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Don't go changing: An analysis of sub -groups within the precontemplation stage of the transtheoretical model of behavior change.

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DON'T GO CHANGING:
AN ANALYSIS OF SUB-GROUPS WITHIN THE PRECONTEMPLATION STAGE OF THE TRANSTHEORECTICAL MODEL OF CHANGE

by

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ABSTRACT OF DISSERTATION
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The stage of precontemplation within the transtheoretical model of change is currently characterized by a single stage whose members are united by a lack of intention to change. However, this characterization may obscure distinct influences that keep Precontemplators from intending and enacting change. Identification of sub-groups within this stage can help to identify factors that keep precontemplators from intending to change and therefore, tailor intervention content more appropriately, allocate resources more judiciously, and influence change more effectively. The purpose of this study was to: identify the existence of unique sub-groups within the precontemplation stage and to determine if the unique sub-groups influenced the way Precontemplators changed over time. Existence of sub-groups was explored for women whose stage of change was assessed for consistent condom use with their main partner based on the measures of self-efficacy for condom use, perceived risk for HIV and other STDs for the respondent and her partner, and pregnancy desire. Latent class analysis was used.

DEDICATION

I dedicate this dissertation to my family. In particular, to my parents, grandparents, aunts and uncles, who instilled in me from my earliest days the sacred value of education. You have come and laid before me a foundation on which to build my life. For that I am eternally grateful.

I also dedicate this to my daughter, whose entry to my life has been the blessing that I cherish most.

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CHAPTER 1

INTRODUCTION

Habit is habit and is not to be flung out the window, but coaxed downstairs. Mark Twain

The transtheoretical model of change (TMC) is a popular theory of behavior change that has been utilized across a wide range of behaviors, including but not limited to the cessation of smoking (DiClemente et al., 1991), adoption of exercise (Marcus et al., 1992; Reed, 1999), and the adoption of condom use for the prevention of HIV and other sexually transmitted diseases (STDs) (Prochaska et al., 1994; Geilen et al., 2001; Fogarty et al., 2001). The model is based on the premise that people change their health behavior over time by progressing through a series of five stages of intention and behavior change including: (a) precontemplation, (not intending to make a change in the next six months); (b) contemplation, (intending to make a change in the next 6 months); (c) preparation, (intending to make a change in the next 30 days); (d) action, (performing the intended behavior for less than 6 months); and (e) maintenance, (performing the intended behavior for at least 6 months) (Prochaska and DiClemente, 1983).

Traditional health promotion programs have generally targeted and appealed to individuals who recognize a desire to change their behavior at some point, and have been limited by evaluation efforts that focus on an outcome of "changed versus unchanged" behavior. In contrast, by segmenting the target population into different stages of readiness to change based on the combined measure of an individual's intention and

behavior, TMC provides the ability to identify people who may be "at risk" but not yet ready to make a change; design intervention messages and strategies that are tailored to where the person is in the change process; and evaluate an individual's progression through the change process. In this manner, TMC provides a unique contribution to behavior change programs by enabling public health interventions to more effectively utilize resources and direct programs to address individuals at their current "stage of change."

Identification of five distinct stages within the model implies that the distinctions between stages are much greater than the distinctions within stages (Weinstein, Rothman and Sutton, 1998). As such, individuals classified in each stage may be viewed as relatively homogenous groups. With regards to precontemplation, typically one of the most populous stages, often including up to 50% of a population at risk (Prochaska, 1994), members may be seen to comprise one large group with similar barriers to change. However, although individuals in precontemplation are similar in their lack of intention to change, they may be influenced by a variety of factors that act as deterrents to change. These influences include but are not limited to lack of knowledge, lack of confidence in their ability to change (self-efficacy), lack of desire to change (due to competing desire), lack of belief that change is necessary (perceived risk), or a willingness to take risks.

Understanding the specific influences that may keep an individual from changing his/her behavior or formulating the intention to do so is critical to the appropriate allocation of resources and to the development of strategies to effectively move an individual out of precontemplation, and into higher stages along the change continuum. Therefore, the identification of qualitatively distinct reasons that individuals may be

categorized within the stage of precontemplation, and therefore not intending to change, merits further exploration.

Statement of the Problem

Current characterization of the precontempation stage of the TMC as a single stage may obscure distinct influences that keep precontemplators from intending and enacting change. Identification of subgroups within precontemplation can help identify factors that keep precontemplators from intending to change and, in turn, tailor intervention content more appropriately, allocate resources more judiciously, and influence change more effectively.

Research Questions

1. Do subgroups exist within the stage of precontemplation from the transtheoretical model of change (TMC)?
2. Are identified subgroups unique to the precontemplation stage?
3. How does membership in a particular subgroup influence how individuals move through the stages over time?

The research questions were designed to test a theoretical question intended to expand upon the Transtheoretical Model of Change. Analyses were conducted on a secondary dataset of women whose stage of change was assessed for condom use with main partner. Perceived risk for Human Immunodeficiency Virus (HIV) and other sexually transmitted diseases (STDs) and pregnancy desire were selected as characteristics by which subgroups could be classified within the precontemplation stage.

Therefore, research question 1 may be specifically interpreted as follows: Do subgroups exist within the stage of precontemplation that may be characterized by perceived risk or pregnancy desire?

Hypotheses

1. Subgroups exist within the precontemplation stage of the TMC. (Specifically, precontemplation subgroups may be identified based on perceived risk for HIV and other STDs and desire for pregnancy.)
2. Subgroups identified within precontemplation are unique to the stage of precontemplation and are not found in other stages.
3. Membership in precontemplator subgroups at Time 1 will vary by Precontemplators who (a) remain in precontemplation, (b) move out of precontemplation, or (c) do not return for follow-up at 6 months post data collection.

Limitations

This study is influenced by three major limitations. First, all analyses are performed on a secondary dataset. Thus, measures that are utilized are often limited in scope and applicability to this study. Next, data were collected on women who were recruited from selected locations, such as homeless shelters, drug treatment centers, and public housing developments and, therefore, findings may not be generalized to women in other settings. Finally, analysis on the exploration of subgroups was conducted

specifically using the behavior of condom use, with selected indicators specific to that behavior. Therefore, findings may not be generalized to TMC for other behaviors.

Summary

Chapter 2 includes a review of related literature, including a brief introduction of current trends in the epidemiology of women and HIV; a detailed description of the transtheoretical model, including a brief overview of applications of TMC to HIV prevention programs; and a discussion of the factor of risk perception in HIV prevention and its relationship to TMC. Chapter 3 describes the methods of the study. In chapter 4, the results of the analyses are described and in chapter 5, a discussion of the implications of the results, limitations of the results, and recommendations based on findings are made.

CHAPTER 2

REVIEW OF RELATED LITERATURE

Epidemiology of HIV/AIDS Among Women in the U.S.

The proportion of Acquired Immunodeficiency Syndrome (AIDS) cases among women in the United States has been steadily increasing. In just over a decade, the proportion of all AIDS cases reported among adult and adolescent women nearly tripled; increasing from 7% in 1985 to 22% in 1997 (Centers for Disease Control and Prevention [CDC], 1998a, 1998b). In 1993, AIDS was the fourth leading cause of death among women aged 25-44 years (CDC, 1995). More recently, from 1996 to 1997, the AIDS incidence and deaths among women declined 8% and 32%, respectively (CDC, 1998c). However, this decline has occurred at a proportionately slower rate than declines observed among men.

The increase in rates of AIDS cases has most dramatically affected women of racial and ethnic minorities. In 1995, African-American and Hispanic women together represented less than one-quarter of all U.S. women, yet they accounted for more than three-quarters (77%) of AIDS cases among women (CDC, 1995). By 2000, 80% of AIDS cases in women were among minority women (CDC, 2003a).

Compared to AIDS cases, a larger percentage of Human Immunodeficiency Virus (HIV) cases are being diagnosed among women, causing a growing concern regarding HIV transmission among women. The incidence of HIV infection in women is growing at a proportionately faster rate than men. During the period from January 1994 to June

1997, women represented 17% of all AIDS diagnoses, but 28% of all HIV diagnoses (CDC, 1998a, 1998b).

Heterosexual contact with an infected male is the largest HIV transmission category for women. Heterosexual transmission of HIV has been increasing steadily over the years, and in 1994 it surpassed intravenous drug use (IVDU) as the major HIV transmission route among U.S. women (CDC, 2001). In 2000, 38% of AIDS cases among women were attributed to heterosexual contact, compared to 25% for IVDU (CDC, 2003a). Many women with HIV/AIDS in the U.S. are initially reported without risk information; two-thirds of whom are later reclassified as heterosexual risk (CDC, 2003a). This suggests that women may be unaware of their risk (e.g., unaware of their partner's risk factors) or less willing to disclose risk, compared to men.

Relationship Between HIV Prevention and Pregnancy Intention

Some women who are at risk for HIV and other STDs are also at risk for unintended pregnancy and are in need of highly effective strategies for protection against both risks (CDC, 1996). Consistent and correct condom use remains the only method that provides dual protection against pregnancy and most sexually transmitted diseases, including HIV. Unfortunately, research suggests that women who believe they are effectively preventing pregnancy without condoms are less likely to use condoms and therefore may be at risk for disease (CDC, 1996). Likewise, surgically sterilized women are less likely to use condoms than nonsterilized women (CDC, 1992a, 1992b).

In a study of childbearing and contraception use planning among women at high risk for HIV infection, nearly 37-49% of women who reported that they did not want to

become pregnant ever, or at least not in the next three years, reported never using contraception. However, 41-64% reported wanting a baby at some point in the future, with 11-28% wanting a baby within the next year (CDC, 1992c). Most emphasis in the field of HIV prevention regarding pregnancy has been on preventing unintended pregnancy. While this focus is of undisputed importance, pregnancy desire among high risk women and the influence on safer sexual behavior for the prevention of HIV and other STDs has been the subject of less research.

HIV Prevention

Recent medical advances have focused on delaying the progression of HIV illness and onset of AIDS. Despite increased efforts in vaccine development, no alternatives have emerged, and reducing risky sexual behavior through behavior change remains the only option for the prevention of the sexual transmission of HIV. With specific regard to preventing the sexual transmission of HIV, behavior change options are limited to abstinence from sexual intercourse, mutual testing and monogamy (that is, being in a long term, mutually monogamous relationship with a partner who has been tested and is known to be HIV-negative), or the correct and consistent use of condoms with all sexual partners (CDC, 2003b). For interventions aimed at the sexually active, condom use has been the primary target. Correct and consistent condom use is defined as use of male latex condoms for every act of sexual intercourse (CDC, 1988, 1993).

Behavior change interventions are generally considered more likely to be successful if they are based on carefully controlled studies that are founded on behavioral science theory and evaluated with appropriate measures (Kelly, Murphy, Sikkema, &

Kalichman, 1993; Fishbein, 2000; Lauby et al., 1998). Interventions that are developed with a foundation in theory may provide a superior explanation for relationships among factors that influence the desired behavioral outcome and as such facilitate the evaluation and replication of effective programs. The TMC has emerged as a popular theory that has been applied to condom use interventions.

The Transtheoretical Model of Change

The TMC is a dynamic model of change that includes four main constructs: the stages of change, processes of change, decisional balance (pros and cons), and self-efficacy. Not all applications of this theory include all four constructs. However, the stages of change are considered the most popular construct and may be described as the hallmark of the theory. This study focuses only on two of these constructs: the stages of change and self-efficacy. However, a brief explanation of each construct is provided below.

The Four Main Constructs

Stages of change. The stages of change (SOC) characterize the evolution of behavior change through a series of stages, beginning with not thinking about changing behavior to maintaining effective behavior change, and may be conceptualized as a continuum of motivational readiness. While the stages reflect a temporal dimension of change with an implied time frame, the time frame is not fixed. That is, people often cycle and recycle through the stages, rather than progress linearly, and people may remain in any stage (although particularly in the early stages) indefinitely. TMC

traditionally identifies five stages that individuals progress through in the process of changing their behavior. The stages are precontemplation, contemplation, preparation, action, and maintenance. A sixth stage, termination, is sometimes added as the final stage of change. This stage is not commonly used primarily because it was not a part of the original conceptualization of the model and because it may only be selectively applied to certain behaviors that have an endpoint, such as seeking health care for a one-time or infrequent test or examination.

Individuals in each stage may be identified by concise measures of intention and behavior known as the staging algorithm. Stage of change may also be assessed by a continuous measure that elicits additional information on each stage and then calculates a score to correspond with one of the five stages (Reed, 1999). While the staging algorithm is the more common way of measurement, the continuous measure provides additional information to help interpret stage membership. Reed (1999) also developed an "intuitive shorthand" for distinguishing between stages as follows: I won't/I can't (precontemplation); I might (contemplation); I will (preparation); I am (action); and I have (maintenance).

According to research on stage distribution of individuals in stages prior to the "action" stage across a wide range of behaviors, a small percentage, roughly 20%, of individuals currently engaged in the problem behavior are in the preparation stage and actually ready to make a change. This indicates that the majority are divided between contemplation and precontemplation and not intending to make a change in the near future (Prochaska, Redding, & Evers, 1997; Reed, 1999).

The first stage, Precontemplation, is characterized by individuals who are not thinking about changing their behavior in the foreseeable future, typically defined as within the next 6 months (e.g., not thinking about using condoms every time they have sex with their main partner in the next 6 months). Six months was established as this time frame because it is considered to the longest time frame in which people can accurately assess their future intentions (Prochaska et al., 1997; Reed, 1999). Characteristics of Precontemplators typically include low confidence in their ability to perform the target behavior (self-efficacy) and a greater perception of disadvantages (cons) of changing their behavior compared to advantages (pros). Precontemplators are unified in their lack of intention to change. However, their reasons for not intending change may be highly varied. A discussion of possible explanations for lack of intention to change is provided further below. The percentage of people in the stage of precontemplation have been estimated as high as 50% (Prochaska, 1994). While this percentage may vary across studies and behaviors of interest, precontemplation maintains one of the highest proportions of people, with the least amount of progression compared to other stages (Evers, Harlow, Redding, & LaForge, 1998).

Individuals in Contemplation are not currently engaging in the target behavior but have long-term intentions to do so (within the next 6 months). Although Contemplators identify an intention to change in the next 6 months, this does not mean they *will* change their behavior during that time frame. People may remain in the contemplation stage for any length of time, becoming chronic contemplators. During this stage the perception of advantages and disadvantages of changing behavior are often weighted equally.

The Preparation stage (sometimes known as Ready for Action) is characterized by people who have immediate intentions to change their behavior, typically in the next 30 days. In addition to short-term intentions to change their behavior, classification of individuals in the preparation stage is sometimes combined with a behavioral criterion that stipulates their initial attempts at performing the requisite behavior. That is, people in preparation must have begun to enact small steps or attempts at behavior change in addition to having short-term intentions of change. However, this criterion is not always used. Individuals in this stage recognize or weight the advantages of changing behavior higher than the disadvantages.

Action is determined by the consistent enactment of the target behavior for a time period of less than 6 months. The "target behavior" by which to evaluate an individual's readiness and success at change is determined by the scientific community as that which is sufficient to reduce the risk of disease. For HIV prevention, using condoms at each act of intercourse is the accepted standard for behavior. In this stage, individuals may be characterized with high self-efficacy to perform the behavior and typically perceive greater advantages to changing their behavior than disadvantages.

Maintenance is typically considered the final stage of behavior change process and represents sustained behavior change for a period of 6 months or longer without relapse. The criterion of 6 months without relapse was identified because it was established as the length of time required for behavior change to become more stable.

Although the stages are intuitively sequential, an individual's progress through the stages is not necessarily meant to be linear. Rather, behavior change is conceptualized as a cyclical process where individuals move forward and backward through the stages

before achieving final behavior change. In fact, the concept of "relapse" and recycling through the stages is recognized as inherent to an individual's progression through the SOC and is considered more the norm than the exception with regards to progression.

In 1998, Evers et al. conducted a study of the naturalistic stage progression of condom use. They evaluated women's stage of change on two separate occasions over a 1-year time frame. Utilizing Latent Transition Analysis (LTA), they studied how individuals moved throughout the continuum of motivation and change. Their results provided information on the stability of each stage by providing an estimate of what percentage remained in the stage, as well as what type of movement naturally occurs without intervention. Findings indicated that precontemplation and maintenance were the most stable stages, with approximately 50% of members remaining in the same stage over time. Forward and backward movement was observed, underscoring the importance of studying the transition of an individual across the stages, as opposed to simply observing how many individuals enact action. By comparing the best transition model for condom use with one for smoking, Evers et al. conclude that relapse and recycling through the stages is more common with condom use behavior than with smoking.

