MODERATORS OF PROSTATE CANCER TESTING INTENTION AND PSA TESTING IN BLACK MEN

A Dissertation

Submitted to

the Temple University Graduate Board

---

in Partial Fulfillment

of the Requirements for the Degree

DOCTOR OF PHILOSOPHY

---

by

Stacy Nichole Davis

May, 2011

Examining Committee Members:

Stephen Lepore, Advisory Chair, Public Health

Thomas Gordon, Public Health

Mark Schmitz, Social Administration

Michael Diefenbach, External Member, Mount Sinai School of Medicine

ABSTRACT

Black men have the highest burden of prostate cancer (PCa) compared to all other races. Early detection of PCa is controversial, thus preference based PCa testing is recommended. PCa testing intention can be used as a proxy for testing preferences. Intention is known to predict behavior; however there is a gap between testing intention and testing behavior. The aims of this study were to examine the PCa testing intention-prostate specific antigen (PSA) testing gap and identify social cognitive variables that moderate the gap. Two hundred and sixteen black men participated in this longitudinal study. Results indicated PCa testing intention was a positive but moderate predictor of three PSA testing outcomes, $p<.05$. Men who tested in accordance with their PCa testing intention (positive or negative) ranged from 52% to 58%. Men who intended to test but did not, were the group most responsible for the PCa intention-PSA testing gap. History of PCa testing had an independent main effect on medical claim of a PSA test between time one interview and one year after time one interview, $p<.05$. A significant knowledge of PCa testing controversy by PCa testing intention interaction effect on medical claim of a PSA test between time one and time two interview was found, $p<.05$. Men who do not know about the testing controversy are more likely to have a positive intention and fulfill their testing intention. Conversely, men who are aware and appreciate the controversy surrounding testing are more ambivalent about testing. Social cognitive variables were associated with PCa testing intention-PSA testing outcomes. These variables should be considered when designing interventions to help black men to manage their risk for PCa in a manner that is consistent with their testing preferences.

DEDICATION

This dissertation is dedicated to my wonderful mother, Effie J. Davis. You have taught me that hard work, honesty, and kindness matter most in this world. I know that it was only through your many sacrifices, love, and support that allowed me to reach this far in life.

ACKNOWLEDGEMENTS

I would like to thank my dissertation committee Dr. Stephen Lepore, Dr. Thomas Gordon, Dr. Mark Schmitz, and Dr. Michael Diefenbach for their support, insight, and feedback. Thank you for your time and your invaluable research wisdom that you willingly shared. I would especially like to recognize my advisor Steve for allowing me the use of his CAP dataset for the dissertation. Steve: you went above and beyond by providing me with unlimited time, support, and guidance. Words cannot express my gratitude to you; I am more appreciative than you will ever know. Thank you.

To my SBHI labmates: Thank you for your ongoing encouragement, support, jokes, and food. Gloria Park-Perin: Thank you for the inspiration to finish. A special thank you to Övgü Kaynak: Thank you for your support and friendship during our years at Temple. I will never forget our long weekends studying and writing while everyone else was enjoying the sunshine.

To my friends and family: Thank you for your prayers, support and encouragement. You have stood by me throughout my long and tiring educational journey. I love you all. Dr. Hayley Thompson: Thank you for believing in me, encouraging me, and pushing me into graduate school. Stacia Jones, Lori Brewington, and Jennaydra Clunis: without your emotional support and belief in my abilities, I would not have finished. Thank you. Andi Williams: Thank you for your willingness to read my dissertation, words of encouragement, and seeing me to the finish line. To my partners in a promise that started in 2002, Drs. Julia Bryan, LaShawn Curtis, and Ned Okarter: Thank you for sharing the Dr.

experience with me. Michael Spencer: You knew when to help, when to encourage, when to stand back, when to inspire, and when to love. Thank you.

To my siblings Lorna, Kevin, Debbie, DeAngie and Daniel: Thank you for telling me how proud you are of me and encouraging me. It is now my turn to support and encourage you. Special thanks to my sister/roommate Debbie. Debbie: Through every 'mini crises' you listened patiently and intently, even if you really didn't understand a thing that I was babbling on about. I have never had to pretend with you, and for that, I am grateful. To my nephews Romello and Naji and my niece Destiny: There is no substitute for education and no short cuts to get there. With hard work, patience, and persistence you can accomplish anything! Naji: thank you for never hesitating to climb and trip over piles of paperwork to give me hugs and kisses. I would like to express my love and undying gratitude to my parents, Effie Davis and Rupert Davis: You have instilled a belief in me, that the sky is the limit and I should never stop until I reach my goals. Your unconditional love and never-ending encouragement has motivated this accomplishment. Thank you and I love you both.

I would like to thank my Lord and savior Jesus Christ, for only through his grace, mercy and strength, did I survive this dissertation. "I can do all things through Christ who strengthens me" *(Philippians 4:13)*.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figure Page

CHAPTER 1

INTRODUCTION

In the United States, prostate cancer (PCa) is one of the most commonly diagnosed malignant cancers in men, accounting for 25% of new cancers and 10% of cancer deaths in American men (American Cancer Society (ACS), (2010). One of the most significant risk factors for developing PCa is being a black male (Powell, 2007). Black men have a higher burden of PCa incidence and mortality compared to all other races (Hoffman, et al., 2001; Powell, 2007). The higher PCa mortality rate in black men is the result of a two-fold increased risk of presenting with advanced stage PCa, cancer that has spread from the prostate to other organs (Gilligan, 2005; Hoffman, et al., 2001). Treatment and survival of PCa after diagnosis depends on age, PCa staging, the presence of other illnesses, and treatment preferences (Freedland & Isaacs, 2005; Gilligan, 2005; Powell, 2007). Treatment of PCa is frequently invasive, may cause long-term complications, and does not guarantee survival (Crawford & Thompson, 2007; J. W. Davis, Kuban, Lynch, & Schellhammer, 2001; Krahn, et al., 1994).

As yet, a single prognostic marker that can reliably predict which prostate cancers will progress aggressively and cause death has not been identified. Therefore, the success of PCa treatment to save lives is largely dependent on early detection (Lilja, Ulmert, & Vickers, 2008; Tingen, Weinrich, Heydt, Boyd, & Weinrich, 1998; Ulmert, et al., 2008).

