AIDS prevention as part of the course requirement. Research hours were given to HK participants and extra credit was given to US participants. The same procedure was followed at both research sites. The participants were given questionnaires by a graduate student in psychology in both HK and the US. Participants were told this was a study aimed at gathering information to develop AIDS prevention programs for university students. Each participant filled out the questionnaires in small groups and/or with adequate spacing (one or more seats between respondents) to insure privacy and preserve confidentiality. The spacing between participants was provided due to the potentially embarrassing nature of the questionnaires. The procedure took approximately one hour to complete, and following completion, students brought their questionnaire to the experimenter and each subject was given AIDS education prevention material.

### Results

Cross-cultural comparisons are presented first, briefly discussed and followed by within cultural analyses. Cross-cultural data are presented in the following order: first,

staging for sexual activity and condom use; second, self-efficacy; and finally, decisional balance. All of the results are then followed by a longer discussion section.

Staging for Sexual Activity.

The following statements were used to determine what stage of change for sexual activity subjects were in: precontemplation: I am not considering having sexual contact in the next six months; contemplation: I am considering having sexual contact in the next six months; preparation: I am planning to have sexual contact within the next six months; action: I have been active sexually within the past six months; maintenance: I have been active sexually longer than six months. Table 4 shows a breakdown of the sexual activity for HK and the US.

Table 4

Staging for Sexual Activity among HK and US participants

Stage	Hong Kong	United States
Precontemplation	81% (186)	20% (46)
Contemplation	4% (10)	7.2% (17)
Preparation	0	0.8% (2)
Action	12% (27)	22% (51)
Maintenance	3% (6)	50% (116)

As predicted, there were more US participants active sexually compared with HK students. The Chi square comparison of the frequency of self-reported sexual activity in HK versus the US was significant,  $\chi^2(2, N = 231) = 27.68, p = .0001$ . Only, fifteen percent of HK participants admitted being sexually active. This percentage is greater than in previous research in Hong Kong where only 2.5% to 12% of university students admitted being active sexually (Hong Kong Family Planning, 1992; Silverman, 1992).

According to researchers in Hong Kong, there is a reluctance to admit being sexually active, and thus, the 15% may not reflect the actual rate of sexual activity among these university students. In the US, the reverse might be true, as it may be considered socially desirable to be active sexually and not use a condom.

Stages of change for condom use. Individuals were placed into one of five stages of change based on the following answers to "Do you always use condoms when you have sex?": precontemplation: No, and I am not thinking about starting within the next 6 months; contemplation: No, but I am planning to starting to always use them within the next 6 months; preparation: No, but I am planning to start within the next 30 days; action: Yes, and I have been doing so for 6 months or less; maintenance: Yes, and I have been doing so for 6 months or longer. The breakdown for these categories are listed in Table 5.

Table 5

Stages of Change for Condom Use

Stage	Hong Kong	United States
Precontemplation	53% (118)	20% (45)
Contemplation	11% (24)	5% (12)
Preparation	8% (18)	15% (36)
Action	10% (23)	11% (25)
Maintenance	18% (41)	49% (112)

The hypothesis that the distributions across the categories of change for condom use would be different across cultures was supported. According to Prochaska (1992) and Rossi et al. (1992), about 40 to 80% of a population are in the precontemplation stage and only 10 to 20% of a population are ready to take action. As shown in Table 5, 53% of the HK subjects were in the precontemplation stage compared to 20% of the US

subjects. The probable reason for this difference is the differential rate of sexual activity across the two cultures.

Self-efficacy for condom use. A principal components analysis (PCA) with an varimax rotation were conducted on the 14-item scale using separate analyses for HK ( $n = 223$ ) and US ( $n = 230$ ) surveys. The PCA performs a simple eigenvalue-eigenvector analysis of the correlation matrix in its original form. On the basis of previous research, a clear one-factor solution explained over 60% of the variance, with factor loadings ranging from .51 to .89. The number of components to be retained was determined by the Scree method (Catell, 1966) and interpretability. After rotation, an item was judged as belonging to a component if there was a component loading of .5 or greater, and if the item did not load on another component.

These data are best represented by one self-efficacy (SE) factor with some overlap on a second factor named condom availability (CA). The Cronbach's alpha for HK was .91, and for the US it was .95. See Table 6 for the factor loadings for self-efficacy. The first factor (SE) accounted for 74% of the variance in the data for HK and Factor 2 (CA) for 14% of the variance in the data. In the US data, Factor 1 (SE) accounts for 92% of the variance in the data and Factor 2 (CA) for 8% of the variance in the data. In the HK sample, SE and CA were significantly correlated in both cultures (i.e.,  $r = .53$  and  $r = .84$  for HK and US, respectively).



Table 6

Self-efficacy - Factor Loadings for Hong Kong and the United States

Scale items for self-efficacy	Hong Kong		United States	
	SE	CA	SE	CA
1. When I am really sexually aroused	.62	-.23	.78	.25
2. When my partner is really insulted about using a condom	.63	.38	.82	-.03
3. When I am depressed	.61	-.11	.87	-.22
4. When I am affected by alcohol or drugs	.57	.02	.76	.13
5. When I'm feeling angry	.69	.06	.89	-.21
6. When condoms are not available	.45	.54	.80	.41
7. When I am upset	.76	-.06	.89	-.27
8. When my partner says no	.75	.19	.82	-.17
9. When I feel nervous	.74	-.32	.82	-.24
10. When there is not much risk to me	.51	-.47	.74	.31
11. When my partner threatens me	.71	.19	.67	-.27
12. When I am in a hurry to have sex	.77	-.09	.86	.11
13. When I don't have condoms with me	.71	.21	.84	.38
14. When I am really lonely	.72	-.22	.88	-.14

Scores of the self-efficacy scale were converted to standard (T) scores ( $M = 50$ ;  $SD = 10$ ) using the procedure outlined by Hinkle, Wiersma, and Jurs (1979) and Prochaska et al. (1993). A 2 cultures (HK versus US) x 5 stages (PC, C, P, A, M) ANOVA for self-efficacy was conducted. There were main effects for culture,  $F(1, 444) = 8.82, p = .003$ ; and stage,  $F(4, 444) = 16.35, p = .0001$ . The interaction was not

significant. A post hoc Scheffé F-test found significant differences between precontemplation and action,  $F(4, 448) = 2.10, p < .05$ ; and precontemplation and maintenance;  $F(4, 448) = 13.29, p < .05$ . Combined means and standard deviations for the main effect can be seen in Table 7.