Processes of change. The second construct in the TMC is the processes of change (POC). Ten processes of change emerged after a comparative analysis of leading theories of psychotherapy and behavior change. Processes are defined as the overt and covert strategies that a person employs to progress through the SOC (Table 1). Structural analysis of the processes of change identified two distinct types of processes: cognitive (processes 1-5) and behavioral (processes 6-10) (Prochaska and DiClemente, 1983).

Traditional descriptions of TMC suggest that the relative importance of the processes as influencing factors differs across the stages. That is, in the early stages of precontemplation and contemplation, processes that reflect cognitive and emotional factors are thought to be more important in increasing an individual's awareness and perception of vulnerability and desire for change on an emotional level. In contrast, in the later stages of preparation and action, during which individuals are already intending and making steps towards behavior change, "behavioral" processes that focus on skills building and increasing confidence in ability are considered more important (Cabral et al., 1996; Reed, 1999; Block & Keller, 1998).

Table 1. Processes of Change

	Process	Description
1	consciousness raising	Awareness of the problem behavior and its sequelae
2	emotional arousal/dramatic relief	Emotional experience pertaining to the problem behavior (followed by reduced affect if appropriate action is taken)
3	environmental reevaluation	Awareness that one's behavior can serve as a positive or negative role model for others
4	self-reevaluation	Appraisal of one's self-image with and without a particular unhealthy habit
5	self-liberation	Belief that one *can* change; commitment to act
6	social liberation	Social opportunities or alternatives to the problem behavior.
7	helping relationships	Social support for the healthy behavior change
8	stimulus control	Cues for unhealthy habits removed and prompts for healthier alternatives added
9	reinforcement management	Rewards and punishments for behavior
10	counter-conditioning	Substitution of healthy behaviors for problem behaviors

In recent years, evidence has emerged that suggests that behavioral processes, such as those to increase self-efficacy, may be equally important to both individuals in early and later stages (Malotte et al., 2000; Cabral et al., *in press*). This makes sense intuitively, as individuals may never intend to change as long as they feel like they could

never be successful at sustaining a change. This may be particularly true of individuals who have failed in attempts at change or are faced with real barriers to change. Likewise, Hedeker et al. also found the emotive, early stage processes corresponding to perceived susceptibility were equally important across all thresholds of change (Hedeker, Mermelstein, & Weeks, 1999). Their findings also suggest that while self-efficacy may be important across all stages, its relative importance is greater in later stages. Clearly additional research is needed to further understand the role of the processes in the TMC (Reed, 1999).

Self-Efficacy. The third construct within the TMC is self-efficacy. Self-efficacy, one of the most important constructs in Social Cognitive Theory, is also an important construct in TMC. Self-efficacy is conceptualized as an individual's situation-specific confidence in his/her ability to perform a behavior (Bandura, 1977). The relationship of self-efficacy to the SOC is linear; it is significantly lower in precontemplation compared to all other stages, and it increases throughout each stage until it peaks in the action or maintainence stage (Grimley, Prochaska, Velicer, & Prochaska, 1995). According to Prochaska and DiClemente, the predictive value of self-efficacy is most evident in the stages of action and maintenance (1992). However, as noted above in the description of POC, there are varying reports regarding the level of importance of self-efficacy as a differential motivator across the stages (Hedeker et al., 1999; Malotte, 2000; Block & Keller, 1998; Cabral et al., *in press*). These variations may be a result of variations in measurement of the construct as well as the distinct role it plays in different behaviors.

However, while the actual role of self-efficacy at different stages is debated, the importance of self-efficacy as a motivator for behavior change is not.

Self-efficacy has been found to be associated with the performance of a variety of health behaviors, including condom use and stage of change for condom use among women (Stark et al., 1998; Corby & Wolitski, 1996; Galavotti et al., 1995; Marin, Gomez, & Tschann, 1993; Wulfert & Wan, 1993). Two recent studies of the behavior of female drug users found a relationship between self-efficacy and stage of change for insisting that men use condoms "every time" (Montoya, 1997; Rhodes & Malotte, 1996). With regards to condom use, self-efficacy should be assessed separately for use with primary and non-primary partners (Galavotti et al., 1995; Grimley et al., 1995). This reflects the situation-specific nature that arises from the different factors that influence condom use in these types of relationships.

Decisional balance. The fourth main construct of the TMC is decisional balance, or the relative weighing of advantages (pros) and disadvantage (cons) of behavior change. With regards to TMC, the "pros" represent an individual's positive reasons or perceived benefits to change behavior and the "cons" represent the barriers or negative reasons of behavior change. Research on the relationship between stages of change and decisional balance across a variety of behaviors revealed a clear relationship where the cons of change outweighed the pros for precontemlators, and the pros outweighed the cons for individuals in the action stage (Prochaska et al., 1994). The crossover of pros outweighing cons is considered a necessary step in the behavior change process and typically occurs in the contemplation or preparation stages.

As with self-efficacy, in order to capture the different factors that influence condom use in different types of relationships, pros and cons should be assessed separately for condom use with main and non-main partners (Galavotti et al., 1995; Grimley et al., 1995). In addition, contrary to other behaviors where the relative importance of cons decreases through the stages while pros increase, the cons for condom use remain relatively stable across the stages (Grimley et al.). This emphasizes the need for behavior change interventions to emphasize the benefits (pros) of condom use rather than attempting to deemphasize the drawbacks (cons).

Characterizing Precontemplators

The identification of five stages within TMC implies that members of a stage share "common attributes" and, as such stage membership may be influenced by common factors (Weinstein, Rothman, & Sutton, 1998). While most applications treat each stage as uniform with respect to membership and motivation (Velicer, Hughes, Fava, Prochaska, & DiClemente, 1995), some researchers have explored the possibility of additional distinctions within the current stages, particularly with regards to the stage of precontemplation.

Based on experience using the TMC rather than structured analyses, DiClemente (1991) provided a description of precontemplators and the reasons they do not intend to change: reluctance, rebellion, resignation, and rationalization. "Reluctant" precontemplators do not want to consider change, possibly due to lack of knowledge. "Rebellious" precontemplators have made a heavy investment in the problem behavior and in making their own decisions. They are resistant to being told what to do and do not

want to change. "Resigned" precontemplators have given up on the possibility of change and seem overwhelmed by the problem. Without some hope of the possibility for change, the resigned individual can never be motivated to contemplate change. "Rationalizing" precontemplators are not considering change because they feel comfortable with the odds of personal risk, or they are able to identify many reasons why the problem is not a problem (at least not for them). While the existence of these subgroups has not been validated through quantitative research, their existence is plausible and the distinct strategies that would be required to address each is evident.

Velicer et al. (1995) identified three subtypes of Precontemplators with regards to smoking behavior: immotives, progressors, and disengaged. These groups were identified using cluster analysis. Immotives were described as classic Precontemplators in that they fit the original characterization of Precontemplators. Progressors were more like Contemplators in their weighing of pros and cons. Disengaged precontemplators did not fit the profile of precontemplation at all, no obvious explanation was available, and further research to understand this group was recommended. The three types of subgroups identified, however, were also identified in the other stages examined (contemplation, preparation, and action) and therefore were not unique to precontemplation.

Reed (1999; 1995) used principal component analysis on a continuous assessment of stage membership and identified six clear factors related to intention and behavior regarding regular exercise. Four of the factors corresponded with the stages of contemplation through maintenance. The remaining two stages characterized the stage of precontemplation into two distinct stages: precontemplation nonbelievers, and

precontemplation believers. Nonbelievers do not intend to perform the behavior because they do not believe the behavior is important to them. Believers identify the importance of the outcome behavior, but do not intend to change due to the presence of specific barriers. Although neither group of precontemplators intends to change, they have very different reasons for not engaging in the behavior, and thus require distinct strategies for intervention and motivation. Whereas nonbelievers may benefit more from strategies that incorporate increasing awareness and emotional arousal, believers may benefit more from strategies to increase self-efficacy and overcoming barriers.

TMC and HIV Prevention

Much of the research on TMC and HIV prevention has focused on validating measures and establishing the appropriateness of their use. However, TMC has also been used as the theoretical foundation of several interventions. Two of the more well-known HIV prevention interventions based on TMC were the AIDS Community Demonstration Project (ACDP) and the Women and Infants Demonstration Project (WIDP). The ACDP, a community level intervention in five U.S. cities, demonstrated significantly greater consistency of condom use in main and non-main partner relationships (Jamner, Wolitsky, & Corby, 1997). The WIDP was a community-level behavioral intervention research project designed to improve the understanding of factors influencing women's behavior changes regarding condom and contraceptive use. Project CARES (Comprehensive AIDS and Reproductive Health Education Study), the facilities-based component of the WIDP, provided reproductive health services in nontraditional settings and enhanced counseling services to women aged 15-44 years. Amongst other findings,

Project CARES demonstrated significant progression in the SOC or maintenance of consistent condom use among HIV+ women and validated the use of peer para-professionals to deliver a stage-based counseling intervention (Geilen et al., 2001; Cabral et al., 1996).

The Role of Perceived Risk in HIV Prevention

Perception of risk has been conceptualized as a central construct of many health behavior change theories, including but not limited to the Health Belief Model, AIDS Risk Reduction Model, Information Motivation and Behavior Model, Protection Motivation Theory (Kline & Strickler, 1993; Kowalewski, Henson, & Longshore, 1997). Despite the frequency with which perceived risk has been incorporated in behavior change research, findings have been inconsistent and inconclusive regarding the exact role perceived risk plays in HIV-related behavior change (Eversley et al., 1993). Positive, negative, and even no correlation have all been reported to characterize the relationship between perceived risk of HIV and risky behaviors (Buunk, Bakker, Siero, van den Eijnden, & Yzer, 1998; Gerrard, Gibbons, & Bushman, 1996). The fact that the relationship between perceived risk for HIV and HIV protective and risk behaviors has been inconsistently observed has complicated research findings. Thus, the relationship of perceived risk to HIV prevention remains somewhat inconclusive. Inconsistent findings have not diminished the significance of the role of perceived risk in HIV behavior change, however, as researchers have concluded that they more likely result from a lack of understanding of how individuals actually assess their personal risk and discrepancies in how perceived risk has been operationalized and measured, rather than from a lack of

importance (Poppen and Reisen, 1997; Kowalewski et al.,1997; Gerrard, 1996). A more detailed discussion of these influences follows.

Assessing Personal Risk for HIV

Scientists and risk management experts generally rely on mathematical probabilities and objective, fixed criteria in their assessments of risk. The average person, however, relies on cognitive rules of thumb, or heuristics, in assessing personal risk (Hankins, 1998). These heuristics are more often made up of a synthesis of cultural, personal, and interpersonal biases and experiences, rather than mathematical probabilities, and as such may not reflect accurate assessments of risk. Several researchers have described the types of information some individuals use to assess their personal risk for HIV. In a sample of African-American and Hispanic women, Kline, Kline, and Oken (1992) reported that respondents relied more on evaluations of who their partners were and on the characteristics of their relationships, rather than on their sexual behavior when evaluating their personal risk. Blanton and Gerrard (1997) determined that high sex appeal of potential partners influenced student's assessments of how risky an encounter would be. These findings suggest that people do not often rely on objective risk data and, in fact, may consciously or subconsciously modify their perceptions of risk in order to suit their desired response to a situation.

In addition to heuristics, several other factors play a role in formulating an individual's perception of risk for HIV. These include, but are not limited to optimistic bias and perceptions of invulnerability, the hierarchy of risk, and the personal context

within which sexual risk behaviors occur. A brief description of these factors is provided below.

Perceptions of invulnerability/optimistic bias. In general, people tend to underestimate risk that is attributed to their own personal behavior (perceived invulnerability) and are more likely to assess their personal risk as less than what they perceive the risk for others to be (optimistic bias) (Weinstein, 1987). That is, in spite of knowledge of HIV risk and objective data, people may be inclined to underestimate their own personal risk, as it relates to their own behavior. Likewise, whereas one may identify others who engage in risky sex practices to be at risk of HIV, they may perceive their own risk to be lower, despite the fact that they are engaging in the same behavior. This point is illustrated by research findings that revealed that although a high proportion of heterosexuals engaging in vaginal intercourse without a condom objectively identified the behavior as risky for HIV transmission, only 18% perceived themselves to be personally at risk (James, Gillies, & Bignell, 1991). Likewise, in a sample of single, pregnant, inner-city women, Hobfall, Jackson, Lavin, Britton, and Shepard (1993) found that although the women recognized heterosexual risk for HIV, they did not perceive themselves to be at risk for HIV as they did not regard their partner's current or past behavior as an influence of their risk.

Hierarchy of risk. HIV risk behaviors do not take place in a vacuum, but are related to many other risk behaviors as well as personal life experiences (Connors, 1992). As such, while the risk for HIV posed by an individual's unsafe sexual behavior may be

recognized as significant, it may still be weighted as low, or even dismissed, given the existence of other more proximal risks. For example, emotional and material dependency has been cited as a factor in the tendency for low-income minority women to deny risk they may face from their sexual partners (Kline & Stickler, 1993).

Context of risk. Epidemiologic research that has predominated the field of HIV prevention has typically focused on risk characteristics and behaviors. Objective sexual risk measures often include history of STD, number of partners in a certain time frame, consistency of condom use, and risky sex partners. Anthropologists and qualitative researchers have emphasized the importance of examining the situational/contextual risk in which an individual actually assesses their risk and which, arguably, will influence their behavior.

Initially, HIV risk was described in terms of risk groups, such as IVDU and gay men. Not only was this characterization stigmatizing for the affected populations, it may have inadvertently led to many people denying their risk. To address this, a shift in terminology was made from describing "risk groups" to identifying "risk behaviors" (Aggleton, O'Reilly, Slutkin, & Davies, 1994). More recently, an increase in infection rates in monogamous or married women without readily apparent risk behaviors prompted another reevaluation of risk terminology. This time an emphasis on "risk situations" has emerged in an effort to take into consideration the many contextual factors that determine an individual's risk. Examining contextual factors related to risk provides an understanding of risk perception that is influenced by interpersonal interactions with others and which take place in the context of ongoing social relationships (Rhodes &

Quirk, 1998). This perspective is arguably a more accurate approach to understanding risk perception than the triadic assessment of an individual's knowledge, beliefs, and behavior.

Inconsistencies with Measurement/Conceptualization of Perceived Risk

In addition to the complex way in which individuals evaluate their personal risk, the relationship between perceived risk and HIV sexual risk behavior has been further obscured by inconsistent and often poor theoretical conceptualizations and measurement. These research limitations may be primarily attributed to variations in (a) the type of risk measured, (b) construct definition, (c) use as a predictor versus outcome variable, (d) temporal issues of measurement, and (e) study design.

Type of risk inconsistently measured. Many of the inconsistent results in research on perceived risk and HIV risk/protective behavior have resulted from the fact that a number of different risk perceptions have been measured and are often not distinguished. These include risk without context (how likely do you think it is that you will contract HIV?), global risk (based on past, present and hypothetical future behavior, how likely do you think it is that you will contract HIV in 5 years?), comparative risk (compared to someone like you, how likely do you think it is that you will contract HIV?), conditional risk (if you engage in sex without a condom, how likely do you think it is that you will contract HIV?), situational risk (if you have sex without a condom with your current partner, how likely do you think it is that you would contract HIV?) and behavior-specific risk (if you had anal sex without a condom, how likely...). Each of these types of

risk is measured by a different question because it refers to a different type of personal risk assessment. A person could conceivably answer each of the above questions in slightly different ways because they would rely on different information/heuristics to make their assessments. However, findings have often been universally presented as perceived risk, without specification for what type of risk was assessed. Recognition of the importance of incorporating context (including partner) in individual risk assessments, would suggest that situational risk assessments are superior (Rhodes & Quirk, 1998; Weinstein & Nicholich, 1993).

Construct confusion. In addition to variations in the types of risk assessed, many different constructs have been used interchangeably to reflect perceived risk. That is, perceived vulnerability, perceived susceptibility, worry, etc., have all been used to signify perceived risk. In one study, Dolcini et al. (1996) found that worry and perceived risk were only moderately correlated and, therefore, empirically distinct. Inaccurate definitions and conceptualizations of perceived risk have contributed to inconsistent results regarding the relationship of perceived risk and behavior and, therefore, have confused the interpretation.