The primary screening tests for the early detection of PCa are the prostate-specific antigen (PSA) test and the digital rectal exam (DRE). The incorporation of the DRE in PCa testing protocols is under debate. The PSA test is considered to be superior to the DRE due to high inter-examiner variability in the DRE, regardless of examiner experience. In addition, nodules found during the DRE have a poor correlation with tumor location in biopsy specimens and there is an inability to palpate the entire gland (Andriole, et al., 2009; Ilic, O'Connor, Green, & Wilt, 2007; Mistry & Cable, 2003; Okotie, et al., 2007).

There is controversy pertaining to benefits and risks associated with PSA testing in asymptomatic men (Lin, Lipsitz, Miller, & Janakiraman, 2008; Murphy, McKiernan, & Olsson, 2004). A number of risks associated with testing have been identified: (a) lack of conclusive evidence that early detection reduces mortality; (b) detection of disease that would not have caused a clinical problem; (c) the possibility of false positive results which can lead to unnecessary morbidity; (d) lack of evidence supporting the superiority of any treatment for localized PCa over another; and (e) side effects associated with diagnosis and treatment (Gwede & McDermott, 2006; Lin, et al., 2008). Thus, it has been argued that the risks may outweigh the benefits when testing for PCa in asymptomatic men.

As a result of this controversy, recommendations regarding PCa testing vary among medical organizations. However, there is consensus that physicians should discuss potential benefits and risks of testing with patients in an effort to allow patients to make a preference-sensitive decision about PSA testing (Lin, et

al., 2008; 2010). A preference-sensitive medical decision is one in which a patient's decision to test for PCa will be based on individual consideration of the ratio of potential benefits to potential harms (O'Connor, Legare, & Stacey, 2003). Thus, PSA testing preferences will ultimately be different for each patient. Unfortunately, it is clear that many physicians do not discuss PSA testing with their patients and often decide whether or not to order a PSA test without considering patient preferences (Dunn, Shridharani, Lou, Bernstein, & Horowitz, 2001). For this reason, PSA testing rates may be a reflection of physicians' beliefs regarding the benefits and risks of testing and not a valid reflection of men's PSA testing preference. A better indicator of a man's PSA testing preference is to ask men their testing intention and determine if their PSA testing behavior matched their intention.

Intentions are defined as instructions people give themselves to perform particular behaviors or to achieve desired outcomes (Ajzen, 1991; Triandis, 1980). An intention to perform a behavior is considered to be a direct predictor of behavior (Ajzen, 1991). Unfortunately, there is an inconsistency between PCa testing intention and future PCa testing behavior (P. Sheeran, 2002). Consistent with other health behaviors, barely more than half of men with positive intentions to have a PSA test successfully do so (Flood, et al., 1996; Taylor, et al., 2006; Volk, Spann, Cass, & Hawley, 2003). Often those with a positive intention do not act and those who had a negative intention do act. Although health theories provide support that behavior can be predicted by intention, only 28% of the variance in health behavior is explained by intention (P. Sheeran, 2002). Given

that roughly 50% of people behave in accordance with their intention (Orbell & Sheeran, 1998; P. Sheeran, 2002), it would suggest that once an intention is formed, other factors moderate the intention- PSA testing relation.

The Social Cognitive Theory (SCT) is the framework used to guide the exploration of moderators of the relation between PCa testing intention and subsequent behavior. According to SCT, an ability to regulate and modify health behavior occurs through a dynamic ongoing interaction of (a) cognitive, emotional, and other personal factors; (b) behavioral; and (c) social and/or physical environmental factors (Bandura, 1986, 1997; Baranowski, Perry, & Parcel, 2002). Select constructs within the SCT were examined as variables that might moderate the PCa testing intention and PSA testing behavior relation.

Advancement of Scientific Knowledge

Black men have an exceptional burden of PCa morbidity and mortality. The controversy surrounding asymptomatic PSA testing in men has shifted PSA testing decisions to the patient. As long as black men are disproportionately burdened with PCa, understanding the factors relevant to fulfilling their testing intentions may help researchers and educators develop interventions that can empower men to manage their risk for PCa in a manner consistent with their preferences. Research delving into the moderators of the PCa testing intentions-PSA testing relation within black men will help achieve this goal.

Research Aims of the Present Study

This two-wave longitudinal study used both self-report and medical claims data to investigate the following research aims:

Aim One. Determine if intention to have a PCa test is associated with three PSA testing outcomes: (a) Self-report of a PSA test between the time one and time two interview, (b) Medical claim of a PSA test between the time one and time two interview, and (c) Medical claim of a PSA test between time one interview and one-year after the time one interview.

Aim Two. Determine the extent to which select social cognitive variables (PCa knowledge, history of PCa testing, physician recommendation to test, awareness of PCa tests, efficacy to talk to a physician about PCa, perceived value of PCa testing benefit, and perceived value of PCa testing risk) have independent main effects on each PSA testing outcomes.

Aim Three. Determine whether the relation between PCa testing intention and each PSA testing outcome is moderated by select social cognitive variables (PCa knowledge, history of PCa testing, physician recommendation to test, awareness of PCa tests, efficacy to talk to a physician about PCa, perceived value of PCa testing benefit, and perceived value of PCa testing risk).

CHAPTER 2

LITERATURE REVIEW

This chapter reviews the literature on PCa in black men, including the history of PSA testing, the controversy surrounding early detection of PCa, and the clinical and practical aspects of PSA testing. This section is followed by a review of the intention literature, focusing on the testing intention-behavior inconsistency. The gap between PCa testing intention and PSA testing is discussed, as well as the theoretical framework used to identify variables explaining the gap between PCa intention and PSA testing. The chapter concludes with a discussion of the limitations of previous studies and the strengths of this study.