Table 7

Combined Means, Standard Deviations for Self-efficacy Scale

	n	M	SD
PC-Self-efficacy*	162	46.1	9.89
C-Self-efficacy	36	47.1	9.37
P-Self-efficacy	54	48.9	9.67
A-Self-efficacy	48	52.4	11.42
M-Self-efficacy	153	53.9	8.27

PC=precontemplation; C=contemplation; P=preparation; A=action; M=maintenance.

\*  $p < .05$  reflected differences between HK and the US.

A graph of the T-score means for self-efficacy for condom use, across the five stages of change, can be seen in Figure 1. In the graph, the mean self-efficacy T-score shows a steady increase after the precontemplation stage for the HK sample. A one-way ANOVA was found to be significant for these data,  $F(4, 219) = 4.69, p = .001$ . Scheffé tests found differences between those individuals in precontemplation and those in maintenance,  $F(4, 216) = 3.60, p < .05$  in the HK sample. This suggests individuals just considering using condoms (contemplation stage) have few feelings of self-efficacy for condoms until they have had experience with condoms (action and maintenance). In Figure 1, the mean self-efficacy T-scores for the US show a sharp significant increase after the contemplation stage. This suggests individuals just considering using condoms

(contemplation stage) may actually have enhanced feelings of self-efficacy for condoms, especially considering the low levels of self-efficacy for individuals in the precontemplation stage. A one-way ANOVA was conducted for self-efficacy and was significant across the five stages of change,  $F(4, 225) = 14.75, p = .0001$ . Scheffé tests found differences between those individuals in precontemplation and action,  $F(4, 225) = 3.32, p < .05$ ; precontemplation and maintenance,  $F(4, 225) = 12.07, p < .05$ , and contemplation and maintenance,  $F(4, 225) = 4.37, p < .05$ .

Post hoc tests. Because there was a main effect for culture, further post hoc tests were conducted. A 2 culture (HK versus US) x 5 stages (PC, C, P, A, M) x 2 (nonactive sexually versus active sexually) ANOVA was conducted in order to determine if lack of experience with the target behavior, i.e., using condoms, impacted on self-efficacy. Main effects for culture and stage were found. The interactions between culture and sexual activity,  $F(1, 1) = .04, p = .94$ , and stage and sexual activity,  $F(4, 1) = .91, p = .45$  were not significant. Thus, the differential rates of sexual activity across HK and the US cannot explain the main effect of culture for self-efficacy for using condoms.

Decisional Balance Scale. A factor analysis was conducted on the decisional balance scale which consisted of statements of advantages and disadvantages for condom use. Principal components analyses (PCA) with a varimax rotation were conducted on the 17-item scale (8-items for Advantages and 9 items for Disadvantages) using separate analyses for the two samples from HK ( $n = 223$ ) and US ( $n = 230$ ). These analyses revealed four components per culture, dividing the advantages and disadvantages into two components, reflecting concern for self (I) and reflecting concern for partner/relationship (we). Cronbach's alpha for the HK data was .83 for advantages and .85 for the HK disadvantages. Cronbach's alpha for the US data was .79 advantages and .85 for disadvantages. This suggests the data represented a homogeneous collection of

variables and were suitable for factor analysis. See Table 8 for factor loadings for decisional balance.

Factor loadings indicated differences on 3 items of the Advantages and 3 for the Disadvantages section of the Decisional Balance scale (see Table 8). For the advantages section, statements number 1, 5, and 8, loaded on opposing factors. For the disadvantages section, statement number 11, 16, and 17, loaded on opposite factors suggesting cultural differences regarding I/we or self/other distinctions. In the HK sample, Factor 1 accounted for 54% of the variance of the data and Factor 2 accounted for 46% of the data for the advantages subscale of decisional balance. For the disadvantages section, Factor 1 accounted for 81% of the variance of the data and Factor 2 accounting for only 18%. In HK advantages for self and advantages for the other were correlated  $r = .64$  and disadvantages for self and disadvantages for the other were correlated  $r = .39$ .

For the advantages section among the US sample, Factor 1 accounted for 51% of the variance of the data and Factor 2 accounted for 49%. For the disadvantages section, Factor 1 accounted for 53% of the variance and Factor 2 accounting for 47% of the variance of the data. Advantages for self and advantages for the relationship were correlated,  $r = .54$ . Disadvantages for self and disadvantages for the relationship were correlated,  $r = .50$ .

Table 8

Decisional Balance - Factor Loadings for Hong Kong and the United States

	HK		US	
	I	we	I	we
<u>Advantages</u>				
1. I would feel safer*	.71	.24	-.06	.80
2. It would build trust	.26	.76	.32	.67
3. I'd feel more responsible	.39	.65	.22	.74
4. Sex would feel cleaner	.81	.27	.77	.27
5. Sex would be less worrisome*	.84	.09	.29	.57
6. It would make sex less messy	.77	.26	.82	.08
7. My partner would approve*	.29	.74	.54	.36
8. Sex would be more enjoyable*	.02	.79	.71	.09
<u>Disadvantages</u>				
9. It would be a lot of trouble	.67	.01	.78	.18
10. It would make sex less spontaneous	.83	-.30	.82	.12
11. My partner would be angry*	.66	.21	.23	.83
12. Sex would be less exciting	.82	-.29	.74	.33
13. Sex would take too long	.56	.45	.60	.33
14. I would feel embarrassed	.47	.74	.31	.65
15. It would put up an unnatural barrier	.81	-.09	.61	.43
16. My partner would be upset*	.78	.05	.17	.89
17. It would make sex physically uncomfortable*	.82	-.27	.48	.55

\* indicates opposite factor loadings for Hong Kong and the United States

Advantages. Scores of the advantages scale for decisional balance were converted to standard (T) scores ( $M = 50$ ;  $SD = 10$ ) using the procedure outlined by Hinkle, Wiersma, and Jurs (1979) and Prochaska et al. (1993). A graph of the T-score means for advantages of condom use, across the five stages of change, can be seen in Figure 2. The graph for the advantages depicts the level of advantages in a state of flux across the five stages of change for HK and was found to be non-significant across the five stages for the HK sample. A 2 culture (HK versus US) x 5 stages (PC, C, P, A, M) ANOVA for advantages was conducted. There was a main effect for stage,  $F(4, 441) = 4.70, p = .001$  and a significant Culture x Stage interaction,  $F(4, 441) = 2.55, p = .03$  (see Figure 2). The interaction of Culture x Stage can be seen at the maintenance stage of change. The means and standard deviations for these data are depicted in Table 9.