Predictor versus outcome variable. Perceived risk has been conceptualized as both a predictor of risky sexual behavior as well as an outcome of sexual behavior, but researchers have often failed to distinguish between how it has been measured in their interpretation of findings (Kowalewski et al., 1997). For example, some researchers have conceptualized perceived risk to be a reflection of a person's previous behavior (outcome

variable) and therefore hypothesize a positive correlation between perceived risk and behavior (I engaged in risky sexual behavior therefore I perceive my risk to be high). Other researchers have conceptualized perceived risk as a function of behavior (predictor variable) and hypothesize a negative correlation between perceived risk and behavior (I perceive that I am at high risk, therefore I will engage in safe sex practices). This confusion has been further exacerbated by the function of time and study design (cross-sectional versus longitudinal).

Time. Perceived risk has been presented as an evaluation of past, current, and future behavior and has been conceptualized as influencing past, present, and future behavior. The substantial variability in length of time that is often involved in risk assessments (lifetime risk versus risk within past 90 days) combined with the volatile nature of sexual behavior (practices vary by partner and age) as well as the latency period of HIV manifestation, have all contributed to inconsistencies in findings.

Study Design. Much of the research on perceived risk and HIV risk/protective behavior has been conducted using a cross-sectional study design. While cross-sectional studies are adequate for exploring factors that influence perceived risk, they are insufficient for characterizing the relationship between perceived risk and behavior (Gerrard, 1996). This is especially important given that perceived risk is not static or unidirectional and that time most certainly plays a role in its interpretation. More longitudinal studies are necessary to better understand this relationship.

Perceived Risk and TMC

While not specifically identified as a central construct of TMC, perceived risk is considered to be inherent to the processes of change. In particular, it is related to cognitive or emotive processes that are typically associated with the earlier stages, such as consciousness raising and emotional arousal. As such, increasing perceptions of risk may be seen as an important step in developing intentions to change. As noted earlier, however, the relationship of perceived risk to the TMC is somewhat inconclusive as some feel the relative importance of this factor remains constant throughout the stages (Hedeker, Mermelstein, & Weeks, 1999), others have interpreted findings to mean that, as an emotional/cognitive factor, perceived risk is more important to individuals in the early stages (Block & Keller, 1998).

Summary

In recognition of the role of self-efficacy and perceived risk in motivating an individual to change their behavior, and that the desire for pregnancy may play a major role in influencing condom use behavior, these variables were selected to test the existence of subgroups within the stage of precontemplation.

CHAPTER 3

METHODOLOGY

Purpose of Study

The study was designed to test whether or not subgroups could be identified within the stage of precontemplation from the TMC. Identification of subgroups was based on response patterns to selected variables including reports of self-efficacy, perceptions of risk behaviors (self and partner), and current desire for pregnancy (self and partner). A second purpose of the study was to determine if subgroups within precontemplation were different from subgroups in other stages. A third purpose was to explore how membership in a particular subgroup influenced how individuals moved through the stages over time.

Analyses for this study were conducted on a secondary dataset collected as baseline and follow-up data for an intervention project funded by the CDC. Eligible women were 15-44 years of age, reported sexual intercourse with a male partner in the past year, and were not currently pregnant (n = 1288). Women were recruited from outpatient drug treatment centers, homeless shelters, and primary care clinics located in public housing developments. Data were collected during face-to-face interviews. See Cabral et al., 1996, Fogarty et al., 2001, Geilen et al., 2001 for a discussion of findings and methods of research from the original study.

Sample

Given that the outcome of interest was the respondent's stage of change with respect to condom use with a main partner, a subsample of women was selected to include only those identifying a main partner (defined as a "husband or steady boyfriend") at baseline with whom they reported having sex within the past 6 months (n = 774). For most analyses, a further subsample of women were identified as "Precontemplators" (n = 416) based on responses to items designed to categorize respondents into one of five "stages" along a continuum of change associated with the TMC. For analyses on desire for pregnancy, women who were surgically sterilized were excluded (n = 270 remained). Data utilized for analysis relating to how subgroups changed over time was collected 6 months after baseline data collection. Of the women who were sexually active with a main partner at baseline, 76% (n = 591) participated in the follow-up interview 6 months later, 80% of whom (n = 473) reported sex within the past 6 months with a main partner.

Measures

The following constructs/indicators were selected to include in analyses: stage of change (SOC); self-efficacy for condom use; perceived risk (self); perceived risk (partner); desire for pregnancy; and perceived partner desire for pregnancy. Items used to measure constructs were identical at baseline and follow-up.

Stage of Change

Stage of behavior change was assessed for consistent condom use with main partner using the staging algorithm described in the appendix. These questions are consistent with the theoretical definitions outlined in the TMC. Women who reported using condoms for more than 6 months consistently (every time they had sex) with their main partner were coded as in "maintenance." Those using condoms consistently for less than 6 months were coded in "action." Those who reported not using condoms consistently but intended to use them consistently in the next 30 days were in "preparation." The decision to not utilize a behavioral dimension to classify individuals within the preparation stage was made to be consistent with how stages were presented as a part of the study for which the data were collected (Geilen et al., 2001; Fogarty et al., 2001). Those who reported not using condoms consistently but intended to use them consistently in the next 6 months were in "contemplation." Those who reported not using condoms consistently and did not intend to in the next 6 months were in "precontemplation."

Self-Efficacy

Six items were used to assess the respondent's self-efficacy (perceived confidence in ability) to use condoms consistently (every time they had sex) with their main partner. These items are described in the appendix. Three items asked whether the respondents could or could not use condoms in distinct situations, and three follow-up items were used to assess how sure (very or somewhat sure) the respondent felt they could or could

not use condoms in each of the situations. Each situational item was combined with the related item assessing level of sureness to create a three-item scale of self-efficacy to use condoms consistently with a main partner, with a five-point response scale where "5" was "very sure" they could and "1" was very sure they could *not* use condoms in each of the situations. These measures are consistent with the theoretical definitions of measuring self-efficacy; however, the scale is limited by having few items that are relatively limited in focus. Researchers from the original study note that the scale was intentionally shortened in order to be compatible with a need for short administration time (Lauby et al., 1998).

Perceived Risk (Self)

Three items were used to assess self risk: history of multiple partners in the past 6 months, a lifetime history of exchanging sex (for money, drugs, food, shelter, etc.), and a lifetime history of intravenous drug use (IVDU; appendix). Selected items are consistent with HIV-related risk factors currently recognized in the field of public health (CDC, 1995) and conform to a definition of objective risk.

Perceived Risk (Partner)

Respondents' perceptions of their partner's risk behavior was assessed with six items related to the partners' sexual behavior with men and women, intravenous drug use, and incarceration (appendix). Selected items are consistent with heterosexual risk factors for women for HIV currently recognized in the field of public health (CDC, 1995) and conform to a definition of objective risk. Two additional items assessing situational risk

were included. The items assessed the respondent's perception of the likelihood of getting (a) a sexually transmitted disease (STD) and (b) HIV by having vaginal sex with their main partner without a condom. Responses were recorded using a three-point response scale including "very", "somewhat", and "not at all" likely.

Pregnancy Desire

A single item was used to assess whether or not the respondent wanted to have a baby "now" (appendix). A single item was also used to assess the respondent's perceptions of their partner's current desire to have a child with the respondent "now" (appendix).

Recoding Variables for Latent Class Analysis

The type of Latent Class Analysis utilized for analysis requires that all variables be dichotomous. Therefore, all selected variables were recoded to create a dichotomous "high" and "low" value for each construct/indicator.

Stages of Change

Each item within the staging algorithm was recoded, and "stages" were created by combining appropriate low or high responses to specific items. For frequency of condom use with main partner, "every time" was coded as "high," and responses of "almost every time," "sometimes," "almost never," or "never" were coded as "low." Although "almost every time" reflects frequent condom use, it was coded as low to be consistent with both the accepted TMC staging algorithm as well as the public health recommendation of

consistent condom use for the prevention of HIV and other STDs. Responses of using condoms consistently for 6 months or longer were coded as "high," indicating individuals in the maintenance stage. Women reporting using condoms consistently for less than 6 months were coded as "low" and corresponded with the action stage. For women who did not report consistent condom use, intentions to use condoms consistently in the next 6 months was assessed. "Low" long-term intentions were defined as those reporting "undecided," "somewhat sure" or "very sure" they would not use condoms in the next 6 months, corresponding with the precontemplation stage. Those reporting they "very sure" or "somewhat sure" they would use condoms consistently in the next 6 months were coded as having "high" long-term intentions to use condoms. Women with high long-term intentions were asked about their short-term intentions to use condoms in the next 30 days. Coding was identical for intentions to use condoms in the next 30 days. Women with low short-term intentions corresponded with the contemplation stage, and women with high short-term intentions corresponded with the preparation stage.

Individuals with missing data for particular questions due to skip patterns related to the staging algorithm were coded as "low" or "high" in a manner consistent with their stage. For example, individuals staged in the higher stages of action and maintenance were not administered items related to condom use intention. These individuals were coded as "high" intention for condom use for the next 30 days as well as 6 months. Likewise, individuals staged in "lower" stages (precontemplation through preparation) were not administered items on length of time using condoms consistently. These individuals were coded as having "low" consistency of condom use.

Self-Efficacy

The mean level of self-efficacy was determined for the sample of all women at Time 1 who reported being sexually active with a main partner in the last 6 months. On a scale of 1-5, with five being the highest, the mean score of self-efficacy was 3.23. Individual mean scale responses that met or exceeded the mean were coded as "high" and those that were less than the mean were coded as "low." Given that the midpoint of the scale is 3 and the mean was 3.23, the distinction between "low" and "high" self-efficacy is slightly higher than the midpoint.

Perceived Risk (Self)

Individuals who reported having only one partner in the last 6 months, having never exchanged sex for money or other goods, and never using intravenous drugs were coded as having "low" sexual risk. Those reporting more than one partner in the last 6 months, ever exchanging sex for money or other goods, or ever using intravenous drugs were coded as having "high" personal risk. This distinction of low and high risk is consistent with generally accepted standards in the field of HIV prevention.

Perceived Risk (Partner)

Respondents who reported thinking or suspecting that their main partner shot drugs or was ever in jail or prison for more than one day were coded as having a "high" perception of partner risk. Respondents who reported that their partner had other male or female partners were also coded as "high" if they reported that their partner *did not always* use condoms when he had sex with his other partners. Respondents were also

coded as having "high" perceptions if they reported that it was "very" or "somewhat" likely they could get a STD or HIV from their main partner if they had sex without a condom. Respondents not reporting any partner risk behavior AND reporting that it was "not at all" likely they could get a STD or HIV from their main partner were coded as having "low" perception of partner risk. This distinction of low and high risk is consistent with generally accepted standards in the field of HIV prevention.

Pregnancy Desire (Self)

Respondents reporting that they wanted to have a baby at that time were coded as having "high" desire for current pregnancy. Those reporting that they were "undecided" or did *not* want to have a baby at that time were coded as having "low" desire for current pregnancy.

Pregnancy Desire (Partner)

Respondents reporting that their partner did want to have a baby at that time were coded as having "high" perceived partner pregnancy desire. Those reporting that their partner did *not* want to have a baby at that time, or that they "did not know" or "did not care," were coded as having "low" perceived partner pregnancy desire.

Latent Class Analysis

Latent Class Analysis (LCA) is a statistical method to identify mutually exclusive hypothesized subgroups within a population based on relationships between multivariate data. Within each class, each variable is assumed to have conditional independence. That

is, it is assumed to be statistically independent of every other variable in that class so that any relationship that is observed is a result of each variable's relationship to the latent variable. Responses to items are often used as a surrogate for identifying individuals within latent classes, or members within a hypothesized subgroup.

LCA uses a series of probabilities to characterize a population into hypothesized subgroups or latent classes. Once the probability of latent class membership is determined (gamma parameters), LCA then estimates the probability that an individual will fit the specified characteristics of the class (rho parameters). In other words, when the class is defined by response patterns, LCA estimates the probability that an individual will respond in the hypothesized way, given their class membership. For each of the models, the gamma parameters were freely estimated and the rho parameters were constrained so that items with high probabilities of scoring high or low would be equal to all of the other items with high probabilities of scoring high or low.

How well the hypothesized model fits the data is determined by the G^2. Similar to a chi-square, the G^2 measures the distance between the predicted and observed response patterns. Goodness-of-fit is approximated by calculating the p-value for the G^2, and degrees of freedom (df) from a chi-square table. If the model fits the data well, the goodness-of-fit statistic will be small. A value of $p = .10$, was used as a criteria for determining the goodness of model fit. The difference G^2 test is used to determine if one model fits better than another. Unfortunately, this test is not appropriate for comparing models with different numbers of latent classes, as were used in these analyses, as it violates some regularity assumptions and may no longer have a theoretical chi-square distribution.

In LCA, the estimation algorithm used to test the model, identifies the best solution for the model out of all values. However, it is sometimes possible for it to converge on "local maxima" instead the "global maximum." This problem is more likely to occur with more complex models, as the number of latent classes increases. To address this, each of the hypothesized models were tested with different parameter start values to verify that the same solution would be reached each time. In cases where the outcomes were discrepant, the decision was made to go with the less extreme start values. Initial start values used for rho parameters were .8/.2. To confirm results, .6/.4 were chosen as less extreme start values. Start values of equal proportion summing to one for all classes combined were chosen for gamma parameters for convenience.

After testing the models for goodness-of-fit, classes with very low probability of membership were removed, and the models were retested in an attempt to find the most parsimonious model with the best fit. Very low membership was set at .05 or less. Next, classes determined to have a good probability of membership were examined to determine the probability of scoring high or low on each of the indicators given class membership. Rho measurement parameters that are closer to zero or one are considered more reliable, as they indicate higher probabilities of responding to hypothesized patterns given class membership. Values that are closer to the center (.5) suggest that the response pattern is more likely to have been determined by chance, than by class membership. WinLTA software was used for all LCA analysis.

Construction of Models

Three distinct reasons were hypothesized for being in precontemplation for condom use (not using or intending to use condoms with main partner): (a) they feel they can but do not because they did not think they need to use condoms (e.g., they do not perceive they are at risk for HIV or other STDs); (b) they feel they cannot use condoms because of low self-efficacy; and (c) they feel they can use condoms, but do not because consistent condom use conflicts with something else they want (e.g., desire for pregnancy). Two models of hypothesized subgroups were constructed to test these three reasons: a perceived risk model and pregnancy desire model. A series of response patterns for each of the high/low variables were hypothesized for each model. It is important to note that while classes identified within the models are mutually exclusive from one another, classes across models are not necessarily mutually exclusive because they contain distinct variables.

Perceived Risk Model

In the perceived risk model, six different classes were originally hypothesized (Table 2) and are characterized below. Class 1 was created to test low self-efficacy attributed by a cause other than perceived risk and was defined with low self-efficacy, low perceived personal risk, and low perceived partner risk.

Classes 2-4 were created to test the barriers posed by the partner. In each of these classes, the woman would need to communicate her desire to use condoms with her partner because of her partner's behavior, or her own behavior. Individuals in class 2 were defined by low self-efficacy for using condoms consistently with their main

partners, low perceived self-risk and high perceived partner risk. They are hypothesized to be in precontemplation because they do not have confidence in their ability to use condoms, possibly due to the fact that they have to negotiate condom use with their partner. Individuals in class 3 are defined by low self-efficacy to use condoms, high self risk, and low perceived partner risk. Class 4 combines the two hypothesized "partner" barriers of classes 2 and 3. Membership is characterized by identifying risk behaviors for themselves and their partner, but lacking confidence in their ability to use condoms.

Table 2. Perceived Risk Response Model

Class	Self-Efficacy	Perceived Risk (Self)	Perceived Risk (Partner)
Class One	Low	Low	Low
Class Two	Low	Low	High
Class Three	Low	High	Low
Class Four	Low	High	High
Class Five	High	Low	Low
Class Six	High	High	Low

Classes 5 and 6 were designed to test the lack of perceived risk as the reason for being in precontemplation for consistent condom use. Individuals in class 5 are defined by high self-efficacy, low risk for themselves, and low perceived partner risk. Therefore, they may not perceive consistent condom use to be a relevant behavior for themselves, as they do not perceive that they are putting their partner at risk, nor do they perceive that they are at risk from their main partner. Individuals in class 6 are defined by high self-efficacy, high self-risk, and low partner risk. Although they identify their own risk behavior, they do not report any perceptions of risk behavior from their partners.