Epidemiology of Prostate Cancer in Black Men

In the United States, PCa is one of the most commonly diagnosed malignant cancers in men (ACS, 2010). It is estimated that by the end of 2010, there will be 217,730 new cases and 32,050 deaths attributed to PCa (ACS, 2010). In addition to increased age and a family history of PCa, a significant risk factor for developing PCa is being a black male (Jemal, Siegal, Xu, & Ward, 2010; Powell, 2007). Black men have a higher burden of PCa compared to all other racial groups (Hoffman, et al., 2001; Jemal, et al., 2010). In addition, the incidence rate of PCa in black men is 1.6 times higher, the mortality rate is 2.4 times higher relative to white men (Powell, 2007) and the lifetime risk of dying of PCa is 4.72% in black men compared to 2.86% in white men (Gilligan, 2005).

In the early stages of disease (Stage I and II), PCa is localized to the prostate gland. In the advanced stages of disease (Stage III and IV), PCa has spread beyond the prostate to other organs (American Urological Association, 2010). Stage at diagnosis, is thought to be a key factor contributing to the disparity in PCa mortality between black and white men. The majority of PCas are diagnosed in the early stage of disease however, approximately 15% to 20% of PCas are diagnosed in the advanced stage, and thus more difficult to treat (Andriole, et al., 2009; Chu, Tarone, & Freeman, 2003; Jones, et al., 2008). The five-year survival rate for men with advanced stage PCa is 31% compared to 99% for men diagnosed with early stage disease (Chu, et al., 2003; Hoffman, et al., 2001; Merrill & Lyon, 2000). Black men have a two-fold increased risk of presenting with advanced stage PCa relative to other racial groups (Gilligan, 2005; Hoffman, et al., 2001; Jones, et al., 2008; Powell, 2007).

It has been suggested that the difference in PCa staging may be due, in part, to socio-cultural differences between black and white men. Compared to white men, black men have worse access to healthcare and thus present to physicians at a later stage of disease (Hoffman, et al., 2001; Jones, et al., 2008; Roetzheim, et al., 1999), are less likely to have a diagnosis of PCa through routine PCa testing (Etzioni, Berry, Legler, & Shaw, 2002), are subject to different treatment and management of disease (Shavers & Brown, 2002; Shavers, et al., 2004), and tend to have lower socioeconomic status, leading to an increase in co-morbidities and a decrease in life expectancy (Jones, et al., 2008; Shavers, et al., 2004).

Testing for Prostate Cancer

Treatment and survival of PCa depends on age, PCa staging, presence of other illnesses, and treatment preferences. Treatment is frequently invasive and can cause long-term complications such as incontinence or impotence (Krahn, et al., 1994). The success of PCa treatment to reduce mortality is dependent on early detection (Crawford & Thompson, 2007). The primary screening tools for early detection are the PSA test and DRE (Mistry & Cable, 2003). The PSA test is a blood test that detects the serum level of prostate specific antigen, a substance created by the prostate gland. The DRE is an exam in which a healthcare professional inserts a gloved finger into the rectum to palpate the prostate for hard and lumpy areas (AUA, 2010).

The incorporation of the DRE in PCa testing protocols is controversial for several reasons. The DRE has high inter-examiner variability (regardless of examiner experience), nodules found during the DRE have a poor correlation with tumor location in biopsy specimens, there is often an inability to palpate the entire prostate gland, and the DRE is ineffective at detecting early stage PCa (Andriole, et al., 2009; Ilic, et al., 2007; Lin, et al., 2008; Mistry & Cable, 2003; Okotie, et al., 2007). In addition, the DRE has been cited as aversive to many men in that it evokes embarrassment and discomfort (Clarke-Tasker & Wade, 2002; Forrester-Anderson, 2005; C. R. Webb, Kronheim, Williams, & Hartman, 2006). The PSA test is considered to be superior to the DRE due to its higher sensitivity, specificity, and positive predictive value to detect PCa compared to

the DRE (Andriole, et al., 2009; Mistry & Cable, 2003; Roobol, et al., 2009). As a result, most studies, including this dissertation, have focused on the PSA test.

Controversy Surrounding the PSA Test. The United States Food and Drug Administration (USFDA) approved the PSA test to monitor PCa in the late 1980s (Burack & Wood, 1999). In 1992, the ACS formally endorsed the use of the PSA test to screen for PCa (Moran, et al., 2000). By 1994, the USFDA had approved the use of the PSA test for the early detection of PCa (Burack & Wood, 1999). In 2000, Medicare began covering annual PSA testing (Freeman, et al., 2002). After the introduction of the PSA test, PCa incidence rates soared to their highest levels, in 1992 for white men and in 1993 for black men (H. Williams & Powell, 2009). The increase in PCa incidence resulted in stage migration to more localized cancers and a decrease in mortality (Chu, et al., 2003).

Currently, there is controversy pertaining to whether the potential benefits outweigh the potential risks of PSA testing in asymptomatic men (Gwede & McDermott, 2006; Jemal, et al., 2010; Lin, et al., 2008; Murphy, et al., 2004). A number of testing risks have been identified: (a) lack of conclusive evidence that early detection via screening and treatment reduces mortality; (b) “over diagnosis” or detection of disease that would not have caused a clinical problem; (c) possibility of false positive results which can lead to unnecessary morbidity associated with biopsies and treatment; (d) lack of evidence supporting the superiority of any treatment for localized PCa over another, including watchful waiting; (e) lack of agreement over the optimal treatment for PCa; and (f) side effects associated with diagnosis and treatment (Barry, 2009; Gwede &

McDermott, 2006; Lilja, et al., 2008). Thus, it has been argued that the risks may outweigh the benefits of PCa testing in asymptomatic men.

The relationship between early detection and decreased mortality as a result of the PSA test is unclear (Jemal, et al., 2010; Lin, et al., 2008). It has not been demonstrated that early detection of PCa via the PSA test improves survival outcomes (Concato, et al., 2006; Farrell, Murphy, & Schneider, 2002; Shaw, et al., 2004). In addition, although PCa mortality is decreasing it has not been established that this decrease is due to the PSA test (Etzioni, et al., 1999; Hankey, et al., 1999). Two large randomized control trials to investigate the efficacy of testing have been completed (Andriole, et al., 2009; Schroder, et al., 2009). The United States Prostate, Lung, Colorectal and Ovarian Cancer Screening Trial did not find a survival benefit for testing. On the other hand, the European Randomized Study of Screening for Prostate Cancer demonstrated a survival benefit for testing, a 20% reduction in PCa mortality (Andriole, et al., 2009; Schroder, et al., 2009). The disparate results of these two trials has done very little to stop the controversy.