For the US, the pattern of data indicate a consistent rise in advantages for condom use as individuals move through the nonaction (PC, C, P) stages to action (A, M) stages with significance across the five stages of change,  $F(4, 223) = 6.72, p = .0001$ . Scheffé tests showed differences between those individuals in precontemplation and maintenance,  $F(4, 223) = 6.18, p < .05$  for the US sample.

Table 9

Means and Standard Deviations for Advantages - Hong Kong and the United States

	Hong Kong			United States		
	<u>M</u>	<u>SD</u>	n	<u>M</u>	<u>SD</u>	n
PC-Advantages	48.72	10.19	117	44.25	11.52	45
C-Advantages*	50.62	10.39	24	46.08	8.56	12
P-Advantages	49.16	7.74	18	49.83	11.65	36
A-Advantages	53.26	11.85	23	49.68	9.12	25
M-Advantages	50.14	8.66	41	52.75	8.14	112

PC=precontemplation; C=contemplation; P=preparation; A=action; M=maintenance.

\*  $p < .05$  reflected differences between HK and the US.

Disadvantages. Scores of the disadvantages scale for decisional balance were converted to standard (T) scores ( $\underline{M} = 50$ ;  $\underline{SD} = 10$ ) using the procedure outlined by Hinkle, Wiersma, and Jurs (1979) and Prochaska et al. (1993). A 2 culture (HK versus US) x 5 stages (PC, C, P, A, M) ANOVA for the T-scores showed a main effect for culture,  $F(1, 441) = 5.58, p=.01$  and stage,  $F(4, 441) = 6.56, p=.0001$ . The interaction was not significant. The means and standard deviations are depicted in Table 10.

Table 10

Means and Standard Deviations for Disadvantages - Hong Kong and the United States

	Hong Kong			United States		
	n	<u>M</u>	<u>SD</u>	n	<u>M</u>	<u>SD</u>
PC-Disadvantages	117	51.99	10.12	45	53.71	9.32
C-Disadvantages**	24	50.43	9.35	12	55.52	7.01
P-Disadvantages.	18	50.28	9.10	36	49.41	10.60
A-Disadvantages	23	46.47	9.93	25	51.35	12.60
M-Disadvantages	41	45.72	9.39	112	47.85	9.22

PC=precontemplation; C=contemplation; P=preparation; A=action; M=maintenance.

\*\* p < .001 indicates difference between HK and the US.

Figure 3 depicts the T-score means for disadvantages for condom use across the five stages of change and show a linear decrease in disadvantages as a function of stages for HK participants. Significant differences were found between the nonaction (PC, C, P) stages of change and the action (A, M) stages of change,  $F(4, 217) = 3.77, p = .005$ . Scheffé tests found significant differences between those individuals in precontemplation and those in maintenance;  $F(4, 216) = 2.98, p < .05$  for HK. For the United States, the graph indicates (see Figure 3) individuals in precontemplation and contemplation demonstrated a significant decrease in disadvantage scores compared to those in the preparation, action and maintenance stages of change to action stages of change,  $F(4, 224) = 4.08, p = .003$ . Scheffé tests found significant differences between those individuals in precontemplation and maintenance,  $F(4, 224) = 2.89, p < .05$ .

Post hoc tests. Because there was a main effect for culture, further post hoc tests were conducted. A 2 culture (HK versus US) x 5 stages (PC, C, P, A, M) x 2 sexual



activity (nonactive versus active) ANOVA was conducted in order to determine if lack of experience with the target behavior (i.e., sexually active and using condoms) impacted on disadvantages. The main effects for culture and stage, and the interaction between culture and stage were significant. The interactions between culture and sexual activity,  $F(1, 1) = .33, p = .56$ ; and stage and sexual activity ( $F(1, 4) = .94, p = .43$ ) were not significant.

Decisional balance. Decisional balance for HK is illustrated in Figure 4, with the cross-over of advantage and disadvantage scores at the preparation stage of change. Thus, there was a change in the weighing of the advantages and disadvantages prior to engaging in the target behavior, i.e., between nonaction (PC, C, P) stages and action stages (A, M). Figure 5 illustrates decisional balance for the US at the action stage of change. This suggests that decisional balance was not demonstrated in the US until participants have actually had experience with the target behavior.

The data were also examined using T-scores ( $M = 50, SD = 10$ ) for overall change between nonaction and action stages of change. In the HK sample, for both the advantages and disadvantages, there was slightly greater than one-half standard deviation ( $T=5$ ) change from precontemplation to action on the advantages ( $T=5.5$ ) and the disadvantages ( $T=5.4$ ). The same was found for advantages ( $T=5.4$ ) and disadvantages ( $T=5.8$ ) in the US sample. A change of 0.5 standard deviation is considered to be a medium effect size (Cohen, 1977; Rossi, 1990). Increases in the advantages, however, were not as substantial as decreases in the disadvantages across the five stages of change. Compared to the US, the HK sample, in the advantages subscale, no statistical significance was reached between the nonaction stages of change and the action stages of change, suggesting cultural differences in weighing disadvantages more than advantages in decision making.

## Discussion

The purpose of this research was to extend and validate the SBC model for Chinese students living in Hong Kong concerning the problem of condom use for AIDS prevention. The results of this study answered specific questions in the areas of sexual activity and condom use, self-efficacy and decisional balance. These results paralleled previous studies using the SBC model with other behaviors such as cocaine and smoking cessation, weight control, safer sex adoption, and mammography screening within diverse populations within the United States (DiClemente et al., 1993; Prochaska et al., 1994; Redding, 1993). More specifically, the data supported similar factor structures for self-efficacy and decisional balance across both populations. This study found individuals in an Asian culture in the action (A, M) stages of change to have higher self-efficacy than those in the nonaction (PC, C, P) stages of change as compared to participants in the United States. The HK and the US data supported an increase in advantages and a decrease in the disadvantages across the five stages of change for condom use. Advantage scores increased significantly for the US sample across the five stages of change, but not for the HK sample. Disadvantage scores decreased significantly from the stages of change for both HK and US data. Asian individuals demonstrated changes in decisional balance across the stages of behavior change comparable to those found in previous studies. At least one-half standard deviation difference was found from nonaction to an action stages in each component. The hypotheses for a lower rate of sexual activity in HK, a greater number of individuals in precontemplation stage for condom use in HK, and a greater number of individuals in maintenance stage for condom use in the US were supported. These results offer initial support for the effectiveness of the SBC model in a different cultural group, Chinese in Hong Kong. The results support the model can be used in HK for the problem of AIDS prevention.