Pregnancy Desire Model

In the pregnancy desire model, five classes were originally hypothesized and may be characterized as follows (Table 3). Class 1 was designed to test self-efficacy as a barrier without the influence of pregnancy desire and is defined by individuals with low self-efficacy and low personal and perceived partner pregnancy desire.

Table 3. Pregnancy Desire Response Model

Class	Self-Efficacy	Pregnancy Desire	Perceived Partner Pregnancy Desire
Class One	Low	Low	Low
Class Two	Low	Low	High
Class Three	Low	High	High
Class Four	High	High	Low
Class Five	High	High	High

Classes 2 and 3 were designed to test the woman's lack of confidence in her ability to use condoms because of her perception of her partner's pregnancy desire. Individuals in class 2 have low self-efficacy to use condoms and a low personal pregnancy desire, but a high perceived partner pregnancy desire. Individuals in class 3 have low self-efficacy for using condoms consistently with their main partner, and a high desire for a baby and a high perception of their partner's desire for a baby.

Classes 4 and 5 were designed to test the desire for a baby as a conflict to condom use behavior. Individuals in class 4 may be characterized as having high self-efficacy to use condoms, high personal pregnancy desire and a low perceived partner pregnancy desire. Individuals in this class feel confident they can use condoms, and do not perceive their partner wants a baby now, but they themselves do want a baby now. Individuals in

class 5 were defined with high self-efficacy for using condoms consistently with their main partner and high personal pregnancy desire and perceived partner pregnancy desire.

Each of the above models was tested within LCA to confirm the hypothesized subgroups within precontemplation. LCA determines how well the hypothesized response patterns characterize the data and determines the probability of belonging to each of the above classes, as well as the probability of responding according to the hypothesized patterns given class membership.

Models identical to those testing subgroups in precontemplation were tested for participants in other stages as a means to test the uniqueness of identified subgroups to precontemplation. Due to lower numbers in some of the other stages, theoretically similar stages were grouped together as follows: contemplation was combined with preparation (n = 232), and action and maintenance stages were combined (n = 122). The original models of pregnancy desire and risk perception were tested within the grouped stages and the same process for reducing the models was followed.

Finally, the response patterns mirroring the staging algorithm within the TMC were specified and a "stages of change" model was tested to see how well the hypothesized stages fit the data. This analysis was done for Time 1 and Time 2.

A second purpose of the study was to determine if membership in specified subgroups identified within the precontemplation stage influenced a respondent's mobility through the stages of change over time. In order to test this, the sample of precontemplators from Time 1 was divided into subgroups based on how they changed from Time 1 to Time 2. That is, Time 1 precontemplators were divided into three groups: 1) "movers", or those who moved up in the stages of change at Time 2 (n = 94); 2)

"stayers", or those who remained in precontemplation at Time 2 (n = 170); and 3) "drop-outs", or those who did not participate in Time 2 data collection (n = 103). Identical models were tested in all three groups to determine if goodness-of-fit and probability of class membership were the same.

Next, the original models for risk perception and pregnancy desire were tested for each of the subgroups using Time 1 data to determine if membership in a particular subgroup influenced how they changed over time with respect to stage movement at Time 2. The same process was followed using LCA as described above. The original models of perceived risk and pregnancy desire were also tested for precontemplators at Time 2, to determine the similarity between subgroups identified for precontemplators at Time 1 and Time 2.

Given that Time 2 data were collected post intervention, controlling for the intervention effect was considered. However, this was determined to be unnecessary due to the fact that published analyses from the original study report that many participants did not participate in the intervention at all (received no treatment) and that no effect was observed among those that did participate (Fogarty et al., 2001).

Finally, after all models were tested in LCA, actual response patterns for each sub-population were reviewed in a post hoc analysis. Distribution and clustering of actual response patterns were compared with LCA findings, and inferences were made regarding the existence of subgroups and the influence of subgroup membership on mobility through the stages of change.

CHAPTER 4

RESULTS

Descriptive Statistics

The majority of women in the Precontemplation stage (n = 416) were African American (80.5%), had never been married (67.3%), had a high school education or less (or equivalent GED) (88.2%), and were between 25-34 years of age (54.1%) (Table 4). Only 38.2% reported receiving money from a job or business in the previous year. Other major sources of income included welfare and money from personal contacts (including partners, family members, etc.). Approximately 38% of subjects lived with their main partner and 92.8% had ever been pregnant. Thirty-four percent of precontemplators had been surgically sterilized. Precontemplators did not differ dramatically on these demographic characteristics compared to the larger sample of all women who were staged (n = 770). However, compared to women in other stages (n = 354), precontemplators were more likely to live with their partners (38.2% versus 19.9%), less likely to be African American, less likely to be 24 years of age or younger, less likely to have never been married (67.3% versus 78.5%), and more likely to be currently married (14.4% versus 6.2%). These differences were statistically significant ($p < .01$).

Only nonsterilized women were classified within the sample of precontemplators for analysis of the pregnancy desire models. Nonsterilized precontemplators were compared with sterilized precontemplators on basic demographic variables (Table 5). Differences between the two groups were minor with the exception that nonsterilized

precontemplators were significantly more likely to have never been married ($p<.05$) and less likely to have ever been pregnant ($p < .01$).

Table 4. Descriptive Statistics, Precontemplators Versus all Other Stages

Demographic Characteristic	Overall Sample n = 770		Precontemplators n = 416		All other stages n = 354	
Age (in years)	number	percent	number	percent	number	percent
14-19* *** [a]	61	7.9%	16	3.9%	45	12.8%
20-24 *** [a]	107	13.9%	50	12%	57	16.2%
25-29	186	24.1%	101	24.3%	85	24.2%
30-34	224	29.1%	124	29.8%	97	27.6%
35-39	167	21.7%	106	25.5%	60	17.1%
40+	26	3.4%	19	4.6%	7	2%
Race/Ethnicity						
African Am. [a]	658	85%	335	80.5%	320	90.4%
White	78	10.1%	52	12.5%	25	7.1%
Asian	1	.1%	2	.5%	1	.3%
Native Am.	2	.3%	25	6%	0	0
Latina/Hispanic	32	4.1%	2	.5%	7	2%
Marital Status						
Married [a]	82	10.6%	60	14.4%	22	6.2%
Divorced	61	7.9%	36	8.7%	25	7.1%
Widowed	9	1.2%	4	1%	5	1.4%
Separated	60	7.7%	35	8.4%	24	6.8%
Never married [a]	561	73%	280	67.3%	278	78.5%
Education						
1-8	34	4.4%	17	4.1%	17	4.8%
9-12	564	73%	340	81.7%	301	85.3%
GED	20	2.6%	10	2.4%	10	2.8%
Beyond HS	74	9.6%	49	11.8%	25	7.1%
Received $ from job in past year**	289	37.3%	159	38.2%	129	36.4%
Live w/ Spouse/Partner** [a]	230	30%	159	38.2%	70	19.9%
Ever pregnant	720	93%	386	92.8%	330	93.5%
Surgically sterilized	243	31.4%	142	34.1%	100	28.3%

*Although eligibility criteria required participants be at least 15 years of age, some women in the sample were 14.

**These data should be interpreted with caution as recruitment venues included public housing which often has regulations on income and living with male partners to whom they are not married. Therefore, underreporting on these variables may have occurred.

***Data combined for significance test.

[a]Denotes statistically significant differences between precontemplators and women in other stages.

Table 5. Descriptive Statistics, Non-Sterilized/Sterilized Precontemplators

Demographic Characteristic	Not sterilized n = 274		Sterilized n = 142	
Age (in years)	number	percent	number	percent
14-19*	16	5.8%	6	4.2%
20-24	44	16.1%	24	16.9%
25-29	77	28.1%	52	36.6%
30-34	72	26.3%	46	32.4%
35-39	60	21.9%	14	9.9%
40+	5	1.8%	0	0
Race/Ethnicity				
African Am.	218	79.6%	117	82.4%
White	38	13.9%	14	9.9%
Asian	0	0	0	0
Native Am.	2	.7%	0	0
Latina/Hispanic	14	5.1%	11	7.8%
Marital Status				
Married	41	15%	19	13.4%
Divorced	18	6.6%	18	12.7%
Widowed	2	.7%	2	1.4%
Separated	16	5.8%	19	13.4%
Never married [a]	196	71.5%	84	59.2%
Education				
1-8	12	4.4%	5	3.5%
9-12	220	80.3%	120	84.5%
GED	8	2.9%	2	1.4%
Beyond HS	34	12.4%	15	10.6%
Received $ from job in past year**	100	36.5%	59	41.6%
Live w/ Spouse/Partner**	103	37.6%	56	39.4%
Ever pregnant [b]	246	89.8%	140	98.6%

*Although eligibility criteria required participants be at least 15 years of age, some women in the sample were 14.

**These data should be interpreted with caution as recruitment venues included public housing which often has regulations on income and living with male partners to whom they are not married. Therefore, underreporting on these variables may have occurred.

[a]Denotes statistically significant differences between surgically sterilized women and non-sterilized women ($p < .05$).

[b]Denotes statistically significant differences between surgically sterilized women and non-sterilized women ($p < .01$).

A comparison of the overall sample at Time 1 and Time 2 regarding stages of change is illustrated in Table 6. Percentages in each stage were relatively consistent over

time, with slightly fewer women in precontemplation and slightly more in maintenance at Time 2 compared to Time 1. Just over half of the sample at Time 1 were characterized as precontemplators and slightly less than half were in precontemplation at Time 2. The number of women staged in contemplation is particularly low. This may reflect the fact that no behavioral criterion was used to classify women into preparation. Therefore, it is possible that some women staged in preparation would be shifted into contemplation if a behavioral criterion had been used.

Table 6. Stages of Change for Condom Use With Main Partner, Times 1 & 2

Stages	Time 1 n = 770		Time 2 n = 471	
Precontemplation	416	54%	227	48.2%
Contemplation	20	2.6%	7	1.5%
Preparation	212	27.5%	106	22.5%
Action	44	5.7%	46	9.8%
Maintenance	78	10.1%	85	18.1%

Stage movement from Time 1 to Time 2 is illustrated in Table 7. The table only includes subjects that were staged at both time periods. Precontemplation is the largest stage at both time periods. Seventy-five percent of precontemplators from Time 1 remained in precontemplation at Time 2, representing 36% of the overall sample staged at both time periods. Preparation is the second most populated stage, followed by the maintenance stage.

A comparison of all high/low variables of interest between precontemplators and women in all other stages reveals consistent high/low levels for all variables, with the exception of self-efficacy (Table 8). That is, women in all stages are more likely to report low pregnancy desire, low perceived partner pregnancy desire, high perceived

personal risk, and high perceived partner risk. With regards to self-efficacy, the majority of women in precontemplation reported low self-efficacy, whereas the majority of women in all other stages reported high self-efficacy. Precontemplators exhibiting significantly lower self-efficacy is consistent with the TMC. Despite these similarities, a statistically significant difference was observed between Precontemplators and women in all other stages for all variables indicating that Precontemplators were more likely to have low self-efficacy and low perceived partner risk, and more likely to have high pregnancy desire, perceived partner pregnancy desire, and self risk. No significant differences were observed between Precontemplators at Time 1 and Precontemplators at Time 2.

Table 7. Stage Membership for Condom Use With Main Partner, Times 1 & 2

Stage Freq % Total % T2 (row) % T1 (col)	PC (Time 2)	C	Prep	A	M	Total
PC (Time 1)	170 36.1 64.4 74.9	4 0.9 1.5 57.1	48 10.2 18.2 45.3	22 4.67 8.33 47.83	20 4.3 7.6 23.5	264 (56.1%)
C	5 1.1 38.5 2.2	1 0.2 7.7 14.3	6 1.3 46.2 5.7	0	1 0.2 7.7 1.2	13 (2.8%)
Prep	39 8.3 30.7 17.2	1 0.2 0.8 14.3	43 9.1 33.9 40.6	15 3.2 11.8 32.6	29 6.2 22.8 34.1	127 (27%)
A	6 1.3 26.1 2.6	1 0.2 4.4 14.3	2 0.4 8.7 1.9	6 1.3 26.1 13.0	8 1.7 34.8 9.4	23 (4.9%)
M	7 1.5 15.9 3.1	0	7 1.5 15.9 6.6	3 0.6 6.8 6.5	27 5.7 61.4 31.8	44 (9.3%)
Total	227 (48.2%)	7 (1.5%)	106 (22.5%)	46 (9.8%)	85 (18.1%)	471 (100%)

Variables were also compared between precontemplators who had been sterilized and those who had not (Table 9). There were no significant differences between these two groups for any of the variables (not calculated on pregnancy desire or partner pregnancy desire).

Table 8. High/Low Variables, Precontemplators and all Other Stages

	Precontemplators (Time 1) n = 416		All Other Stages (Time 1) n = 354		Precontemplators (Time 2) n = 227	
Variable	Low	High	Low	High	Low	High
Self Efficacy[a]	247 (59.5%)	168 (40.5%)	114 (32.2%)	240 (67.8%)	132 (58.4%)	94 (41.6%)
Pregnancy Desire*[a]	181 (66.3%)	92 (33.7%)	212 (84.5%)	39 (15.5%)	82 (68.9%)	37 (31.1%)
Partner Pregnancy Desire*[a]	131 (48.3%)	140 (51.7%)	161 (63.9%)	91 (36.1%)	63 (52.9%)	56 (47.1%)
Self risk[a]	164 (39.4%)	252 (60.6%)	175 (49.7%)	177 (50.3%)	95 (41.9%)	132 (58.1%)
Perceived partner risk[a]	122 (29.3%)	294 (70.7%)	54 (15.3%)	299 (84.7%)	63 (27.8%)	164 (72.3%)

*Calculated on nonsterilized respondents only.

[a] Statistically significant difference between precontemplators and all other stages, Time 1, $p < .01$.

Table 9. High/Low Variables, Non-Sterilized/ Sterilized Precontemplators

	Non-sterilized n = 274		Sterilized n = 142	
Variable	Low	High	Low	High
Self-Efficacy	163 (59.5%)	110 (40.5%)	84 (59.6%)	57 (40.4%)
Pregnancy Desire*	181 (66.3%)	92 (33.7%)	--	--
Partner Pregnancy Desire*	131 (48.3%)	140 (51.7%)	--	--
Self-Risk	108 (39.4%)	166 (60.6%)	56 (39.4%)	86 (60.6%)
Perceived Partner Risk	85 (31%)	189 (69%)	37 (26.1%)	105 (73.9%)

*Questions not asked of sterilized women.

Cronbach's alpha was assessed for the self-efficacy scale (alpha = .73) on the sample of all women who were staged at Time 1 using SAS (2001). Inter-item correlation was also assessed for all high/low variables using Kendall's Taub (Table 10). For these analyses, pregnancy desire and perceived partner pregnancy desire showed the strongest correlation ($r = .45$, $p < .01$). Of interest also was a small, negative correlation exhibited between pregnancy desire and self-efficacy for consistent condom use ($r = -.21$, $p < .01$) and partner pregnancy desire and self-efficacy for consistent condom use ($r = -.13$, $p < .01$).

Table 10. Correlation Between High/Low Variables

Variable	Self-Efficacy	Pregnancy Desire*	Partner Pregnancy Desire*	Perceived Risk (self)	Perceived Risk (partner)
Self-efficacy	1.00				
Pregnancy desire*	-.21 $p < .01$	1.00			
Partner pregnancy desire*	-.13 $p < .01$	.45 $p < .01$	1.00		
Personal risk	-.16 $p < .01$	.09 $p < .05$	.07	1.00	
Partner risk	.04	-.03	.07 $p < .10$	.09	1.00

*Calculated on non-sterilized women only.

For analysis on the relationship between subgroups and precontemplator movement at Time 2, precontemplators at Time 1 were divided into one of three groups: women remaining in precontemplation at Time 2 (n = 170) were identified as "stayers"; women who advance into other stages at Time 2 (n = 94) were identified as "movers", and women who were not staged because they were not interviewed at all at Time 2 were identified as "drop-outs" (n = 103). Forty-nine precontemplators from Time 1 were not

included in these classifications because they either did not have a main partner or were not sexually active with their main partner in the past 6 months at follow-up.