National PSA Testing Recommendations. Until the efficacy of the PSA test is conclusive, many medical organizations have developed their own testing recommendations, see Table 1. The ACS recommends that starting at age 50, asymptomatic men who are in good health and can expect to live at least 10 more years have the opportunity to make an informed decision with their doctor about testing after learning about the uncertainties, risks, and potential benefits associated with PSA testing. Asymptomatic men who are not expected to live

more than 10 years should not be offered PSA testing, as the risks likely outweigh the benefits (ACS, 2010).

Table 1. National PSA Testing Recommendations

Organization	Recommendation
American College of Family Physicians	Evidence is insufficient to recommend for or against PSA screening in men younger than 75.
American Cancer Society	Discuss potential benefits and harms of testing before offering PSA testing and DRE yearly, beginning at age 50 years, to men of average risk and at least 10-year life expectancy. Black men or men with family history should be screened starting at age 45.
American College of Physicians	Evidence is insufficient to recommend for or against PSA screening in men younger than 75.
American College of Preventive Medicine	Recommends against routine screening with PSA test. Men older than 50 years, with a life expectancy of at least 10 years should be given information about the pros and cons of screening.
American Medical Association	Physicians should provide info regarding risk of PCa, in addition to the pros and cons of screening.
American Urological Association	Offer PSA test to well-informed men 40 years and older with a life expectancy of at least 10 years.
Centers for Disease Control and Prevention	Current evidence is insufficient to assess the balance of benefits and harms of screening in men younger than 75 years. Do not screen for prostate cancer in men 75 years and older.
US Preventive Services Task Force	Current evidence is insufficient to assess the balance of benefits and harms of screening in men younger than 75 years. Do not screen for prostate cancer in men 75 years and older.

Note. All recommendations are current up to November 22, 2010

Conversely, since 1998 the United States Preventive Services Task Force (USPSTF) has maintained that evidence is insufficient to recommend for or

against PSA testing. Men older than 75 usually have a life expectancy of less than 10 years and are unlikely to benefit from PSA testing. As a result the USPSTF does not recommend PSA testing to men older than 75. The USPSTF does however, recommended that a physician should not order a PSA test without first discussing the potential benefits and risks of testing (Lin, et al., 2008).

Organizations that make clinical practice recommendations regarding the use of the PSA test tend to correspond with either the ACS or USPSTF guidelines. The Centers for Disease Control and Prevention and other federal agencies follow the testing guidelines of the USPSTF (CDC, 2010). The American Academy of Family Physicians, American College of Physicians, and American College of Preventive Medicine, in agreement with the USPSTF, state there is insufficient evidence to recommend for or against routine testing in men younger than 75 (American College of Family Physicians, 2010; American College of Physicians, 2010; Lin, et al., 2008). The American College of Preventive Medicine also recommends men 50 years of age and older should be given information about the potential benefits and harms of testing, limits of the current evidence, and should be allowed to make an informed decision regarding testing (Lin, et al., 2008). The American Medical Association recommends providing information regarding the risk of PCa and potential benefits and harms of testing to men who are both appropriate candidates for treatment and interested in treatment for prostate cancer (American Medical Association, 2010).

The American Urological Association recommends PSA testing for men who are informed of the potential harms and benefits of screening (AUA, 2010).

National PSA testing rates indicate that men are getting tested in spite of the surrounding controversy. Data from the 2002-2006 Behavioral Risk Factor Surveillance System (BRFSS), found that most men have had a PSA test within the past two years, and in addition, black men were more likely to have had a PSA test than white men (Ross, Meade, Powe, & Howard, 2009; Ross, Taylor, Richardson, & Howard, 2009). The Health Informational National Trends Survey (HINTS) 2003 data indicates that over 50% of men aged 50 and older have had at least one PSA test in their lifetime (Finney Rutten, Meissner, Breen, Vernon, & Rimer, 2005). Black and white men have similar rates of PSA test awareness, receipt of the test, and time elapsed since most recent PSA test (V. L. Shavers, W. Underwood, 3rd, & R. P. Moser, 2009a). Data from the 2005 National Health Interview Survey (NHIS) found that black men aged 40 to 49 were more likely to have a PSA test compared to white men, however rates of PSA tests were similar for men aged 50 to 79 (Ross, Berkowitz, & Ekwueme, 2008).

Data from the National Ambulatory Medical Care Survey, a survey of office based physicians, also supports that despite the controversy surrounding the PSA test, physicians have not decreased their use of the PSA test (Farwell, Linder, & Jha, 2007). From 1994-2004, physicians increased their orders for the PSA test by 50%. The likelihood of a physician ordering a PSA test increased significantly among all ethnic and racial groups; however, black men had the most pronounced increase (Farwell, et al., 2007). The increase in national PSA

testing rates may be due to an increased awareness of the higher PCa risk for black men among physicians. As a result physicians are either recommending PSA testing (Purvis Cooper, Merritt, Ross, John, & Jorgensen, 2004; Stroud, Ross, & Rose, 2006) or making PSA testing decisions for black men.

Preference-sensitive Testing. The risk factors of PCa, controversy surrounding the widely available PSA test, and national recommendations make PSA testing a preference-sensitive medical decision that should first be discussed with a physician. In the case of PSA testing, a man is best able to make an informed medical decision when he receives relevant and unbiased testing information, is able to understand the information he receives, and is able to interpret the information as it applies to him as an individual (Briss, et al., 2004). Traditionally this information was obtained via shared decision-making (SDM). SDM is defined as occurring when a patient and physician, in a clinical setting, both express preferences and participate in making treatment decisions. SDM interventions are usually comprehensive and/or more personalized, because they take place in clinical settings and involve one-on-one interactions between physicians and patients (Briss, et al., 2004).