There are cultural differences, however, found in the current investigation which impact on interventions using the SBC model in HK. The first difference was that self-efficacy was significantly higher in HK. Self-efficacy refers to beliefs about one's ability to emit certain behaviors under specific conditions (Bandura, 1977; Winett, King, & Altman, 1988). Self-efficacy was coined initially by Bandura (1977), as part of his social learning theory. It has almost become a standard variable in the prediction of behavior. Initially, it was believed that this may be a function of no experience with the target behavior, i.e., being active sexually and using condoms. However, when sexual activity (i.e., active versus inactive) were factored into the ANOVA, it did not interact significantly with any other independent variable (i.e., culture or stage).

Other cultural issues have influenced the increased self-efficacy scores. Students in HK are imbued with the need to succeed which may be reflected in the elevation of the self-efficacy scores (Bond, 1991). Research also has demonstrated that HK Chinese need to show "good face" and to exhibit socially desirable behavior or at least depict themselves in a favorable light (Bond, 1991). "Face is lost" when an individual, either through personal action or close alliances, fails to meet essential requirements placed upon the individual by virtue of an occupied position such as that of the student (Bond, 1991; Hofstede, 1984). For example, if an individual demonstrates lack of confidence, this may be perceived as weakness and letting the group down. Thus, possibly demonstrating high self-efficacy scores on a questionnaire may be considered a socially desirable behavior. Because of the cultural propensity to give social desirable responses in the HK population, special care is needed in interventions. In the current study, insuring confidentiality and providing adequate spacing for subjects helped to reduce the potential research bias of giving socially desirable answers. Techniques to insure honest responses for baseline and ongoing assessments of self-efficacy throughout an intervention might include privacy when collecting data, anonymity, and paying close

attention to any expectations in the intervention or experimental setting and to possible experimenter reactivity in either HK or the US.

The components of decisional balance, advantages and disadvantages, demonstrated cultural differences. It is speculated the differences in factor loadings on the decisional balance may be due to cultural differences between the Chinese in this study and their US counterparts. The difference between self (I) and other (we) concerns on decisional balance are illustrative. Items 1. (I would feel safer), 5. (Sex would be less worrisome), 11. (My partner would be angry), and 16. (My partner would be upset) loaded on the self factor in HK and other (we) factor in the US. This suggests there is more emphasis on the individual taking responsibility for maintaining harmony and saving face. Further, 7. (My partner would approve) and 8. (Sex would be more enjoyable) loaded on the other (we) factor in HK but the self (I) factor in the US suggesting concern for others as well. A plausible reason is Chinese have been labeled as collectivistic whereas Americans have been labeled individualistic (Hofstede, 1984; Triandis, 1989). Collectivism is defined as concern and affiliation with the group. In a collectivistic society, emphasis is placed on maintaining family integrity, the self is defined in terms of the group, and behavior is regulated by the ingroup norms. Hierarchy, harmony and cooperation are considered essential within the cultural group. Collectivism, however, does not mean a negation of the individual's well-being or interest, rather, it simply assumes that maintaining the group's interest is best for survival of the individual (Hofstede, 1984).

Thus, the items which loaded on the other (we) factor serve to demonstrate a collectivistic outlook. The converse is true for the US population which has been labeled as individualistic. Individualism represents a preference for a loosely knit social framework in society wherein individuals are responsible only for themselves and their immediate families (Hofstede, 1984). Recent research endorses the individualism-

collectivism construct as having implications for understanding thought and behavior (Gudykunst & Nishida, 1986; Gudykunst & Tin-Toomey, 1988; Gudykunst, Yoon, & Nishida, 1987; Triandis, 1989; Triandis et al., 1986; Triandis, McCusker, & Hui, 1990). Thus, the differences on the decisional balance factor loading with regards to concern for self (I) versus concern for others (we) may be a function of the constructs of individualism and collectivism or other, unresearched cultural constructs.

In previous investigations for a variety of behaviors, advantage and disadvantage scores cross over prior to the action stage of change. For the Hong Kong sample, the cross-over began in the contemplation stage, occurred again at the preparation stage, and made a distinct crossover in the action stage. In the United States, the crossover began in the preparation stage, occurred again at the action stage, and made another distinct crossover at the maintenance stage. It could be argued this was due to some participants not being sexually active and having no experience with condoms but no interaction with this variable was statistically significant. This could also be a function of the cross-sectional design of the current investigation. It could also be argued that the differences in crossovers may be related to the psychological processes in each culture linked to the various stages of change. According to Prochaska (1994), psychological processes which move individuals from precontemplation to contemplation to action are consciousness raising (CR), environmental (ER) and self-reevaluation (SR), and dramatic relief (DR). The process CR is defined as an increased level of awareness and more accurate information processing, e.g., I seek information related to AIDS prevention. The process ER is defined as affective and cognitive re experiencing of one's environment and problems, e.g., I stop to think that AIDS prevention and treatment is greatly affecting our community. Self-reevaluation is the affective and cognitive reexperiencing of one's self and problems, e.g., not using a condom or practicing safe sex makes me feel disappointed in myself. Finally, DR is defined as experiencing and releasing feelings, e.g., warnings

about the hazards of unprotected, unsafe sex move me emotionally. Further investigation is needed to test the cross-cultural applicability of the various psychological processes, leading to movement from precontemplation to contemplation. Data need to be collected which assess individuals' emotional/cognitive changes they experience when considering change. These may differ culture to culture. Asking subjects to endorse previously validated questions as well as providing for open-ended responses would allow for identification of these processes which, in turn, would allow for the development of culturally appropriate, staged-matched interventions. In relation to the current investigation, interventions aimed at moving HK individuals from precontemplation to contemplation would include education to increase the awareness of the behavior and how the problem and solution impacts on the group, thus, addressing collective concerns.

In the current investigation, for the US sample, the relative weights of advantages versus disadvantages do not occur until the individuals actually have more experience with the target behavior. Reinforcement management (RM) is the process identified as the process which occurs in the action stage. The process RM is defined as reinforcing more positive behaviors and punishing negative ones (e.g., I am rewarded by others if I use condoms). Whereas in Hong Kong, participants appear to experience decisional balance prior to engaging in the target behavior. The psychological process at the preparation stage is self-liberation (SL) which is defined as the belief in one's ability to change and commitment to act on that belief (e.g., I tell myself I am able to use condoms if I want). In the US, there is more discussion of sex and safe sex. Thus, it is posited that external, public reinforcement is needed in the US to promote and sustain the change process even prior to action. In contrast, HK subjects may be more likely to respond to internal cues or reinforcement from their sexual partner brought on by the need to save face by not openly discussing the sexual behavior.