Table 11: Descriptive Statistics of Precontemplators in Change Subgroups

Demographic Characteristic	Stayers n = 170		Movers n = 94		Drop-outs n = 103	
Age (in years)	number	percent	number	percent	number	percent
14-19*	9	5.3%	2	2.1%	4	3.9%
20-24	14	8.2%	16	17%	15	14.6%
25-29	34	20%	19	20.2%	38	36.9%
30-34	50	29.4%	30	31.9%	27	26.2%
35-39	53	31.2%	22	23.4%	16	15.5%
40+	10	5.9%	5	5.3%	3	2.9%
Race/Ethnicity						
African Am. [b]	136	80%	83	88.3%	75	72.8%
White	23	13.5%	8	8.5%	15	14.6%
Asian	0	0%	0	0%	0	0%
Native Am.	1	.6%	0	0%	1	1%
Latina/Hispanic	10	5.9%	3	3.2%	10	9.7%
Marital Status						
Married	27	15.9%	13	13.8%	15	14.6%
Divorced	18	10.6%	9	9.6%	7	6.8%
Widowed	2	1.2%	1	1.1%	0	0%
Separated	11	6.5%	3	3.2%	12	11.7%
Never married	112	65.9%	67	71.3%	69	67%
Education						
1-8	6	3.5%	3	3.2%	6	5.8%
9-12	137	80.6%	81	86.2%	83	80.6%
GED	5	2.9%	3	3.2%	0	0%
Beyond HS	22	12.9%	7	7.5%	14	13.6%
Received $ from job in past year**	67	39.4%	31	33%	40	38.8%
Live w/ Spouse/ Partner** [a c]	82	48.2%	31	33%	37	35.9%
Ever pregnant	153	91.8%	91	96.8%	94	91.3%
Sterilized [a c]	70	41.2%	27	28.7%	28	27.2%

*Although eligibility criteria required participants be at least 15 years of age, some were 14.
**These data should be interpreted with caution as recruitment venues included public housing which often has regulations on income and living with male partners to whom they are not married. Therefore, underreporting on these variables may have occurred.
[a]Indicates statistically significant differences between stayers and movers, $p < .05$.
[b]Indicates statistically significant differences between movers and drop-outs, $p < .01$.
[c]Indicates statistically significant differences between stayers and drop-outs, $p < .05$.

Few differences were noted in demographic variables between stayers, movers, or drop-outs (Table 11). Among them, "drop-outs" were less likely to be African American compared to "movers," and "stayers" were more likely to live with their spouse/partner and be surgically sterilized, compared to the other two groups. With regards to high/low variables, no statistically significant differences were noted between groups (Table 12).

Table 12. High/Low Variables, Stayers, Movers, and Drop-outs

	Stayers n = 170		Movers n = 94		Drop-outs n = 103	
Variable	Low	High	Low	High	Low	High
Self Efficacy	107 (63.3%)	62 (36.7%)	54 (57.5%)	40 (42.5%)	64 (62.1%)	39 (37.9%)
Pregnancy Desire*	61 (61.6%)	38 (38.4%)	46 (68.7%)	21 (31.3%)	50 (66.7%)	24 (32.9%)
Partner Pregnancy Desire*	48 (48.5%)	51 (51.5%)	29 (43.3%)	38 (56.7%)	35 (48%)	38 (52%)
Self risk	71 (41.8%)	99 (58.2%)	35 (37.2%)	59 (62.8%)	36 (35%)	67 (65%)
Perceived partner risk	53 (31.2%)	117 (68.8%)	24 (25.5%)	70 (74.5%)	34 (33%)	69 (67%)

*Calculated on non-sterilized respondents only.

Latent Class Analysis

Latent class analysis was performed on Perceived Risk and Desire for Pregnancy models for women staged in precontemplation, contemplation and preparation, action and maintenance, as well as the precontemplator change subgroups of stayers, movers, and drop-outs at Time 1. LCA was also performed on the same models at Time 2 for precontemplators only. In addition, the Stages of Change Model was tested for all women who were staged at Time 1 and Time 2. There can be no missing data for cases included in LCA. Therefore, sample sizes vary slightly across similar groups, depending on which variables were included and whether or not there was any missing data.

Perceived Risk Model

Perceived Risk Model Among Precontemplators at Time 1, Full Model. Eight unique response patterns were generated from data collected from precontemplators on self-efficacy, personal risk behaviors, and perceived partner risk behaviors at Time 1. The model tested six hypothesized classes. Goodness-of-fit was tested with parameter estimates started at .8/.2 and at .6/.4 to ensure that the global maxima was found. There was no difference between the fit of the two models with regards to G^2 or response probabilities, however, the .6/.4 model had slightly different probabilities of class membership and was therefore used. The hypothesized model did not fit the data well. Examination of the probability of class membership indicated that the probability of being in classes 5 and 6 was none. Classes 5 and 6 were the high self-efficacy models testing the barrier of no perceived risk. The model was rerun with classes 1-4 only.

Table 13. Perceived Risk Model Among Precontemplators at Time 1, Full Model

Precontemplators Time 1	Probability of class membership
n = 415	Class 1 = .298
Response patterns: 8	Class 2 = .255
G^2 = 17.417	Class 3 = .029
df = 0*	Class 4 = .418
Fit: poor	Class 5 = .000
	Class 6 = .000

*Zero degrees of freedom indicates a saturated model.

The four-class model was tested for goodness-of-fit with start values at .6/.4. Reducing the model to four classes did not change the fit of the model. Given the relatively low probability of being in the hypothesized third class, the model was retested with classes 1, 2, and 4 only with the parameters estimated at .6/.4 The three-class model

made a slight improvement on the goodness-of-fit and therefore was selected as the best fitting model of those hypothesized and tested (Table 14). However, the model did not fit the data well. Class 4 accounts for the most response patterns, given the specified model, and is characterized by low self-efficacy and high perceived risk for self and partner. Examination of the rho parameters reveals that they are very close to .5 for the variable of self-efficacy and all variables in the first class. This suggests that respondents have an equal probability of responding low or high given class membership, and is therefore most likely the result of chance.

Table 14. Perceived Risk Model Among Precontemplators at Time 1, Reduced Model

Precontemplators Time 1 (perceived risk)	Self-Efficacy (rho)	Self Risk (rho)	Perceived Partner Risk (rho)	Probability of class membership (gamma)
Class 1	.595*/.405**	. 595/.405	. 595/.405	.281
Class 2	. 595/.405	. 595/.405	. 176/.824	.241
Class 4	. 595/.405	.176/.824	. 176/.824	.477
n = 415	$G^2 = 17.416$	df = 3	Fit = poor	

*The first rho represents the probability of scoring low on this item conditional on class membership.
**The second rho represents the probability of scoring high on this item conditional on class membership.

Perceived Risk Model Among Contemplators and Preparers Time 1, Full Model.

Eight unique response patterns were generated from data collected on the risk model variables from women staged in contemplation or preparation at Time 1. The model tested six hypothesized subgroups. Goodness-of-fit was tested with parameter estimates set at .8/.2 and at .6/.4. There was no difference between the fit of the two models. The hypothesized model did not fit the data well. Examination of the probability of class membership indicated that the probability of being in classes 3 and 5 was none. Classes 3

and 5 both specified high personal risk and low perceived partner risk with alternating values of self-efficacy. The model was rerun with classes 1, 2, 4, and 6 only.

Table 15. Perceived Risk Model Among Contemplators and Preparers Time 1, Full Model

Contemplation and Preparation	Probability of class membership
n = 229	Class 1 = .096
Response patterns: 8	Class 2 = .656
$G^2 = 9.046$	Class 3 = .000
df = 0*	Class 4 = .101
Fit: poor	Class 5 = .000
	Class 6 = .147

*Zero degrees of freedom indicates a saturated model.

The four-class model was tested for goodness-of-fit with parameters estimated at .8/.2 (Table 16). Reducing the model to four classes did not change the fit of the model. Class 2 accounts for the most response patterns, given the specified model. Class 2 is characterized by low self-efficacy, low self risk and high perceived partner risk. Examination of the rho parameters suggests that for the variable of self-efficacy in classes 1, 2 and 4, and all variables in class 1, respondents have an equal probability of scoring low or high on selected variables given class membership. This suggests that the response probability is largely determined by chance. Variables with rhos = 0 or 1 indicate that the responses are determined entirely by class membership.

Perceived Risk Model in Action and Maintenance Time 1, Full Model. Six unique response patterns were generated from data collected on the risk model variables from women staged in action or maintenance at Time 1. The model tested six hypothesized

subgroups. Goodness-of-fit was tested with parameter estimates started at .8/.2 and at .6/.4. The fit of the model was dramatically improved using the .6/.4 estimates, which were therefore used. The hypothesized model fit the data well. However, it should be noted that there were zero degrees of freedom, and the model was saturated. Examination of the probability of class membership indicated that the probability of being in classes 2 and 6 was low. Class 2 hypothesized low self-efficacy, low personal risk, and high perceived partner risk. Class 6 hypothesized high self-efficacy, low personal risk, and low perceived partner risk. The model was rerun with classes 1, 3, 4 and 5.

Table 16. Perceived Risk Model Among Contemplators and Preparers Time 1, Reduced Model

Contemplation and Preparation (Risk model)	Self-Efficacy (rho)	Self Risk (rho)	Perceived Partner Risk (rho)	Probability of class membership (gamma)
Class 1	.506*/.494**	. 506/.494	. 506/.494	.096
Class 2	. 506/.494	. 506/.494	0.0/1.0	.656
Class 4	. 506/.494	0.0/1.0	0.0/1.0	.101
Class 6	0.0/1.0	. 506/.494	. 506/.494	.147
n = 164	$G^2 = 9.046$	df = 2	Fit = poor	

*The first rho represents the probability of scoring low on this item conditional on class membership.
**The second rho represents the probability of scoring high on this item conditional on class membership.

The four-class model was tested for goodness-of-fit with parameters estimated at .6/.4 (Table 18). Reducing the model to four classes did not change the fit of the model. However, it did increase the degrees of freedom to two. Class 4 accounts for the most response patterns, given the specified model. Class 4 represents individuals with low self-efficacy, high personal risk, and high perceived partner risk. Examination of the rho

parameters suggests that items have a good probability of being determined by class membership (as they are close to zero and one), rather than by chance. However, close examination reveals that classes 1, 3, and 4 have zero probability (.000) of scoring low on self-efficacy compared to a relatively high probability (.630) of scoring low in class 5. This scoring is the opposite of how it was originally defined and indicates that response patterns for this model should be interpreted to mean the opposite of how they were originally specified. Therefore, the class with the largest proportion of respondents (class four) has high self-efficacy, low personal risk, and low perceived partner risk.

Table 17. Perceived Risk Model in Action and Maintenance Time 1, Full Model

Action and Maintenance	Probability of class membership
n = 122	Class 1 = .176
Response patterns: 6	Class 2 = .024
$G^2 = 0.000$	Class 3 = .269
df = 0*	Class 4 = .301
Fit: good	Class 5 = .213
p < .10	Class 6 = .016

*Zero degrees of freedom indicates a saturated model.

Table 18. Perceived Risk Model in Action and Maintenance Time 1, Reduced Model

	Self-Efficacy (rho)	Self Risk (rho)	Perceived Partner Risk (rho)	Probability of class membership (gamma)
Class 1	.000*/1.0.**	.000/1.0	.000/1.0	.155
Class 3	.000/1.0	.630/.370	.000/1.0	.247
Class 4	.000/1.0	.630/.370	.630/.370	.351
Class 5	.000/1.0	.630/.370	.000/1.0	.247
n = 122	$G^2 = 0.000$	df = 2	p < .10	Fit = good

*The first rho represents the probability of scoring low on this item conditional on class membership.
**The second rho represents the probability of scoring high on this item conditional on class membership.

Perceived Risk Model Among Stayers, Full Model. Eight unique response patterns were generated from data collected on the three variables in the perceived risk model at Time 1 from women who were staged in precontemplation at Times 1 and 2. The model tested six hypothesized classes. Goodness-of-fit was tested with parameter estimates starting at .8/.2 and at .6/.4. There was no difference between the fit of the two models. The hypothesized model did not fit the data well. Examination of the probability of class membership indicated that the probability of being in classes 5 and 6 was none and the probability of being in class 3 was low. Classes 5 and 6 were defined as high self-efficacy, low perceived partner risk, and high and low personal risk, respectively. Class 3 was defined as low self-efficacy, high personal risk, and low perceived partner risk. The model was rerun with classes 1, 2, and 4 only.

Table 19. Perceived Risk Model Among Stayers, Full Model

Stayers	Probability of class membership
n = 169	Class 1 = .379
Response patterns: 8	Class 2 = .218
$G^2 = 9.134$	Class 3 = .017
df = 0*	Class 4 = .386
Fit: poor	Class 5 = .000
	Class 6 = .000

*Zero degrees of freedom indicates a saturated model.

The three-class model was tested for goodness-of-fit with parameter estimates starting at .8/.2 (Table 20). Reducing the model to three classes did not change the fit of the model and the model still did not fit the data well. Class 4 accounts for the most response patterns, given the specified model. Class 4 is characterized by low self-

efficacy and high personal and perceived partner risk. Class 1 also has a high probability of membership and is characterized by low self-efficacy and low personal and perceived partner risk.

Table 20. Perceived Risk Model Among Stayers, Reduced Model

	Self-Efficacy (rho)	Self Risk (rho)	Perceived Partner Risk (rho)	Probability of class membership (gamma)
Class 1	.633*/.367**	.633/.367	.633/.367	.369
Class 2	.633/.367	.633/.367	.127/.873	.210
Class 4	.633/.367	.127/.873	.127/.873	.421
n = 169	$G^2 = 9.134$	df = 3	Fit = poor	

*The first rho represents the probability of scoring low on this item conditional on class membership.
**The second rho represents the probability of scoring high on this item conditional on class membership.

Perceived Risk Model Among Movers, Full Model. Eight unique response patterns were generated from data collected on the three variables in the perceived risk model at Time 1 from women who were staged in precontemplation at Time 1 but who had advanced in the stages at Time 2. The model tested six hypothesized subgroups. Goodness-of-fit was tested with parameter estimates started at .8/.2 and at .6/.4. There was no difference between the fit of the two models. The hypothesized model did not fit the data well. Examination of the probability of class membership indicated that the probability of being in classes 5 and 6 was none. These classes are characterized as high self-efficacy, low perceived partner risk, and alternating personal risk, high and low respectively. The model was rerun with classes 1-4 only.

The four class model was tested for goodness-of-fit with estimated parameters starting at .8/.2 (Table 22). Reducing the model to four classes did not change the fit of

the model. Class 4 accounts for the most common response patterns, given the specified model. Class 2 also has a high probability of membership. Classes 4 and 2 had low self-efficacy, and high perceived partner risk, and high and low personal risk, respectively. Examination of the rho parameters suggests that all variables in class 1, as well as the variable of self-efficacy across all classes, are largely determined by chance.

Table 21. Perceived Risk Model Among Movers, Full Model

Movers	Probability of class membership
n = 94	Class 1 = .053
Response patterns: 8	Class 2 = .494
$G^2 = 10.498$	Class 3 = .232
df = 0	Class 4 = .220
Fit: poor	Class 5 = .000
	Class 6 = .000

*Zero degrees of freedom indicates a saturated model.

Table 22. Perceived Risk Model Among Movers, Reduced Model

	Self-Efficacy (rho)	Self Risk (rho)	Perceived Partner Risk (rho)	Probability of class membership (gamma)
Class 1	.574*/.426*	. 574/.426	. 574/.426	.090
Class 2	. 574/.426	. 574/.426	.104/.896	.480
Class 3	. 574/.426	.104/.896	. 574/.426	.231
Class 4	. 574/.426	.104/.896	.104/.896	.198
n = 94	$G^2 = 10.498$	df = 2	Fit = poor	

*The first rho represents the probability of scoring low on this item conditional on class membership.
**The second rho represents the probability of scoring high on this item conditional on class membership.

Perceived Risk Model Among Drop-outs, Full Model. Eight unique response patterns were generated from data collected on the three variables in the perceived risk

model at Time 1 from women who were staged in precontemplation at Time 1 and did not participate in data collection at Time 2. The model tested six hypothesized subgroups. Goodness-of-fit was tested with parameter estimates started at .8/.2 and at .6/.4. There was no difference between the fit of the two models. The hypothesized model did not fit the data well. Examination of the probability of class membership indicated that the probability of being in class 5 was zero. Class 5 had high personal risk and low perceived partner risk, and high self-efficacy. The model was rerun with classes 1, 2, 3, 4, and 6 only.