PSA testing is considered a preference-sensitive medical decision because a man's PSA testing decision is based on individual consideration of the ratio of potential benefits to potential harms of testing, thus the preferences will ultimately be different for each patient (O'Connor, et al., 2003). For example, a healthy 65-year-old man who had both a father and younger brother die from a PCa may opt to have a PSA test to ensure early detection. Conversely, a 50-

year-old man that is recently married, plans to have children and values his sex life, may choose to not to have a PSA test in order to avoid a unnecessary procedure which may affect his sex life. However, incorporating a patient's preference into the ultimate decision of whether or not to have a PSA test may be difficult for many physicians.

Physicians and PSA Testing. SDM is a relatively recent development within the medical field. The traditional approach to patient care is paternalistic medicine. That is, within the physician–patient relationship there is high physician control and low patient control over the interaction and/or medical decisions (Frosch & Kaplan, 1999). The issues surrounding PCa testing are complex and physicians often have limited time with their patients. These time constraints have led many physicians to not discuss PSA testing with their patients and decide whether or not to order a PSA test without considering patient preferences (Dunn, et al., 2001). This lack of discussion is reflected in a study of 201 black men in New York City, in which only 23% of the sample report their physician discussed the benefits and risks of PSA testing (S. N. Davis, et al., 2010). Physicians have also reported a number of patient-centric barriers to PSA testing discussions including patient co-morbidities, limited education or health literacy of the patient, presumption that patients would refuse testing, medical visits focused on acute problems, and many patients preferring their doctor to make medical decisions (Guerra, Jacobs, Holmes, & Shea, 2007; Woolf, Krist, Johnson, & Stenborg, 2005). In a quasi-experimental study of 104 veterans,

76% of the sample stated they never discussed their PSA testing preferences with their physician (Ruthman & Ferrans, 2004).

Another physician centric barrier to PSA testing discussions is the majority of physicians recommend PSA testing to their average-risk male patients (A. Ashford, et al., 2000; Pendleton, et al., 2008; Purvis Cooper, et al., 2004; Stroud, et al., 2006; Voss & Schectman, 2001). Physicians' reasons for recommending the PSA test range from a belief that early detection saves lives to a belief that the PSA test is standard care (Purvis Cooper, et al., 2004; Voss & Schectman, 2001). In a cross-sectional study of 104 primary care physicians, 66% believe PCa testing is effective and 53% regularly test their minority patients for PCa (Pendleton, et al., 2008). For many physicians, an endorsement of testing was based on past experiences demonstrating the clinical benefit of screening as well as patient demand for the test (Purvis Cooper, et al., 2004). Thus some physicians, who believe in the efficacy of PSA testing, may influence patients who do not want to have a PSA test to test.

The uncertainty of the efficacy of PSA testing has led many physicians to practice defensive medicine. In 2004, a resident physician and his residency program were found liable in the death of a PCa patient, who declined PSA testing after a discussion of the benefits and harms of PSA testing (Collins, et al., 1997; Steurer, et al., 2009). As a result of this case, many physicians worry about the potential legal liability if a patient chooses to not get tested but later develops PCa. Fear of malpractice lawsuits is a strong motivator for physicians to urge men to test for PCa without taking into consideration patient preferences.

The barriers listed above (paternalism, time constraints, physician belief in the PSA test, defensive medicine) may drive physicians to practice uninformed opportunistic PSA testing. Uninformed opportunistic PSA testing is the practice of not discussing the uncertain benefits and potential harms prior to ordering a PSA test opportunistically when requesting other pathology tests (Gattellari & Ward, 2005). Uninformed opportunistic testing is not encouraged and therefore the practice itself is troubling because physicians who do not engage their patients in discussions regarding the benefits, risks, and limitations of testing are: (a) not adhering to USTPF or ACS recommendations regarding the PSA test; (b) undermining patient autonomy by essentially eliminating men from engaging in discussions regarding their healthcare choices, decisions, and subsequent behaviors; and (c) viewed as inappropriate by younger men and men with knowledge about PCa and PSA testing (Gattellari & Ward, 2005).

In summary, the mixed recommendations regarding the PSA test from medical organizations have led to confusion about the merits of early detection (Crawford & Thompson, 2007). Therefore, PSA testing rates may be a reflection of the physician's belief about PSA testing and may not be a valid reflection of a man's testing preference. A better indicator of preference-sensitive medical decision of PCa testing is to ask men about their testing intentions and then determine if their testing behavior matched their intentions.

Behavioral Intention

Health theories that predict health behavior propose that intention is the immediate and most important predictor of behavior (Aiken, 2001; Ajzen, 1991; Fishbein & Ajzen, 1975; Gibbons, Gerrard, Blanton, & Russell, 1998; Rogers, 1983). Intentions are defined as the instructions people give themselves to perform particular behaviors or to achieve desired outcomes (Triandis, 1980). Intentions can be measured by responses that have the form, “I intend to do X”, “I plan to do X”, or “I will do X” (P. Sheeran, 2002).

PCa testing intentions are quite high among men. In a hospital-based convenience sample of men aged 50 and older attending a free PSA testing event, Flood et al. (1996) found over 90% of men had strong intentions to receive PSA testing within two years. In a randomized controlled trial of a PSA testing educational video and brochure intervention among a hospital-based sample of men aged 45 to 70, Volk et al. (1999) found overall interest in PSA testing decreased from 79% to 62% following their study. In a randomized controlled trial of a PSA testing educational brochure intervention among black men aged 40 to 70, the baseline rate of intention to have a PSA test within a year was 88% (Taylor, et al., 2006). In a randomized control trial, 74% of the men randomized to their control condition had an intention to have a PSA test in the near future (Partin, et al., 2004). In a nonrandomized controlled trial of a PSA testing educational video intervention among veterans aged 50 to 80, Ruthman & Ferrans (2004) found interest in PSA testing decreased from 94% to 63% following the intervention.

In a cross-sectional telephone interview about PCa testing among a population-based random sample of Canadian men aged 40 and older, Mercer et al. (1997) found 18% of the sample had intentions to receive a PSA test within a year. In a cross-sectional survey among hospital-based convenience samples of men aged 50+ in Michigan and Canada, Zemencuk et al. (2001) found roughly 80% desired to have a PSA test within two years. In a cross-sectional telephone interview of 286 black men who were members of a Masonic organization, 88.2% had an intention to have a PSA test in the upcoming year (R. M. Williams, et al., 2008).