Ultimately, however, the goal of intervention is to move individuals through the stages (PC, C, P, A, M) by providing staged-matched, culturally-appropriate interventions. Based on the results of the current investigation, researchers and intervention agents should proceed using the SBC model as the basis for further research and intervention in Hong Kong. However, in order to insure successful implementation of the SBC model, the following recommendations are given. The first step in the planning process is to establish a community advisory group or coalition to guide or oversee the health promotion efforts (Gonzalez et al., 1991). The community advisory committee can assist in the direct assessment of the community's needs and concerns. Methods that have demonstrated effectiveness in the field of social marketing are surveys and questionnaires, focus groups, public forums or meetings, and interested party analysis (Gonzalez, 1991; Manoff, 1985). Community representatives should be used in order to establish some form of baseline assessment of attitudes, in this case, the current understanding the epidemiology involved in the target behavior, in this case HIV infection, as well as baseline measurement of the stages, self-efficacy, and decisional balance.

The next step in determining culturally appropriate placement for the intervention is the use of social marketing techniques to insure effectiveness of an intervention. To illustrate, in the Asian population, the family/community unit is considered to be central in the formation of attitudes and behaviors. The Chinese tend to identify their ideal self in the context of interpersonal concern and social relationships as opposed to romantic dyads found in Western cultures. Consequently, interventions must target all facets of a person's environment such as the family, school, and friends as well as the sexual partner in the case of AIDS prevention. The SBC model uses a progression of intervention techniques which can be aimed at the community as well as the individual (see Table 2). Community-based interventions which involve the community of an individual have

shown reported effectiveness in Asian cultures such as in Thailand (TBIRD, 1992) and in Asian populations within the US (Gonzalez et al., 1988). It is recommended that the interventions be fine-tuned using focus groups using community members and efficacy studies (see Gonzalez et al, 1991; Winett, Moore, and Anderson, 1991). Research-based interventions need to follow a progression from small to large such as focus groups, pilot testing, efficacy trials, effectiveness trials and large scale dissemination. Measures of the components for the SBC, staging, self-efficacy, and decisional balance, need to be assessed throughout each of these designs.

Additional health concerns require attention, e.g., cancer prevention, health screenings, diet modifications and exercise acquisition in Hong Kong. These health concerns have been identified in Hong Kong. Such studies could systematically examine acquisition and cessation behaviors of concern in two diverse populations with US populations acting as comparison groups. Chinese in the US could serve as a comparison group to assess the impact of acculturation upon the processes of change. It is also recommended that studies include both cross-sectional and prospective designs. Prospective studies would allow researchers to track more carefully the processes of change across a Chinese population. Further, this would elucidate the pattern and change in self-efficacy as individuals attempt to negotiate condom use in a variety of situations. Further intervention research could assess interventions designed to match the stage of change (see Table 2). For example, stage appropriate (matching) interventions could be administered which coincided with a group which received interventions which did not use stage as a criterion for planning intervention. The SBC model is a comprehensive model for understanding the process of change and for intervening more effectively in the cycle of change. With refining and expansion to include culturally relevant concerns, the SBC model should be appropriate for use in understanding and for changing health behaviors in diverse cultural groups worldwide.



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## Figure Captions

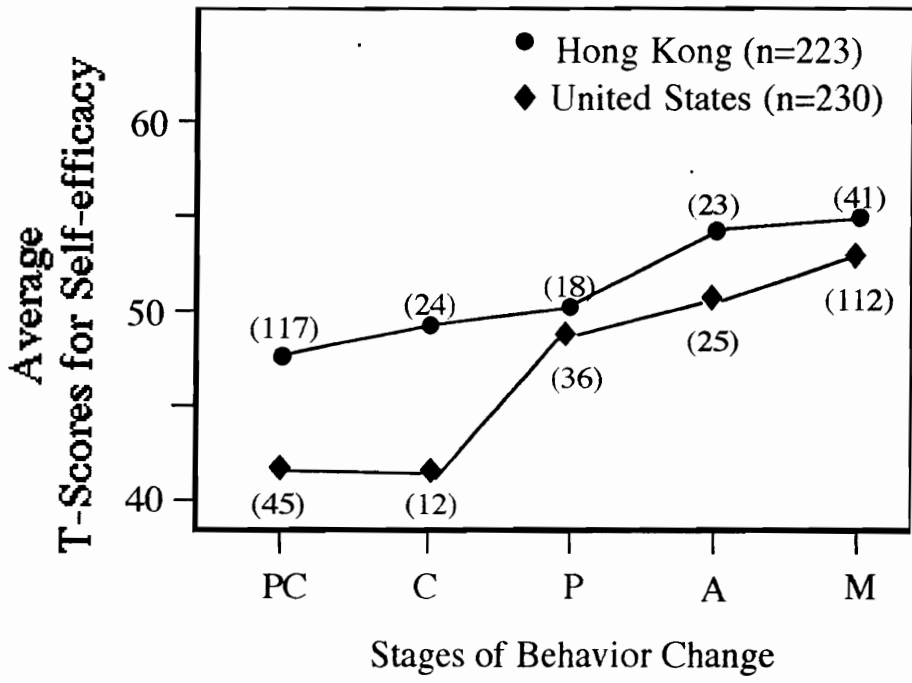
Figure 1. A comparison of self-efficacy across the stages of change for condom use for Hong Kong (n=223) and the United States (n=230).

Figure 2. A comparison of the advantages component of decisional balance across the stages of change for condom use for Hong Kong (n=223) and the United States (n=230).