Table 23. Perceived Risk Model Among Drop-outs, Full Model

Drop-outs	Probability of Class Membership
n = 103	Class 1 = .096
Response patterns: 8	Class 2 = .183
$G^2 = 10.162$	Class 3 = .184
df = 0*	Class 4 = .434
Fit: poor	Class 5 = .000
	Class 6 = .102

*Zero degrees of freedom indicates a saturated model.

The five-class model was tested for goodness-of-fit with parameters estimated at .8/.2 (Table 24). Reducing the model to five classes did not change the fit of the model. The model still did not fit the data well. The majority of people can be classified into class four response patterns, given the specified model which is characterized by low self-efficacy, high personal risk, and high perceived partner risk.

Perceived Risk Model Among Precontemplators Time 2, Full Model. Only four unique response patterns were generated from data collected on the risk model variables

from women staged in precontemplation at Time 2. This is half as many as were generated from Time 1 precontemplators. Therefore, it was not possible to test the original model with six hypothesized subgroups. Consequently, the three-class model that had the best fit of the hypothesized models from Time 1 was tested on Time 2 data. Goodness-of-fit was tested with parameters started at .8/.2 and at .6/.4. There was no change in the fit of the model. The hypothesized model did not fit the data well. Examination of the probability of class membership indicated that the probability of being in classes 1 and 2 was zero. Class 4 is characterized by low self-efficacy and high personal and perceived partner risk. Since there was only one class remaining, the model was not retested.

Table 24. Perceived Risk Model Among Movers, Reduced Model

	Self-Efficacy (rho)	Self Risk (rho)	Perceived Partner Risk (rho)	Probability of class membership (gamma)
Class 1	.683*/.317**	.683/.317	.683/.317	.123
Class 2	.683/.317	.683/.317	.093/.907	.195
Class 3	.683/.317	.093/.907	.683/.317	.197
Class 4	.683/.317	.093/.907	.093/.907	.389
Class 6	.093/.907	.683/.317	.683/.317	.097
n = 103	$G^2 = 10.162$	df = 1	Fit = poor	

*The first rho represents the probability of scoring low on this item conditional on class membership.
**The second rho represents the probability of scoring high on this item conditional on class membership.

Table 25. Perceived Risk Model Among Precontemplators Time 2, Full Model

Precontemplators Time 2	Probability of class membership
n = 81	Class 1 = .000
Response patterns: 4	Class 2 = .000
$G^2 = 24.048$	Class 4 = 1.00
df = 3	
Fit: poor	

Pregnancy Desire Model

Pregnancy Desire Model Among Precontemplators at Time 1, Full Model. Eight unique response patterns were generated from data collected from precontemplators on self-efficacy, pregnancy desire, and perceived partner pregnancy desire at Time 1. The model tested five hypothesized subgroups. Goodness-of-fit was tested with parameter estimates started at .8/.2 and at .6/.4. There was no difference between the fit of the two models. The hypothesized model did not fit the data well. Examination of the probability of class membership indicated that the probability of being in classes 4 and 5 was low to none. Class 4 and 5 were defined as high self-efficacy, high personal pregnancy desire, and low and high perceived partner pregnancy desire, respectively. The model was rerun with classes 1-3 only.

Table 26. Pregnancy Desire Model Among Precontemplators at Time 1, Full Model

Precontemplators Time 1	Probability of class membership
n = 270	Class 1 = .692
Response patterns: 8	Class 2 = .120
$G^2 = 51.999$	Class 3 = .177
df = 1	Class 4 = .000
Fit: poor	Class 5 = .010

The three-class model was tested for goodness of fit among precontemplators at Time 1 (Table 27). The model was tested with parameter estimates started at .8/.2. Reducing the model to three classes slightly worsened the fit of the model. Therefore, class 5 was added back to the model and the fit returned to the original G^2 of the 5-class model. Class 1 overwhelmingly accounts for the highest probability of membership,

given the specified model. Class 1 was defined as low self-efficacy and low personal and perceived partner pregnancy desire.

Table 27. Pregnancy Desire Model Among Precontemplators at Time 1, Reduced Model

	Self-Efficacy (rho)	Pregnancy Desire (rho)	Partner Desire for Pregnancy (rho)	Probability of class membership (gamma)
Class 1	.701*/.299**	.701/.299	.701/.299	.692
Class 2	.701/.299	.701/.299	0.0/1.0	.120
Class 3	.701/.299	0.0/1.0	0.0/1.0	.177
Class 5	0.0/1.0	0.0/1.0	0.0/1.0	.010
n = 270	$G^2 = 51.999$	df = 2	Fit = poor	

*The first rho represents the probability of scoring low on this item conditional on class membership.
**The second rho represents the probability of scoring high on this item conditional on class membership.

Pregnancy Desire Model Among Contemplators and Preparers Time 1, Full Model. Eight unique response patterns were generated from data collected on the three variables in the pregnancy desire model at Time 1 from women who were staged in contemplation or preparation at Time 1. The model tested five hypothesized subgroups. Goodness-of-fit was tested with parameter estimates set at .8/.2 and at .6/.4. There was no difference between the fit of the two models. The hypothesized model fit the data better than it did for precontemplators, but still did not fit the data well. Examination of the probability of class membership indicated that the probability of being in classes 2 and 5 was none. Class 2 had low self-efficacy, low personal desire for pregnancy, and high perceived partner desire. Class 5 had high self-efficacy, high personal desire, and high perceived partner desire. The model was rerun with classes 1, 3, and 4 only.

Table 28. Pregnancy Desire Model Among Contemplators and Preparers Time 1, Full Model

Contemplation and Preparation	Probability of class membership
n = 150	Class 1 = .146
Response patterns: 8	Class 2 = .000
$G^2 = 22.042$	Class 3 = .632
df = 1	Class 4 = .222
Fit: poor	Class 5 = .000

The three-class model was tested for goodness-of-fit with parameters estimated at .8/.2 (Table 29). Reducing the model to three classes did not change the fit of the model. Class 3 accounts for the highest probability of class membership, given the specified model. Examination of the probability of responding in hypothesized patterns suggests that classes have the opposite probability of how the model was originally specified. That is, class 3 reveals a low probability of scoring low on self-efficacy, when it was originally hypothesized to have a high probability of scoring low on this variable. Therefore, class membership should be understood to support response patterns that are the opposite of what were originally hypothesized. That is, the class that had the most membership may be characterized as having high self-efficacy, and low personal and perceived partner pregnancy desire (class 3).

Pregnancy Desire Model Among Action and Maintenance Time 1, Full Model. Seven unique response patterns were generated from data collected on the three variables in the pregnancy desire model at Time 1 from women who were staged in action or maintenance at Time 1. The model tested five hypothesized subgroups. Goodness-of-fit was tested with parameter estimates started at .8/.2 and at .6/.4. A difference was

observed between the fit of the two models, with the .6/.4 model improving the fit. Therefore, the .6/.4 parameter estimates were used. The hypothesized model did not fit the data well. Examination of the probability of class membership indicated that the probability of being in class 2 was zero and the probability of being in class 4 was small. The model was rerun with classes 1, 3, and 5 only.

Table 29. Pregnancy Desire Model Among Contemplators and Preparers Time 1, Reduced Model

	Self-Efficacy (rho)	Pregnancy Desire (rho)	Partner Desire for Pregnancy (rho)	Probability of class membership (gamma)
Class 1	.269*/.731**	.269/.731	.269/.731	.146
Class 3	.269/.731	.835/.165	.835/.165	.632
Class 4	.835/.165	.835/.165	.269/.731	.222
n = 150	$G^2 = 22.042$	df = 3	Fit = poor	

*The first rho represents the probability of scoring low on this item conditional on class membership.
**The second rho represents the probability of scoring high on this item conditional on class membership.

Table 30. Pregnancy Desire Model Among Action and Maintenance Time 1, Full Model

Action and Maintenance	Probability of class membership
n = 101	Class 1 = .084
Response patterns: 7	Class 2 = .000
$G^2 = 20.397$	Class 3 = .839
df = 1	Class 4 = .012
Fit: poor	Class 5 = .065

The three-class model was tested for goodness-of-fit with parameters started at .6/.4. Reducing the model to three classes slightly worsened the fit of the model. Therefore, class 4 was added in (Table 31). With the addition of class 4, G^2 returned to that of the original model. Class 3 overwhelmingly accounted for the most common

response patterns, given the specified model. Similar to the above model, examination of the probability of responding in hypothesized patterns suggests that response patterns should be interpreted to be the opposite of how they were originally specified. This means that the class with the most probability of membership (class 3) was actually characterized with high self-efficacy and low personal and perceived partner pregnancy desire. Likewise, the class with the smallest probability of membership from the original model (class 2) may be characterized by high self-efficacy, high desire for pregnancy and low perceived partner desire for pregnancy. Examination of the rho parameters also indicates that class membership is determined almost entirely by the response patterns, rather than chance.

Table 31. Pregnancy Desire Model Among Action and Maintenance Time 1, Reduced Model

	Self-Efficacy (rho)	Pregnancy Desire (rho)	Partner Desire for Pregnancy (rho)	Probability of class membership (gamma)
Class 1	.099*/.901**	.099/.901	.099/.901	.084
Class 3	.099/.901	.892/.108	.892/.108	.839
Class 4	.892/.108	.892/.108	.099/.901	.012
Class 5	.892/.108	.892/.108	.892/.108	.065
n = 101	$G^2 = 20.397$	df = 2	Fit = poor	

*The first rho represents the probability of scoring low on this item conditional on class membership.
**The second rho represents the probability of scoring high on this item conditional on class membership.

Pregnancy Desire Model Among Stayers Time 1, Full Model. Seven unique response patterns were generated from data collected on the three variables in the pregnancy desire model at Time 1 from women who were staged in precontemplation at Times 1 and 2. The model tested five hypothesized subgroups. Goodness-of-fit was

tested with parameter estimates set at .8/.2 and at .6/.4. There was no difference between the fit of the two models. The hypothesized model did not fit the data well. Examination of the probability of class membership indicated that the probability of being in classes 4 and 5 was low to none. Classes 4 and 5 were characterized by high self-efficacy, high personal pregnancy desire, and low and high perceived partner pregnancy desire, respectively. The model was rerun with classes 1-3 only.

Table 32. Pregnancy Desire Model Among Stayers, Full Model

Stayers (pregnancy)	Probability of class membership
n = 99	Class 1 = .688
Response patterns: 7	Class 2 = .069
$G^2 = 19.341$	Class 3 = .221
df = 1	Class 4 = .000
Fit: poor	Class 5 = .022

The three-class model was tested for goodness-of-fit with parameters estimated at .8/.2. Reducing the model to three classes slightly worsened the fit of the model. Therefore, class 5 was added back into the model. The four-class model returned the G^2 to the same as the five-class model (Table 33). Class 1 overwhelmingly accounts for the highest probability of membership, given the specified model. Class 1 was defined as low self-efficacy, and low personal and perceived partner pregnancy desire. Of interest, although class 5 has a low probability of membership, examination of the rho parameters reveals that class membership is defined entirely by the response patterns (.000/1.00). This may be why the elimination of this class worsened the fit of the model.

Table 33. Pregnancy Desire Model Among Stayers, Reduced Model

	Self-Efficacy Probability of scoring low/ high	Pregnancy Desire	Partner Desire for Pregnancy	Probability of class membership
Class 1	.704*/.296**	.710/.290	.710/.290	.688
Class 2	.704/.296	.710/.290	.000/1.00	.069
Class 3	.710/.290	.000/1.00	.000/1.00	.221
Class 5	.000/1.00	.000/1.00	.000/1.00	.022
n = 99	$G^2 = 19.341$	df = 2	Fit = poor	

*The first rho represents the probability of scoring low on this item conditional on class membership.
**The second rho represents the probability of scoring high on this item conditional on class membership.

Pregnancy Desire Model Among Movers Time 1, Full Model. Eight unique response patterns were generated from data collected on the three variables in the pregnancy desire model at Time 1 from women who were staged in precontemplation at Time 1 but who had advanced in the stages at Time 2. The model tested five hypothesized subgroups. Goodness-of-fit was tested with parameter estimates set at .8/.2 and at .6/.4. There was no difference between the fit of the two models. The hypothesized model did not fit the data well. Examination of the probability of class membership indicated that the probability of being in classes 4 and 5 were low to zero. Classes 4 and 5 were characterized by high self-efficacy, high personal pregnancy desire, and low and high perceived partner pregnancy desire, respectively. The model was rerun with classes 1-3 only.

Table 34. Pregnancy Desire Model Among Movers, Full Model

Movers (Pregnancy)	Probability of class membership
n = 67	Class 1 = .595
Response patterns: 8	Class 2 = .228
$G^2 = 12.114$	Class 3 = .140
df = 1	Class 4 = .000
Fit: poor	Class 5 = .037

The three-class model was tested for goodness-of-fit with parameters estimated at .8/.2. Reducing the model to three classes slightly worsened the fit of the model. Therefore, class 5 was added back into the model. The four-class model was tested for goodness-of-fit with parameters estimated at .8/.2 (Table 35). Reducing the model to three classes did not change the fit of the model. Class 1 has the highest probability of class membership, given the specified model. Class 1 was defined as low self-efficacy, and low personal and perceived partner pregnancy desire. Of interest, although class 5 has a low probability of membership, examination of the rho parameters reveals that class membership is defined entirely by the response patterns (.000/1.00). This may be why the elimination of this class worsened the fit of the model.

Table 35. Pregnancy Desire Model Among Movers, Reduced Model

	Self-Efficacy (rho)	Pregnancy Desire (rho)	Partner Desire for Pregnancy (rho)	Probability of class membership (gamma)
Class 1	.727*/.273**	.727/.273	.727/.273	.595
Class 2	.727/.273	.727/.273	.000/1.00	.228
Class 3	.727/.273	.000/1.00	.000/1.00	.140
Class 5	.000/1.00	.000/1.00	.000/1.00	.037
n = 67	$G^2 = 12.114$	df = 2	Fit = poor	

*The first rho represents the probability of scoring low on this item conditional on class membership.
**The second rho represents the probability of scoring high on this item conditional on class membership.

Pregnancy Desire Model Among Drop-outs Time 1, Full Model. Seven unique response patterns were generated from data collected on the three variables in the pregnancy desire model at Time 1 from women who were staged in precontemplation at Time 1 and who did not participate in data collection at Time 2. The model tested five hypothesized subgroups. Goodness-of-fit was tested with parameter estimates started at

.8/.2 and at .6/.4. There was no difference between the fit of the two models. The hypothesized model did not fit the data well. Examination of the probability of class membership indicated that the probability of being in classes 4 and 5 was minimal to none. Classes 4 and 5 were defined as high self-efficacy, high pregnancy desire, and low and high perceived partner pregnancy desire, respectively. The model was rerun with classes 1-3 only.

Table 36. Pregnancy Desire Model Among Drop-outs, Full Model

Drop-outs (Pregnancy)	Probability of class membership
n = 73	Class 1 = .637
Response patterns: 7	Class 2 = .116
$G^2 = 20.204$	Class 3 = .242
df = 1	Class 4 = .000
Fit: poor	Class 5 = .006

The three-class model was tested for goodness-of-fit with parameters started at .8/.2 (Table 37). Reducing the model to three classes marginally worsened the fit of the model ($G^2 = 20.222$). Therefore, class 5 was added back into the model, and the fit returned to the same as the five-class model. Class 1 has the highest probability of class membership, given the specified model. Class 1 was defined as low self-efficacy and low personal and perceived partner pregnancy desire. Of interest, although Class 5 has a very low probability of membership, examination of the rho parameters reveals that class membership is defined entirely by the response patterns (.000/1.00). This may be why the elimination of this class worsened the fit of the model.

Table 37. Pregnancy Desire Model Among Drop-outs, Reduced Model

	Self-Efficacy (rho)	Pregnancy Desire (rho)	Partner Desire for Pregnancy (rho)	Probability of class membership (gamma)
Class 1	.753*/.247**	.753/.247	.753/.247	.637
Class 2	.753/.247	.753/.247	.000/1.00	.116
Class 3	.753/.247	.000/1.00	.000/1.00	.242
Class 5	.000/1.00	.000/1.00	.000/1.00	.006
n = 73	$G^2 = 20.204$	df = 2	Fit = poor	

*The first rho represents the probability of scoring low on this item conditional on class membership.
**The second rho represents the probability of scoring high on this item conditional on class membership.