The antecedents of intention have been investigated in a number of studies. A meta-analysis of 185 empirical tests was conducted to determine the overall efficacy of the Theory of Planned Behavior (TPB) as a predictor of intention. TPB variables, attitude, subjective norms, and perceived behavioral control, accounted for 39% to 42% of the variance in intention. Although each of these variables contributes to intention, subjective norm is the weakest predictor of intention and attitude is the strongest predictor of intention (Armitage & Conner, 2001).

TPB variables are not the only antecedents of PCa testing intention. Several studies have found that knowledge (Hevey, et al., 2009; O'Dell, Volk, Cass, & Spann, 1999; Watson, et al., 2006), past PCa testing behavior (Berglund, Nilsson, & Nordin, 2005; Frosch, Kaplan, & Felitti, 2001; Hevey, et al., 2009; Myers, 1999; Myers, Wolf, Balshem, Ross, & Chodak, 1994; Sheridan, Felix, Pignone, & Lewis, 2004; Volk, et al., 1999), physician recommendation

(Berglund, et al., 2005; Gattellari & Ward, 2005; Hevey, et al., 2009; Myers, 1999; Myers, et al., 1996; Ruthman & Ferrans, 2004), perceived benefits of testing (Myers, et al., 1996; Watson, et al., 2006; A. M. Wolf & Schorling, 1998), social support (Myers, et al., 1996; Odedina, Campbell, LaRose-Pierre, Scrivens, & Hill, 2008; A. M. Wolf & Schorling, 1998), and attitude towards PCa testing (Berglund, et al., 2005; Hevey, et al., 2009; Odedina, et al., 2008; Watson, et al., 2006; A. M. Wolf & Schorling, 1998) help form a man's PCa testing intention. In summary, numerous variables have been identified as antecedents that individually and collectively predict intention to test for PCa. The important question is not what predicts intention, but how well does intention predict behavior?

Behavioral Intention as a Predictor of Action

Across a number of theories, behaviors, and populations, health intentions have been studied as a predictor of behavior. A meta-analysis conducted to examine the utility of the Theory of Reasoned Action and Theory of Planned Behavior to explain and predict exercise, found the average correlation between intention and exercise was $r=0.47$, $p<.05$ (Hausenblas, Carron, & Mack, 1997). Sheeran, Abraham, and Orbell (1999) conducted a meta-analysis of 121 studies to determine predictors of condom use. The correlation between intention to use condoms and actual condom use was $r= 0.39$, $p<.001$ in cross-sectional designs and $r= 0.46$, $p<.001$ in longitudinal designs. Notani (1998) reviewed 36 studies over a range of behaviors and found a significant correlation between intention and behavior, $r =0.38$, $p < .01$. Milne, Sheeran and Orbell (2000) conducted a

meta-analytic review of 27 studies, representing 7,694 participants, to predict the relation between various health intentions and behaviors. The average correlation between intention and behavior was r= 0.40, p< .001. A meta-analysis of 161 studies, with 185 hypotheses, was conducted to determine the overall efficacy of the TPB as a predictor of intention and behavior (Armitage & Conner, 2001). Armitage and Conner (2001) found that the sample weighted average intention-behavior correlation was r=0.47, p<.0001. Cooke and French (2008) conducted a meta-analysis of 33 studies to determine how well intention predicted various types of screening behavior, e.g. mammography, colorectal screening, pap smear, and prenatal screening. The intention-behavior correlation was lowest in studies of cervical cancer screening and highest in studies that predicted prenatal screening.

To gain insight into the overall effect size of the intention-behavior relation, Sheeran (2002) conducted a meta-analysis of 10 meta-analytic studies, across a variety of health conditions. The correlation between intention and behavior ranged from 0.40 to 0.82 for the 10 meta-analysis. The sample-weighted average correlation derived from these studies was 0.53 (95% CI = 0.52 to 0.53) based on 422 hypotheses and a total sample size of 82,107. Thus, intentions explain 28% of the variance in health behavior, (P. Sheeran, 2002), which is a “large” effect size (Cohen, 1992). The variance suggests intentions have a large effect on behavior; however, a large proportion of the variance in behavior, 72%, is unexplained.

Since the intention-behavior relation across multiple health theories and health-related behaviors is scant, a look at the utility of intention to predict PCa testing is warranted. Indeed, many men who intend to have a PSA test actually have a test, however there are men who intend to have a PSA test but do not (Flood, et al., 1996; Partin, et al., 2004; Taylor, et al., 2006; Volk, et al., 2003). Among men recruited from a scheduled clinic visit, 97% had intentions to have a PSA test, however only 34% of participants actually had a PSA test at their next scheduled visit (Flood, et al., 1996). In a randomized controlled study of a PSA testing decision-aid brochure among a hospital-based sample of men aged 50 to 80, Schapira and VanRuiswyk (2000) found 84% of the sample had intentions to receive PSA testing at baseline and roughly the same proportion received a PSA test at the two-week follow-up visit. Volk et al (2003) contacted 160 men aged 40 to 70 to determine whether they were tested for PCa one year after participation in their study. Men who were randomized to intervention condition were equally as likely as controls to report having had a PSA test at one-year follow-up. In a randomized control trial of 290 veterans, intention to have a PCa test was 74% among men randomized to the control condition. Only 29% of veterans had a PSA test within the first weeks after their appointment, but the number rose to 70% one year after their appointment (Partin, et al., 2004).

In a randomized controlled trial of an educational PCa booklet of 238 black men from Washington, DC, 75% of men with intentions to have a PSA test self-reported they had a PSA at one year follow-up, X^2 (1, 164) = 11.1, $p<0.001$ (Taylor, et al., 2006). In a randomized controlled study of a PSA testing

educational brochure and appointment-reminder intervention among a hospital-based sample of black men aged 40 to 70, Myers et al. (1999) found intention to receive PSA testing increased the likelihood of receiving PSA testing within a year (*OR* = 1.9; *95% CI* = 1.2, 2.9).