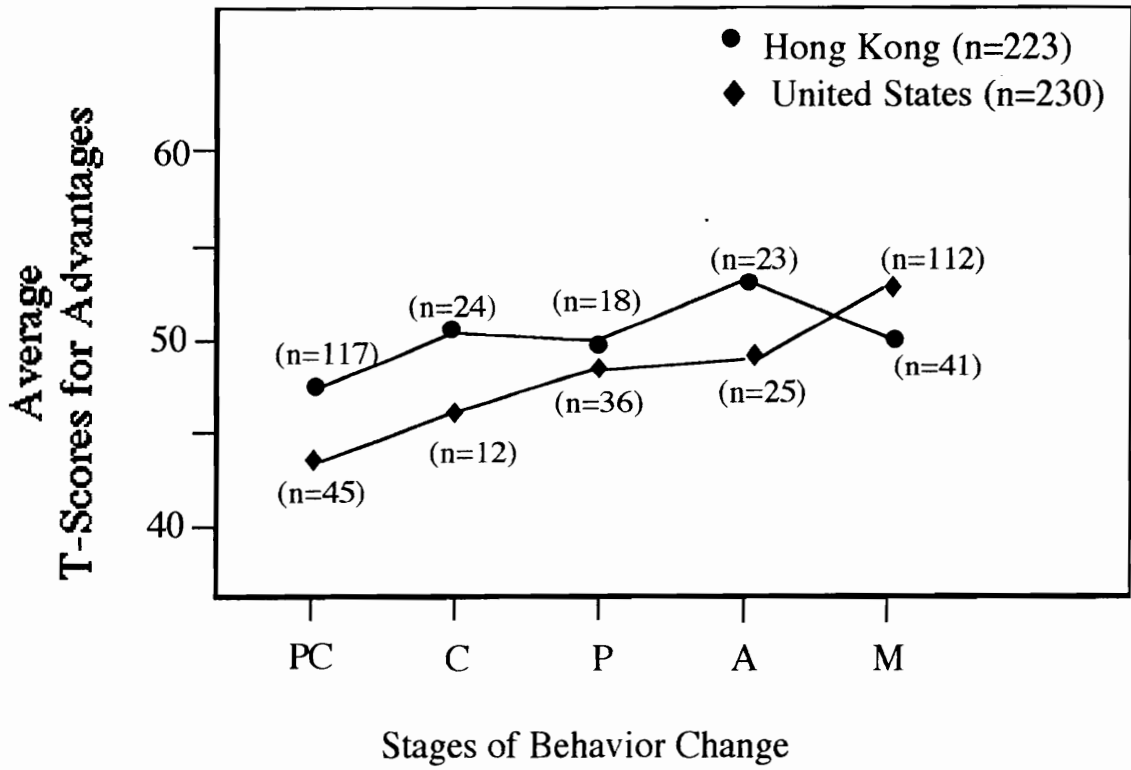
Figure 3. A comparison of the disadvantages component of decisional balance across the stages of change for condom use for (n=223) and the United States (n=230).

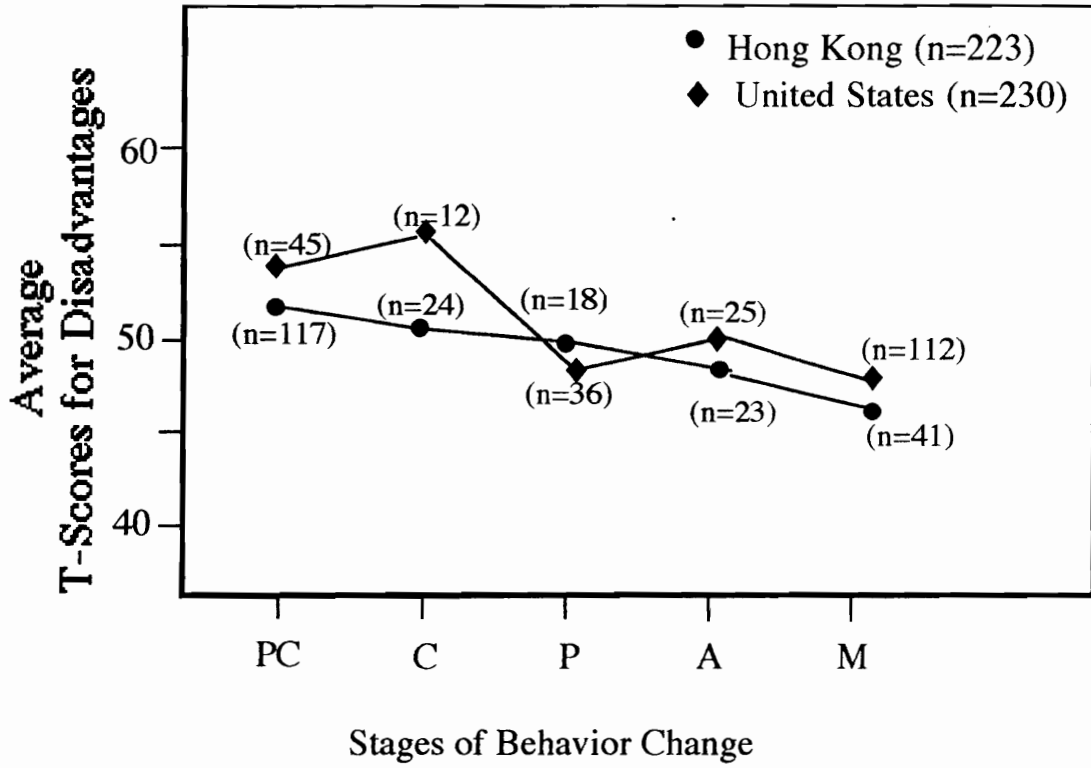
Figure 4. Decisional balance across the stages of change for condom use for Hong Kong (n=223).

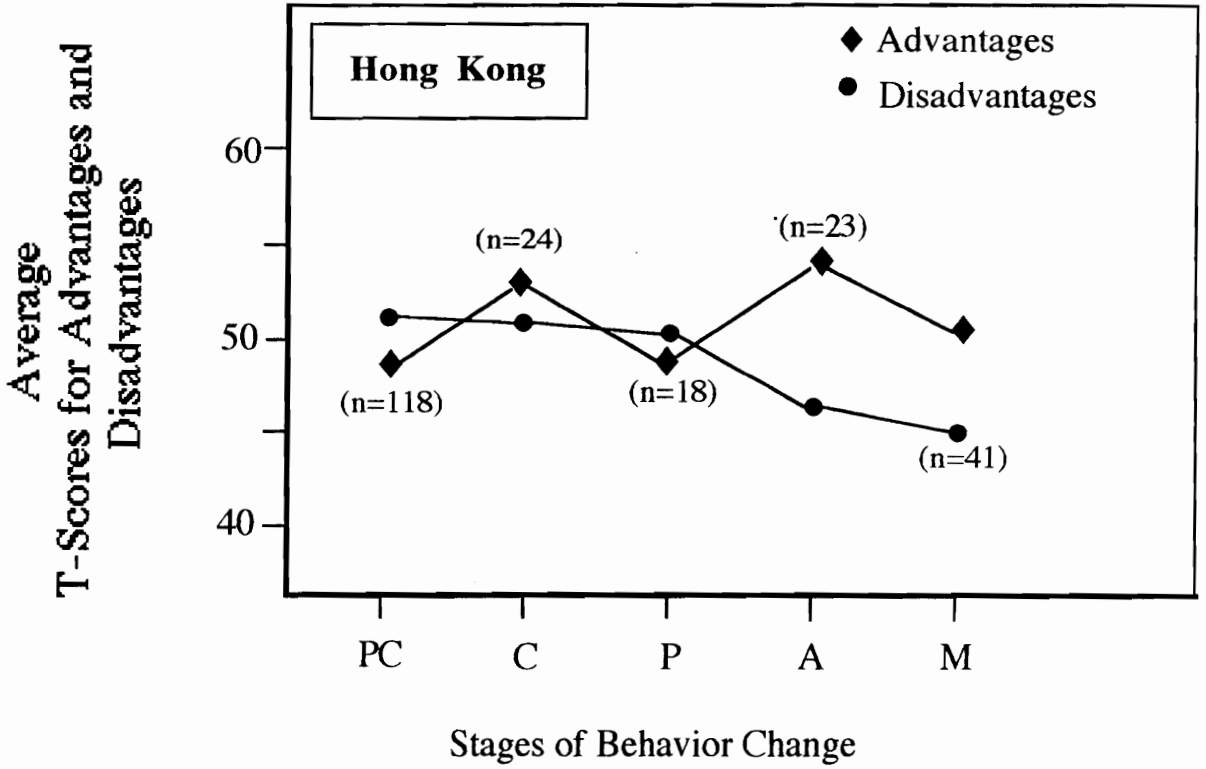
Figure 5. Decisional balance across the stages of change for condom use for the United States (n=230).