Pregnancy Desire Model Among Precontemplators Time 2, Full Model. Data from precontemplators at Time 2 included eight unique response patterns. Five classes/subgroups were hypothesized. Goodness-of-fit was tested with parameter estimates started at .8/.2 and at .6/.4. There was no difference between the fit of the two models. The hypothesized model did not fit the data well. Examination of the probability of class membership indicated that the probability of being in class 4 was none. Class 4 was defined as having high self-efficacy, high personal pregnancy desire, and low partner pregnancy desire. The model was rerun with classes 1-3, and 5 only.

The four-class model was tested for goodness of fit among precontemplators at Time 2 with parameters started at .8/.2 (Table 39). Reducing the model to four classes did not change the fit of the model. Class 1 overwhelmingly accounts for the highest probability of class membership, given the specified model, and was defined as low self-efficacy, and low personal and perceived partner pregnancy desire.

Table 38. Pregnancy Desire Model Among Precontemplators Time 2, Full Model

Precontemplators Time 2	Probability of class membership
n = 121	Class 1 = .718
Response patterns = 8	Class 2 = .080
$G^2 = 26.477$	Class 3 = .120
df = 1	Class 4 = .000
Fit = poor	Class 5 = .082

Table 39. Pregnancy Desire Model Among Precontemplators Time 2, Reduced Model

	Self-Efficacy (rho)	Pregnancy Desire (rho)	Partner Desire for Pregnancy (rho)	Probability of class membership (gamma)
Class 1	.737*/.263**	.737/.263	.737/.263	.718
Class 2	.737/.263	.737/.263	.000/1.00	.080
Class 3	.737/.263	.000/1.00	.000/1.00	.120
Class 5	.000/1.00	.000/1.00	.000/1.00	.082
n = 121	$G^2 = 26.477$	df = 2	Fit = poor	

*The first rho represents the probability of scoring low on this item conditional on class membership.
**The second rho represents the probability of scoring high on this item conditional on class membership.

Stage of Change Model

Stage of Change Model Time 1, Full Model. Ten unique response patterns were generated from data collected at Time 1 on the four variables used to stage people according to the transtheoretical model of change. The model tested five hypothesized subgroups, according to the stages specified in the TMC. Goodness-of-fit was tested with parameter estimates started at .8/.2 and at .6/.4. There was no difference between the fit of the two models. The hypothesized model did not fit the data well. Examination of the probability of class membership indicated that the probability of being in classes 2

(contemplation) and 4 (action) was none. Therefore, the model was rerun with classes 1, 3, and 5 only.

Table 40. Stage of Change Model Time 1, Full Model

Stages of Change Time 1	Probability of class membership
n = 773	Class 1 = .477
Response patterns: 10	Class 2 = .000
$G^2 = 635.430$	Class 3 = .240
df = 9	Class 4 = .000
Fit: poor	Class 5 = .283

The three-class model was tested for goodness-of-fit with parameters estimated at .8/.2 (Table 41). Reducing the model to three classes produced no change to the fit of the model. Class 1, precontemplation, has the highest probability of class membership, given the specified model. Examination of the probability of responding in hypothesized patterns suggests that nearly 100% of respondents in class 1 were characterized by the response pattern.

Table 41. Stage of Change Model Time 1, Reduced Model

	Consistent Condom use	How long consistent	Intentions 60 days	Intentions 30 days	Probability of class membership
Class 1	.999*/.001**	.999/.001	.999/.001	.999/.001	.477
Class 3	.999/.001	.999/.001	.356/.644	.356/.644	.240
Class 5	.356/.644	.356/.644	.356/.644	.356/.644	.283
n = 773	$G^2 = 635.430$	df = 11	Fit = poor		

*The first rho represents the probability of scoring low on this item conditional on class membership.
**The second rho represents the probability of scoring high on this item conditional on class membership.

Stage of Change Model Time 2, Full Model. Eight unique response patterns were generated from data collected at Time 2 on the four variables used to stage people according to the transtheoretical model of change (TMC). The model tested five hypothesized subgroups, according to the stages specified in the TMC. Goodness-of-fit was tested with parameter estimates set at .8/.2 and at .6/.4. There was no difference between the fit of the two models. The hypothesized model did not fit the data well. There was also minimal change in probability of class membership from Time 1 to Time 2. Examination of the probability of class membership indicated that the probability of being in classes 2 (contemplation) and 4 (action) was none. Therefore, the model was rerun with classes 1, 3, and 5 only.

Table 42. Stage of Change Model Time 2, Full Model

Stages of Change Time 2	Probability of class membership
n = 472	Class 1 = .434
Response patterns: 8	Class 2 = .000
$G^2 = 541.360$	Class 3 = .141
df = 9	Class 4 = .000
Fit: poor	Class 5 = .425

The three-class model was tested for goodness-of-fit with parameters estimated at .8/.2 (Table 43). Reducing the model to three classes produced no change to the fit of the model. Class 1, precontemplation, has the most common response pattern, given the specified model. Examination of the probability of responding in hypothesized patterns suggests that 100% of respondents in class 1 were characterized by the response pattern and membership in class 5 is most likely entirely determined by chance.

Table 43. Stage of Change Model Time 2, Reduced Model

	Consistent Condom Use	How long consistent	Intention 60 days	Intention 30 days	Probability of class membership
Class 1	1.0*/0.0**	1.0/0.0	1.0/0.0	1.0/0.0	.434
Class 3	1.0/0.0	1.0/0.0	.404/.596	.404/.596	.141
Class 5	.404/.596	.404/.596	.404/.596	.404/.596	.425
n = 472	$G^2 = 541.358$	df = 11	Fit = poor		

*The first rho represents the probability of scoring low on this item conditional on class membership.
**The second rho represents the probability of scoring high on this item conditional on class membership.

Post Hoc Review of Actual Response Patterns

Given the poor fit of the models hypothesized, a post hoc review of actual response patterns for each subpopulation was conducted. The top three response patterns for each of the subpopulations and the percentage of people responding as such are presented in Tables 44 and 45. The top three response patterns characterized approximately 60 to 80% of all responders for each group, indicating that these response patterns describe the majority of responders in each group. Within each model, the top three patterns for each model are largely consistent across groups. However, there is variation across groups with regards to the percent of responders characterized by each pattern.

Table 44. Top Three Most Popular Response Patterns, Perceived Risk Model

Population	Most Popular	2nd Most Popular	3rd Most Popular
Time 1	SE, SR, PPR[1]	SE, SR, PPR[1]	SE, SR, PPR[1]
Precontemplation	lo, hi, hi* (28%)	hi, hi, hi (17%)	hi, lo, hi (14%)
Contemplation and Preparation	hi, lo, hi (27%)	lo, hi, hi* (25%)	hi, hi, hi (23%)
Action and Maintenance	hi, hi, hi (33%)	hi, lo, hi (30%)	hi, lo, lo* (14%)
Stayers	lo, hi, hi* (30%)	hi, hi, hi (14%)	hi, lo, hi (14%)
Movers	lo, hi, hi* (31%)	hi, lo, hi (19%)	hi, hi, hi (14%)
Drop-outs	lo, hi, hi* (28%)	lo, hi, lo* (18%)	hi, hi, hi (18%)
Time 2			
Precontemplation	lo, hi, hi* (52%)	hi, hi, hi (28%)	lo, hi, lo* (14%)

[1] SE (self-efficacy), SR (self risk), PPR (perceived partner risk)
*indicates actual response pattern that was also hypothesized in original models

Table 45. Top Three Most Popular Response Patterns, Pregnancy Desire Model

Population	Most Popular	2nd Most Popular	3rd Most Popular
Time 1	SE, PgD, PPgD[2]	SE, PgD, PPgD[2]	SE, PgD, PPgD[2]
Precontemplation	lo lo lo* (23%)	hi, lo, lo (21%)	lo, hi, hi* (19%)
Contemplation and Preparation	hi, lo, lo (37%)	lo, lo, lo* (16%)	hi, lo, hi (16%)
Action and Maintenance	hi, lo, lo (59%)	hi, lo, hi (17%)	lo, lo, lo* (13%)
Stayers	lo, lo, lo* (23%)	lo, hi, hi* (21%)	hi, lo, lo (19%)
Movers	lo, lo, lo* (22%)	lo, lo, hi* (19%)	lo, hi, hi*/hi, lo, lo (18%)
Drop-outs	lo, lo, lo* (26%)	hi, lo, lo (23%)	hi, lo, lo (21%)
Time 2			
Precontemplation	lo, lo, lo* (26%)	hi, lo, lo (23%)	lo, lo, hi* (15%)

[1] SE (self-efficacy), PgD (pregnancy desire - self), PPgD (partner pregnancy desire)
*indicates actual response pattern that was also hypothesized in original models

CHAPTER 5

DISCUSSION OF RESULTS AND IMPLICATIONS

This study explored whether subgroups could be identified within the stage of precontemplation and, if so, whether subgroups were unique to the precontemplation stage, and if membership in a particular subgroup influenced an individual's mobility through the stages of change. Findings from the analyses, including study limitations, are discussed below. Findings are presented first with regards to the risk perception and pregnancy desire models, and next for the stage of change model. Later, recommendations based on the findings are offered.

Conclusions from the Data Analysis

In order to test whether or not subgroups exist within the precontemplation stage, two distinct models were proposed: a pregnancy desire model and a risk perception model. These models tested for mutually exclusive subgroups within the respective models, but did not test for mutually exclusive subgroups across models. In other words, if subgroups were identified in either model, this would not give an indication of whether the subgroups were distinct from one another across models.

Neither of the models, pregnancy desire or risk perception, tested with precontemplators demonstrated a good fit. This was true for precontemplators at Time 1 and Time 2, and the distinct subgroups of movers, stayers, and drop-outs within precontemplation. Only one model tested with women in the other stages produced a

good fit: the perceived risk model among women in action and maintenance. However, the fit of this model was determined by the existence of subgroups with rho parameters that were the opposite of what were hypothesized, suggesting that the hypothesized subgroups themselves did not produce a good fit. Moreover, the model had zero degrees of freedom and was, therefore, a saturated model, indicating that findings should be interpreted with caution.

To conclude from these analyses that there are no subgroups within the stage of precontemplation would be premature. Rather, lack of fit for the hypothesized models suggests one or more of the following: (a) other response patterns exist that were not hypothesized, and these patterns (subgroups) characterize more of the data; (b) there are no distinct patterns within the responses to the selected variables (self-efficacy, perceptions of risk behavior, and pregnancy desire) and thus, no subgroups that can be identified by those variables; (c) subgroups exist but are defined by other variables; and (d) problems related to measures and analysis obscured the evidence of subgroups. Each of these possibilities is discussed in more detail below.

Other Patterns /No Patterns Among Hypothesized Variables

In the risk perception model, six of eight actual response patterns were hypothesized. Given that there were only eight possible response options and six were hypothesized, a poor fitting model suggests that either no patterns existed, or that patterns characterizing a large percentage of the population were not hypothesized. A closer examination of the risk perception model and post hoc review of actual response patterns suggests that both are true. That is, the two response patterns that were not hypothesized

in the model appear as two of the three most frequent response patterns for nearly all of the tested populations. These patterns are characterized as high self-efficacy, high self risk, and high perceived partner risk; and high self-efficacy, low self-risk, and high perceived partner risk. Neither of these patterns appear to characterize a subgroup with a reason to be in (or stay in) precontemplation, which is why they were not originally hypothesized. That is, there is no obvious explanation for not using condoms if a woman has high self-efficacy and perceives her partner to have high risk behavior and perhaps perceives it likely for him to infect her with a STD or HIV if they have sex without a condom. (See below for an examination of the measures themselves as possible explanation.) This pattern suggests that another reason, aside from perceived risk, influences an individual's membership in precontemplation.

A post hoc review of actual response patterns suggests that for nearly every group of women tested in the perceived risk model, the same top three response patterns emerge. The most popular response patterns do not distinguish between precontemplators compared to other stages (contemplation and preparation, or action and maintenance), and there is no difference between movers, stayers, and drop-outs with regards to most popular response patterns. This suggests that there are no distinct subgroups to be identified within precontemplation given the variables of self-efficacy, personal risk, and perceived partner risk.

However, within precontemplators overall at Time 1 and Time 2, as well as within movers and stayers, the most common response pattern, characterized by low self-efficacy, and high self and partner risk, corresponds to a substantial proportion (nearly one-third) of respondents. This could suggest that while the model hypothesizing

numerous subgroups does not fit the data well, at least one subgroup does in fact exist among precontemplators. The fact that the response pattern for this subgroup is distinct from the other two most popular response patterns among precontemplators supports the belief that precontemplators may be influenced by several factors.

The characterization of this subgroup as having low self-efficacy and high self and partner risk is both consistent and inconsistent with the TMC. That is, as previously described, precontemplators are often characterized as having low self-efficacy and low awareness or recognition of the problem. While the characteristic of low self-efficacy is supported in this class, its combination with high perceptions of personal and partner risk behavior is surprising. This appears to support findings by Malotte et al. (2000) that suggest that interventions focusing on increasing self-efficacy are appropriate for individuals in the early stages. However, it is worth noting that the measures used for assessing personal and perceived partner risk were largely measures of objective risk and may not correspond with actual levels of perceived risk. This is discussed in more detail under the limitations of measures and analysis section.

Within the desire for pregnancy model, there do not appear to be distinctions in which classes appear to be "good" and "bad" within the hypothesized model between precontemplators and women in other classes, or within distinct precontemplator subgroups of change. A post hoc examination of response patterns reveals that while two of the most popular response patterns are consistent across all tested populations, women who were not staged in precontemplation (staged in either contemplation, preparation, action or maintenance), all exhibited the same most popular response pattern: high self-efficacy and low personal and perceived partner pregnancy desire. This pattern

characterized the substantial proportion of respondents in these classes, proportions that were much higher than what was found in the precontemplation groups. In fact, this class characterized the majority of respondents in action and maintenance. This response pattern was not originally hypothesized as it does not describe an obvious reason for being in precontemplation. Therefore, its popularity in nonprecontemplation stages seems appropriate and is consistent with the characterization of these stages.

A possible explanation for the frequency with which this classification (high self-efficacy, low personal and perceived partner pregnancy desire) was also found within precontemplation groups may be that respondents may be using other methods of contraception to prevent pregnancy and, therefore, in spite of high self-efficacy to use condoms and a desire not to become pregnant now, do not intend to use condoms. As noted in chapter 2, women are less likely to use condoms when they are using another form of effective contraception (CDC, 1996). Alternatively, although they reported not having a desire to have a baby now (or perceiving their partner to want one), they may in fact be ambivalent towards pregnancy and may not be using or intending to use effective contraception or condoms. This hypothesis is discussed in more detail below in limitations of measures and analysis.

Similarly, post hoc review of actual response patterns shows that women in precontemplation at Times 1 and 2, and women in the change subgroups of "movers" and "stayers," exhibit an identical most popular response pattern characterized by low self-efficacy and low personal and perceived partner pregnancy desire. [Note that women in the "stayers" subgroup make up the majority of women in precontemplation at Time 2 and, therefore, the similarity between these two groups should be noted with caution.]

This suggests that the pattern may characterize a popular subgroup within precontemplation. However, the fact that women in the subgroup of "movers" had the identical most popular response pattern as women in the subgroup of "stayers" is difficult to interpret and may suggest that membership in a particular subgroup does not influence stage mobility over time. [Note that patterns from movers and stayers reflect data from Time 1, not Time 2.]

Only one of the two most popular response patterns was hypothesized in the pregnancy desire model, indicating that model fit could have been improved if the other pattern had been included. However, the fact that both response patterns were among the top three most popular patterns across all populations tested suggests that the patterns described are not distinct to the precontemplation stage. Furthermore, two of the most popular response patterns have low personal and perceived partner pregnancy desire and thus describe classes of respondents who are not influenced by pregnancy desire as a reason for not using condoms.