In summary, review of the intention-behavior consistency revealed intention to perform a behavior is the strongest predictor of actual behavior. Specific to PCa, testing intention is also related to PCa testing behavior. However, the overall intention-behavior variance indicates intention does not predict behavior very well; in fact, the consistency is far from perfect.

Barriers and Facilitators of Intention and Behavior

There are several methodological issues that tend to influence the intention-behavior consistency. Sheeran (2002) makes the case that r=0.53 may underestimate the “true” relation or variance between intention and behavior and thus the observed correlation will be weakened. Reasons for the weakened correlation between intention and behavior include: (a) unreliable measures of intention and behavior; (b) lack of compatibility between intention and behavior, due to intention and behavior not measured at the same level of specificity or generality nor matched with respect to action, target, time, and context; (c) a lack of correspondence between scales, different magnitudes, frequencies, or response formats to assess intention and behavior; (d) unequal number of response categories for intention and behavior; (e) restriction of range/variance in intention or behavior; and (f) marginal distributions of the measures do not match (Sutton, 1998).

Accounting for measurement artifact and a weakened correlation does not eliminate the inconsistency between intention and behavior. In a move to increase the strength of the intention-behavior relation, many researchers have developed interventions to increase participant intention and as a consequence, influence behavior. An intervention designed to strengthen breast self-examinations found that although the intervention did strengthen intention ($d=0.55$, $p<.001$), it had minimal impact on behavior ($d=0.38$, $p<.01$) (Luszczynska & Schwarzer, 2003). Similar results were found in an intervention designed to reduce intentional UV exposure via indoor tanning. Reductions in tanning intentions ($d=0.58$, $p<.001$), had only a medium impact on tanning behavior, $d=0.35$, $p<.05$ (Hillhouse & Turrisi, 2002).

Webb and Sheeran (2006) conducted a meta-analysis to determine whether changes in behavioral intention equal changes in behavior. The meta-analytic results of 47 experimental studies indicated that the differences in intention following intervention ranged from $d=0.12$ to 2.97, $SD = 0.54$, sample weighted effect size was $d=0.66$, 95% CI= 0.51 to 0.82. The effect size of the impact of the interventions on behavior ranged from $d=-0.25$ to 2.31, $SD=0.48$, sample weighted effect size was $d=0.36$, 95% CI= 0.22 to 0.50. Thus the results of this meta-analysis indicate that medium-to-large changes in intention only equate to small-to-medium changes in behavior (Webb & Sheeran, 2006). These issues highlight that although the intention-behavior relation can be strengthened, the pathways from intention to action are not straightforward.

Intention-Behavior Gap

Intentions often have a limited impact on subsequent actions (Webb & Sheeran, 2006), thus it stands to reason that many people fail to act on their intention. This is highlighted when the relation between intention and behavior is decomposed in a two by two matrix. Orbell and Sheeran (1998) characterized women on the dimensions of intention to screen for cervical cancer (positive intention vs. negative intention) and behavior (acted vs. did not act), refer to Figure 1. Those who had a positive intention and subsequently carried out the intended behavior were termed 'inclined actors'. Those who had a positive intention, but did not act were termed 'inclined abstainers'. Those who had a negative intention and did not carry out the intended behavior were termed 'disinclined abstainers'. Those who had a negative intention and subsequently carried out the intended behavior were termed 'disinclined actors'. Results indicated that 57% of the women who indicated they were willing to be screened for cervical cancer did not do so during the follow-up period. Inclined abstainers, women who did not act according to their positive intention, were primarily responsible for the intention-behavior gap (Orbell & Sheeran, 1998).

Inclined abstainers are not limited to cervical cancer screening. Inclined abstainers have been found in a variety of health behaviors and populations. A study designed to follow-up on PCa informed decision making found 44% of the men were inclined abstainers (Volk, et al., 2003). A study to predict smoking intention and subsequent quitting found that 67% of smokers were inclined abstainers (Moan & Rise, 2005). In a study designed to encourage physical

exercise following cardiac rehabilitation, 38.9% of participants were inclined abstainers (Sniehotta, Scholz, & Schwarzer, 2005).

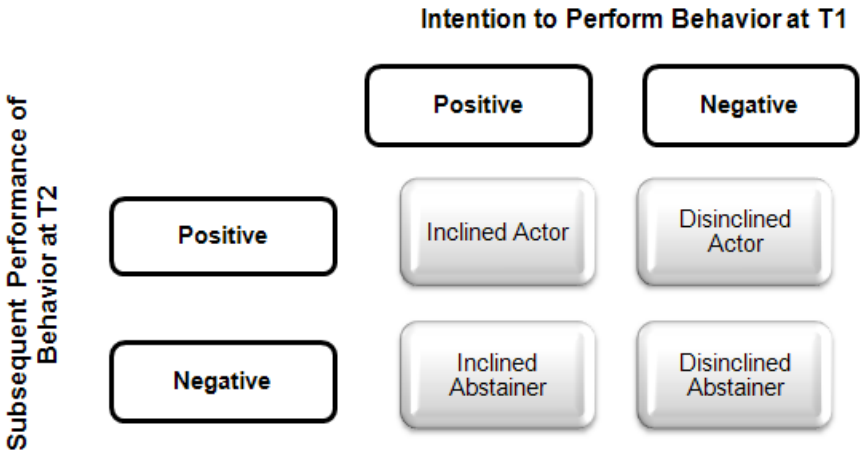

Figure 1. Decomposition of Intention-Behavior Gap. T1=Time One; T2=Time Two

In a 2002 meta-analysis which included two studies of condom use, one study of exercise, and three studies of cancer screening, almost half of the participants were inclined abstainers. On average, intentions were translated into actions only 53% of the time. The percentage of participants with a positive intention that do not subsequently act (inclined abstainer) was 47%, however, those that performed the behavior despite a negative intention (disinclined actor) was 7% (P. Sheeran, 2002).

Sheeran, Milne, Webb, and Gollwitzer (2005) discuss a number of reasons for the intention-behavior gap. The first reason is intention viability,

which refers to the concept that it is impossible to achieve a desired behavior in the absence of ability, resource, or opportunity. Many intentions and behaviors require resources, skill, opportunities and/or cooperation to be completed successfully (Webb & Sheeran, 2006). Men who are considering the PSA test may not be able to realize their intention if the man does not have health insurance or transportation to a physician's office.