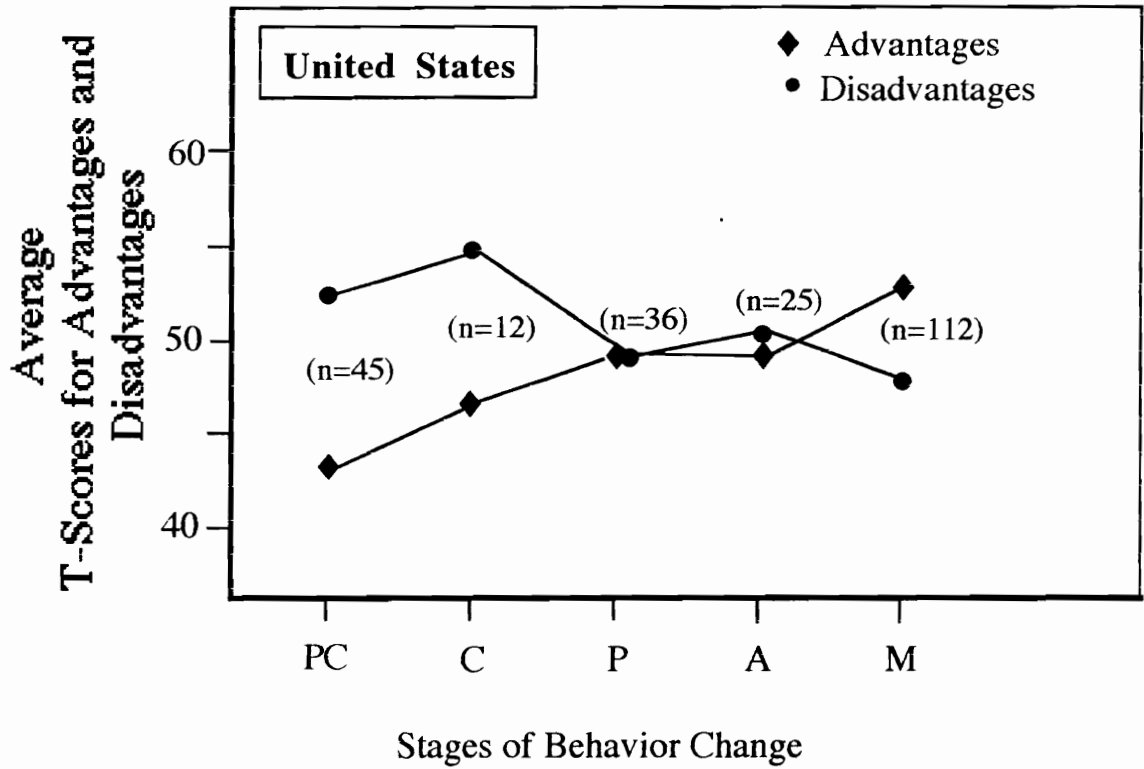












## Appendix A

### Scale title

- a) **Staging for Sexual Activity and Condom Use**
- b) **Self-Efficacy**
- c) **Decisional Balance**

1. Have you had vaginal (or anal) sex for the first time?

- a) No and I am not considering having sexual contact within the next 6 months.
- b) No, but I am considering having sexual contact within the next 6 months.
- c) No but I am planning to have sexual contact within the next 6 months.
- d) Yes, and I have been active sexually within the past 6 months.
- e) Yes, and I have been active sexually longer than 6 months.

**Even if you are not sexually active, please answer the following question as if you were active sexually.**

2. Do you always use condoms when you have sex?

- a) No and I am not thinking about starting within the next 6 months.
- b) No, but I am planning to starting to always use them within the next 6 months.
- c) No but I am planning to start within the next 30 days.
- d) Yes, and I have been doing so for 6 months or less.
- e) Yes, and I have been doing so for 6 months or longer.

### C-Scale

Listed below are situations that might affect people's use of condoms. HOW CONFIDENT are you that you or your partner WOULD USE A CONDOM for either vaginal or anal sex in these situations, using the following 5-point scale?:

1 = NOT AT ALL CONFIDENT • • • • 5 = VERY CONFIDENT

1. When I am really sexually aroused	1	2	3	4	5
2. When my partner is really insulted about using a condom	1	2	3	4	5
3. When I am depressed	1	2	3	4	5
4. When I am affected by alcohol or drugs	1	2	3	4	5
5. When I'm feeling angry	1	2	3	4	5
6. When condoms aren't available	1	2	3	4	5
7. When I am upset	1	2	3	4	5
8. When my partner says no	1	2	3	4	5
9. When I feel nervous	1	2	3	4	5
10. When there is not much risk to me	1	2	3	4	5
11. When my partner threatens me	1	2	3	4	5
12. When I am in a hurry to have sex	1	2	3	4	5
13. When I don't have condoms with me	1	2	3	4	5
14. When I am really lonely	1	2	3	4	5

## ADV-DISA

### A - Scale

Listed below are several possible advantages of using condoms. HOW IMPORTANT is each of these advantages to you in deciding whether or not to use condoms for either vaginal or anal sex, using the following 5-point scale?:

1 = NOT AT ALL IMPORTANT • • • • 5 = VERY IMPORTANT

- |                                 |   |   |   |   |   |
|---------------------------------|---|---|---|---|---|
| 1. I would feel safer           | 1 | 2 | 3 | 4 | 5 |
| 2. It would build trust         | 1 | 2 | 3 | 4 | 5 |
| 3. I'd feel more responsible    | 1 | 2 | 3 | 4 | 5 |
| 4. Sex would feel cleaner       | 1 | 2 | 3 | 4 | 5 |
| 5. Sex would be less worrisome  | 1 | 2 | 3 | 4 | 5 |
| 6. It would make sex less messy | 1 | 2 | 3 | 4 | 5 |
| 7. My partner would approve     | 1 | 2 | 3 | 4 | 5 |
| 8. Sex would be more enjoyable  | 1 | 2 | 3 | 4 | 5 |

### D - Scale

Listed below are several possible disadvantages of using condoms. HOW IMPORTANT is each of these advantages to you in deciding whether or not to use condoms for either vaginal or anal sex, using the following 5-point scale?:

1 = NOT AT ALL IMPORTANT • • • • 5 = VERY IMPORTANT

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1. It would be a lot of trouble               | 1 | 2 | 3 | 4 | 5 |
| 2. It would make sex less spontaneous         | 1 | 2 | 3 | 4 | 5 |
| 3. My partner would be angry                  | 1 | 2 | 3 | 4 | 5 |
| 4. It would make sex less exciting            | 1 | 2 | 3 | 4 | 5 |
| 5. Sex would take too long                    | 1 | 2 | 3 | 4 | 5 |
| 6. I would feel embarrassed                   | 1 | 2 | 3 | 4 | 5 |
| 7. It would put up an unnatural barrier       | 1 | 2 | 3 | 4 | 5 |
| 8. My partner would be upset                  | 1 | 2 | 3 | 4 | 5 |
| 9. It would make sex physically uncomfortable | 1 | 2 | 3 | 4 | 5 |



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Augusta Medical Center - Recovery Choice & Crossroads Mental Health Units  
October 1994 to present

Responsibilities include research development, community outreach, case management, patient education, therapeutic groups focused on the following: feminist theory and application focused on abuse prevention, problem solving, communication skills, alcohol and drug treatment, education, and prevention (based on cognitive/behavioral theory), development, implementation, and evaluation of treatment care plans, patient assessment, utilization review, program evaluation, and other responsibilities.

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Responsibilities included development and implementation of programs for inpatient services, staffing & hiring, staff training and development, administrative and leadership responsibilities, 1:1 and group therapy, nursing duties, part of a multi-disciplinary team, staffing, utilization review, policy development, staff supervision and evaluation, and other responsibilities.

**Clozoral Support Group - Co-Facilitator**  
On Our Own - Charlottesville, VA  
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Community-based support group for individuals diagnosed as schizophrenic who are currently using Clozoral. This group activity included a needs assessment, group topics included medication education (including side effects, drug interactions, psychopharmacology), problem solving, communication, and skill building, discussion of feelings about the medication and other issues.

**Applied Research Specialist**  
Center For Applied Behavior Systems  
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Research areas include: safety in the workplace, industrial-organizational psychology, corporate-based recycling, grant preparation, community safety including bicycle safety and driver safety; program evaluation, professional editing and journal review responsibilities

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Consulting therapist on adolescent and adult behavior problems, stress management, smoking cessation, dietary modification, health education, and other health-related behaviors, biofeedback, community and medical referrals.

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- Journal of Rational-Emotive & Cognitive Behavior Therapy Reviewer 1990
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- Silverman, E. S. (1992). Towards an understanding of culture in psychology. (In revision for publication)
- Silverman, E. S., Lee, S. S., Chow, J., & Leung, J. P. (1992). An assessment of knowledge and behaviors related to AIDS prevention among high risk youths in Hong Kong. Paper submitted for publication
- Silverman, E. S. (1989). Substance abuse: It affects more than the abuser. *Health Beat*, 4, 1-3.
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- Silverman, E. S. (1990). Cognitive variables related to suicidal contemplation in high school juniors & seniors. Unpublished Masters Thesis (Hollins College).

**Professional Conferences and Presentations**

- Silverman, E. S., & Law, J.(1994). A cross-cultural analysis of AIDS prevention: Hong Kong and the United States. Paper presented at the 23rd International Congress of Applied Psychology, Madrid, Spain July 17-22, 1994.
- Silverman, E. S. (September, 1993). Experiences of a Novice Health and Community Psychologist in Hong Kong. Presentation. Eco-Community Conference. Black Mountains, Georgia.
- Silverman, E. S., Abraham, J., & Carr, K. (June 19, 1993). Developing culturally sensitive intervention programs: AIDS prevention in Hong Kong. Forth Biennial Conference on Community Research and Action. Williamsburg, VA.
- Silverman, E. S. (November 24, 1992). An introduction to cognitive-behavioral and rational-emotive therapy. Workshop presented to physicians and psychiatric nurses at Prince of Wales Hospital, City One, Shatin, NT Hong Kong.

Silverman, E. S. (November 10, 1992). Knowledge, attitudes, and behaviors related to AIDS prevention in Hong Kong university students. *Psychotherapy for the Chinese: An International Conference*.

Silverman, E. S. (November 11, 12, 13, 17, & 19, 1992). AIDS prevention programs for college students. The Chinese University of Hong Kong, Shatin NT, Hong Kong.

Silverman, E. S. (April 7, 8, 9, 10, 14, 21, & 23, 1992). Focus group for social marketing of AIDS prevention: Education and evaluation of existing AIDS prevention media. The Chinese University of Hong Kong, Shatin NT, Hong Kong.

Silverman, E. S. (February, 1992). AIDS in Hong Kong: A community-based approach. *Psychology Seminar Series, Chinese University of Hong Kong*.

Silverman, E. S., Futch, C. J., & Stephenson, R. L. (October, 1991). Baseline assessment for bicycle safety in a small college town. Poster presented at the Southeastern Association for Behavior Analysis Conference.

**Honors:**

Fulbright Scholar	1992
Psi Chi National Honor Society for Psychology	1990 - present
F. Joseph McGuiggan Graduate Psychology Research Award for excellence in Research and Education	1990

**Professional Organizations:**

American Psychological Association	1989 - present
Health & Community Divisions	1993 - present
Hong Kong Psychological Society	1992 - 1993
Hong Kong Government Publicity Working Group on AIDS	1992 - 1993
Fulbright Committee on AIDS	1992 - 1993

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12 April 1995