Subgroups Characterized by Other Variables

Two distinct models of pregnancy desire and perceived risk were tested to see if subgroups could be identified. These models were chosen to reflect realistic influences on consistent condom use, desire for pregnancy, lack of perceived risk, and low self-efficacy combined with high partner pregnancy desire. However, any number of other influences on consistent condom use may exist that could characterize subgroups of precontemplators, unrelated to pregnancy desire or perceived risk. Other reasons why a person may not use or intend to use condoms may include (but not be limited to) beliefs

about the effectiveness of condoms to prevent STDs/HIV, beliefs about the transmission routes of STDs/HIV, dislike of condoms, and perceived partner opposition to condoms, to suggest a few.

Limitations of Measures and Analysis.

Data utilized for this study were collected for another purpose and were not intended to be analyzed in this way. As a result, items that were selected were chosen from among those that existed, and there was no opportunity to gather additional information from participants or reword items in any way. Potential limitations from each selected variable are examined below.

Self-Efficacy

The self-efficacy scale exhibited good reliability (alpha = .73). However, the scale was limited by relatively few items which may limit an adequate understanding of the "variations in situational demands" related to self-efficacy (Forsyth & Carey, 1998). Ideally, it would have been improved if it assessed the respondent's confidence in their ability to use condoms facing additional challenging circumstances, and if it included more items assessing each of the barriers. Currently, only a single item was included that measured the influence of partner opposition on condom use. For example, additional items assessing confidence in the face of other partner-specific barriers, such as a woman's beliefs that her partner would not trust her, or that her partner would enjoy sex less, or environmental barriers, such as not having condoms handy, could have broadened

the interpretation of the findings and provided more insight into the role of self-efficacy in relation to stage.

In addition, the accuracy of the measure of self-efficacy may be challenged when it measures an individual's confidence in his/her ability to perform a behavior that he/she do not want or intend to do. In these situations, perhaps measures of confidence in ability to perform a behavior become too hypothetical, making them problematic to respond to and difficult to interpret.

Perceived Risk

Self-reports of risk behavior and perceptions of partner risk behavior were utilized in the construction of the perceptions of risk measures. The interpretation of these data are threatened by the assumption that the individual identifying risk behaviors also recognizes the behaviors as risky. In addition, as noted in chapter 2, while an individual may identify certain behaviors as risky, whether or not she would consider herself at-risk because she has or does engage in those behaviors is also suspect (Weinstein, 1987). In addition, a history of STD has been identified as an important influence on an individual's perceived risk and an important factor in HIV transmission, but was not included in the construction of the personal risk variable. Further, data on protective behaviors, such as condom use with other partners or mutual monogamy and testing for sexual risk, or cleaning or not sharing needles for IVDU risk, were not examined. Information on protective behaviors may be combined with risk behaviors to influence an individual's perception of risk. While two questions assessing the perception of the partner's consistency of condom use with other male and female partners was included in

the partner risk perception measure, no data on the woman's own protective behavior regarding her sexual risk (such as condom use with other partners) were included. This could have influenced the accuracy of the perceptions of risk measures.

Measures of perceived partner risk may have been further compromised by the combination of perceived risk behaviors with measures of perceived likelihood of infection from partner. The measures assessing the perceived likelihood of infection may be more akin to true measures of perceived risk than measures of actual behavior in that they measure the respondent's perception of situational risk (Rhodes & Quirk, 1998; Weinstein & Nicholich, 1993). Perceptions of the likelihood of infection from partner were combined with objective measures of risk behavior in an effort to capture a wider interpretation of perceived partner risk. However, perceived partner risk behaviors and perceived partner risk were found to have no correlation ($r = .07$), suggesting that people who reported risk behaviors for their partners did not perceive that their partners presented a sexual risk for disease transmission. Given this, the true role of these variables in the identification of precontemplation subgroups related to perceived risk may have been obscured.

Pregnancy Desire

Much debate currently exists on the difficulty of measuring pregnancy intention and the relationship of pregnancy intention to behavior (Santelli et al., 2003; Pulley, Klerman, Tang, & Baker, 2002). The measure that was used for these analyses was not one of pregnancy intention, but of current desire for pregnancy. The relationship of pregnancy desire to pregnancy intention or behavior is not as well understood. However,

if parallels may be drawn between the indicators of pregnancy desire and pregnancy intention, those lacking desire may be no more likely to contracept than those lacking intention. According to Santelli et al., the intention to avoid a pregnancy often does not translate into the use of effective contraception. Desire for pregnancy in and of itself may not be a good predictor of behavior, as it does not indicate if a person plans to follow through on her desire. Further, as with pregnancy intention, it is possible and even likely that women who indicated they did not want a child now may not be attempting to prevent pregnancy. The current measures also fail to capture the common attitude of pregnancy ambivalence. Pregnancy ambivalence may be defined as "expressing views that reflect a firm commitment neither to become pregnant nor to prevent pregnancy" (Crump et al., 1999; Zabin, Astone, Emerson, 1993). Another limitation is that use of other forms of contraceptive methods were not included, as this information could have illuminated the relationship between desire for pregnancy and intention to use condoms.

The assumption of conditional independence required for LCA may also be questioned for models that included the pregnancy desire variables for self and partner given the correlation between the items. That is, the fact that an individual's pregnancy desire was correlated to her partner's pregnancy desire may have threatened the assumption of conditional independence between variables within classes, thus compromising the interpretation of the models tested. However, there is currently no accepted test for conditional independence between variables, and correlation is not suggested as an indicator.

Additional Analysis Limitations

The models were threatened overall by the lack of relevant attitudinal items and other psychosocial variables which may have helped confirm or interpret findings on the existence of subgroups. In particular, the inclusion of attitudes towards condoms and perceptions of partner attitudes towards condoms would have been helpful. This information could have been combined with selected measures to create more robust profiles of subgroups with characteristics for not changing. In addition, comparisons between precontemplators and women in all other stages could have been stratified differently, which may have revealed additional differences. For example, if membership in the contemplation subgroup had been higher, it would have been interesting to compare subgroups with contemplation and preparation separately, in order to test subgroup and response pattern distinctions.

Finally, perhaps using LCA to characterize all precontemplators into subgroups was not the most ideal analysis. Perhaps only some people are characterized in precontemplation due to reasons related to desire for pregnancy, while others are influenced by perceived risk, and still others are characterized by other reasons. LCA tested whether or not the entire sample could be classified according to hypothesized response patterns. Testing the existence of multiple classes within each model may have obscured the existence of a selected few. In fact, as discussed earlier, post hoc review of response patterns indicates that, for some of the tested models, a single response pattern characterizes a substantial proportion of respondents.

Stage of Change Model Fit

Much research has been conducted on the Stages of Change, suggesting five distinct stages that an individual passes through in his/her process of change from not performing or intending to perform a behavior (precontemplation) to maintaining a behavior change (maintenance). Testing the stages of change model at Time 1 and Time 2 using LCA did not produce a good fit to the data. The stage of contemplation and action stages were completely lacking probability of membership at both time periods. Post hoc review of actual response patterns suggests that of the top three response patterns, only two reflect actual stages (precontemplation and preparation). The lack of inclusion of the behavioral criterion for defining women in preparation may have diminished the ability to distinguish adequately between the contemplation and preparation stages. One possible explanation for the low number of women in the contemplation stage is that some women who were assigned to the preparation stage may have been coded in contemplation if the behavioral criterion had been utilized. With regards to the action stage, perhaps the low number of women classified in this stage reflect the findings of Evers et al. (1998) in their study of naturalistic progression through the stages for condom use, where they note the volatility of the action stage as a result of many people relapsing from the target behavior.

While the stages of contemplation and action did reflect low membership in this sample, it is unclear why they had no probability of membership in the LCA. One possibility is that instrument skip patterns and multiple items in the staging algorithm may have complicated the ability to effectively recode each item into high/low variables that could then be constructed into discrete stages. For example, individuals who report

using condoms "almost every time" were coded as "low," as is consistent with the theory. However, unlike other "low" code responders (sometimes, almost never, and never) who were skipped out of the next question, individuals reporting that they used condoms almost every time were asked a follow-up question assessing how long they had been using them that frequently. Women reporting that they had been using condoms 6 months or longer would have received a "high" score for this variable. However, according to the staging algorithm and the way stages were defined in LCA, only respondents in the stage of maintenance received a "high" code for length of time using condoms.

Recommendations and Implications

The stages of change from the transtheoretical model provide a useful way to segment an audience to tailor intervention efforts and evaluation. However, current classification schemes may require additional attention. In particular, the characterization of precontemplation as a single population should be revisited. As suggested by Reed, subgroups within precontemplation have significant meaning for prevention efforts (1995, 1999). As they are characterized by different reasons for not wanting change, so too should the tools be different that are used to motivate them.

Although this research did not support the existence of multiple subgroups related to pregnancy desire and perceived risk, it did suggest that some patterns do exist among precontemplators. Moreover, it suggests that additional work to identify subgroups is needed. Further exploration into patterns among precontemplators with high self-efficacy to see what keeps them from changing, as well as research that addresses

different constructs and improves upon the measurement of the same constructs in this research, would be informative and worthwhile. This work may be best informed by exploratory qualitative research with precontemplators to identify what some of the reasons are that they do not intend to change. In addition, given that Reed unintentionally discovered the additional subgroup within precontemplation, it may be worthwhile to use Principal Components Analysis on statements that are intentionally generated to reflect distinct hypothesized precontemplator subgroups. If additional sound subgroup classifications were to be identified, it may also be worthwhile to test movement with intervention research that specifically targets distinct subgroup barriers in an attempt to influence change. Recent LCA software developments no longer require dichotomous variables, allowing for multilevel variables to be included. Therefore, future LCA analysis on precontemplator subgroups that included multilevel variables would be particularly interesting, as it would preserve original distinctions in construct measurement and permit the inclusion of more psychosocial variables, such as attitudes and norms, that could better inform class characterizations.

The practice of identifying target populations for condom use interventions without the concurrent use of eligibility criteria to identify a "risky" sample may be problematic. This recruitment strategy appears to be consistent with an approach of identifying "situational risk" by identifying women in vulnerable settings and is sensitive to the recognition that many women may not be aware of their own risks for HIV (as they may be unaware of their partners' risks). However, it may also simultaneously perpetuate the assumption that "risk groups" instead of "risk behaviors" makes one vulnerable to HIV. That is, the study for which these data were collected recruited

women in vulnerable settings, but did not specify risk criteria for their inclusion in the study. Approximately 40% of women did not identify any personal or perceived partner risks criteria (as defined in this study). However, all were all classified, using a staging algorithm, into one of five stages of change for consistent condom use. The assumption that all women in this sample needed to be consistent condom users may be questioned.

Future studies that identify recipients at-risk due to engaging in risk behavior may be more likely to include individuals who need to change their behavior. This could eliminate targeting a subgroup of Precontemplators for whom the behavior may not be relevant and, therefore, could result in improved intervention success and appropriate allocation of resources to those most in need. Significant differences in demographic variables of marital status and cohabitation between precontemplators in this sample and women in all other stages, supports this conjecture that many precontemplators were in more stable relationships and, thus, may not have been appropriate targets of a program for consistent condom use. Additional research to explore the dimensions of precontemplators would help identify whether or not this type of subgroup exists.

As noted in the previous chapter, two of the most popular actual response patterns in the perceived risk model revealed women with high self-efficacy who perceive their main partners to have high risk behavior and perhaps perceive it likely for these partners to infect them with a STD or HIV if they have sex without a condom. Furthermore, two of the most common actual pregnancy desire response patterns included low personal and perceived partner pregnancy desire. These patterns describe subgroups with characteristics one would associate with being higher in the stage continuum, or reasons for using condoms with their partners. Lack of clear explanations for their membership

in precontemplation could suggest that additional factors that were not explored provide the key to their lack of intent to change. It may also be possible, given the somewhat vulnerable demographic profile of the sample (suggested by recruitment settings of homeless shelters, drug treatment centers, and low-income housing) that while these women may have had compelling reasons to use condoms, these reasons were obscured or diminished by other more pressing life needs that competed for prioritization in the their lives (Connors, 1992).

Current public health policy recommends consistent condom use for the prevention of HIV and other STDs. Additional research with respondents who perform the target behavior "almost every time" is recommended. In particular, it would be informative to conduct qualitative research among those who have been using condoms "almost every time" for 6 months or longer but are characterized as precontemplators in that they do not intend to use condoms consistently in the near or distant future. Such research could reveal characteristics of the sexual encounters without condom use that reflect specific barriers. These barriers could become the focus of intervention efforts targeting consistent condom use. Alternatively, such research could indicate that people have different goals for condom use or beliefs about the efficacy of using condoms "most of the time."

Given the low representation within some of the other stages of change, specifically contemplation and action, additional effort into classifying and motivating subgroups of precontemplators may prove to be more meaningful than the classification distinction between contemplators and preparers, for example. One could argue that determining subgroups within precontemplation is of the same or greater importance to

intervention and evaluation as measuring the five standard stages. Incremental progress through stages is important. However, with a high proportion of people at risk who are not changing, an improved ability to address their specific barriers and evaluate their subtle movements is critically important to public health efforts.

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APPENDIX

ASSESSMENT ITEMS

STAGES OF CHANGE

<table>
<tr><th>Question 1</th><th>Answer 1</th><th>Question 2</th><th>Answer 2</th><th>Question 3</th><th>Answer 3</th><th>Stage</th></tr>
<tr><td rowspan="5">When you have vaginal sex with your main partner, how often do you use a condom?</td><td>Every time</td><td rowspan="2">How long have you been using a condom every time you have sex with your main partner?</td><td colspan="3">Six months or more</td><td>Maintenance</td></tr>
<tr><td colspan="3">Less than six months</td><td>Action</td></tr>
<tr><td>Almost every time

Sometimes

Almost Never</td><td rowspan="2">In the next six months, how likely do you think it is that you will start using a condom every time you have vaginal sex with your main partner?</td><td rowspan="2">Sure I will</td><td rowspan="2">In the next 30 days, how likely do you think it is that you will start using a condom every time you have vaginal sex with your main partner?</td><td>Sure I will</td><td>Preparation</td></tr>
<tr><td>Sure I won't/ undecided</td><td>Contemplation</td></tr>
<tr><td>Never</td><td colspan="3">Sure I won't/ undecided</td><td>Precontemplation</td></tr>
</table>

SELF-EFFICACY

1. If you had been using alcohol or drugs, do you think that you could or couldn't use condoms every time you had sex with your main partner? Would you say that you are very sure you (could/couldn't) or only somewhat sure?

2. If you were really turned on, do you think that you could or couldn't stop to put on a condom every time you had sex with your main partner? Would you say that you are very sure you (could/couldn't) or only somewhat sure?

3. If you thought your main partner might get angry or upset, do you think you could or couldn't use condoms every time you had sex? Would you say that you are very sure you (could/couldn't) or only somewhat sure?

PERCEIVED RISK (SELF)

1. In the past 6 months, how many men have you had sex with?
2. Have you ever had sex in exchange for food, shelter, money, drugs or other things?
3. Have you ever shot up or injected drugs, even once?

PERCEIVED RISK (PARTNER)

1. How likely do you think it is that you could get a sexually transmitted disease by having vaginal sex with your main partner without using a condom? (very, somewhat, not at all)
2. How likely do you think it is that you could get HIV, the AIDS virus, by having vaginal sex with your main partner without using a condom? (very, somewhat, not at all)
3. Do you think your main partner shoots drugs? (yes/no/she suspects, but is not sure/don't know, she has no idea)
4. Do you think that he has sex with other men?
5. (if yes to #4 above) Do you think he always uses condoms when he has sex with other men?
6. Do you think he has sex with other women?
7. (if yes to #6 above) Do you think he always uses condoms when he has sex with other women?
8. Has your main partner ever been to jail or prison for more than a day?

PREGNANCY DESIRE (SELF)

1. Would you say that you do want to have (a/another) baby now, that you don't, or are you not sure?

PREGNANCY DESIRE (PARTNER)

1. What about your partner? Does he want to have (a/another) child with you now? (no, yes, doesn't care, don't know)

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DOCTOR OF PHILOSOPHY

Name of Candidate Katina A. Pappas-DeLuca

Graduate Program Health Education and Promotion

Title of Dissertation Don't Go Changing: An Analysis of Sub-groups Within the Precontemplation Stage of the Transtheoretical Model of Behavior Change

I certify that I have read this document and examined the student regarding its content. In my opinion, this dissertation conforms to acceptable standards of scholarly presentation and is adequate in scope and quality, and the attainments of this student are such that she may be recommended for the degree of Doctor of Philosophy.

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