The second reason for the gap is intention activation. Intention activation refers to the extent to which contextual demands alter the salience, direction, or intensity of the primary intention in relation to other intentions. Behavioral intention may be reduced by situational demands, which trigger alternative behavioral intentions and actions. As a consequence, people forget to perform the behavior or the intention to perform the behavior becomes reprioritized. For example, Abraham et al. (1999) found that intention to use a condom was not enacted because the goal of having sex was more important at the time than the goal of protecting oneself from HIV/AIDS. Intention activation may override receiving a PSA test if an office visit is overshadowed by an acute problem that does not leave time to discuss a PSA test (Guerra, et al., 2007).

The third reason for the gap is intention elaboration. Intention elaboration occurs when people fail to elaborate, in sufficient detail, the particular actions and contextual opportunities that will allow them to follow thru on their behavioral intentions. For instance, the intention to have a PSA test can only be realized if the person has a) decided where they will go to have a PSA test, b) determined

when they will make an appointment to have a PSA test, and c) discussed having a PSA test with their physician.

Traditional health intention theories provide support that behavior can be predicted by intention. However it is also clear that these theories are insufficient to completely explain the intention-behavior relation. Traditional health theories that try to explain intention, despite criticisms regarding their conceptual and empirical foundations, have survived without any modification or further development. The insufficiency of these theories to explain the intention-behavior relation is attributable to several limitations. First, all of the factors and events that effect behavior do not move through intention alone (Michie, 2008). Second, there are additional predictors of behavior, such as perceived value of the behavior, that are not taken into account by traditional intention theories. Third, intention is a necessary but not sufficient condition for performing a behavior and as a result, increased intention to perform a behavior does not translate into increased behavior (Orbell & Sheeran, 1998; Webb & Sheeran, 2006). Fourth, traditional intention theories do not give researchers a method to explain the intention-behavior gap or strengthen the intention-behavior consistency.

Social Cognitive Approach to Intention and Behavior

Health behaviors are defined as “personal attributes such as beliefs, expectations, motives, values, and perception; personality characteristics, such as affective and emotional states and traits; and overt behavior patterns, actions, and habits, that relate to health maintenance, health restoration and health improvement” (Baranowski, et al., 2002). In many instances health behaviors are

largely dependent upon socio-demographic variables. However these variables are not easily susceptible to change (Armitage & Conner, 2000). Accordingly, researchers have focused on social and cognitive variables to explain individual differences in health behavior (Armitage & Conner, 2000). Social and cognitive variables influence cancer prevention and control beliefs and behaviors. Specific to PCa, they contribute to differences in PCa testing access, testing utilization, attitudes toward testing, and beliefs in testing among diverse populations (Bowen, et al., 2006; Mullen, et al., 2006; Volk, et al., 2007). Various health theories have been used as a framework to examine PCa testing behaviors of black men (Bowen, et al., 2006; Volk, et al., 2007). The limitations of traditional intention theories open the door to a third variable, which effects the intention-behavior relation. Integrating post-intentional factors within the intention-behavior relation can help explain the PCa intention-behavior gap and strengthen the consistency.

Social Cognitive Theory

Social Cognitive Theory (SCT) is a complex theory that identifies proximal determinants of health behavior that underlie health related decisions, explains individual differences in health behavior, and predicts health behavior change (Baranowski, et al., 2002). The multi-dimensional approach of the SCT focuses on the individual as well as the broader social and physical environmental factors that have the potential to influence behavior (Bandura, 1986, 1997). The SCT takes the perspective that individuals are both producers as well as products of their social systems. As a result, human behavior can be explained and modified

through an interaction of personal, behavioral, and environmental influences on an individual, see Figure 2 (Bandura, 1986, 1997).

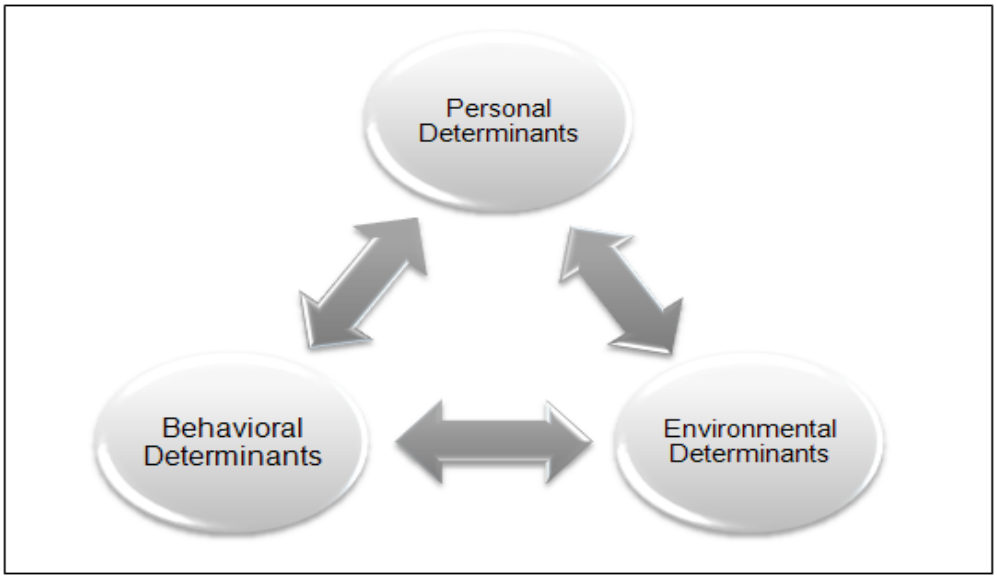

Figure 2. Conceptualization of the Social Cognitive Theory. Adapted from "The self-system in reciprocal determinism." By A.Bandura, 1978, *The American Psychologist,* 33(4), 344-358.

The SCT is particularly applicable to PCa testing intention and PCa testing for two reasons. First the theory brings together previously disparate personal, environmental, and behavioral understandings of an individual. The reciprocal interaction emphasized by the SCT offers pathways by which PCa testing in black men may be more clearly understood. The SCT states that determinants of health behavior differ by population and behavior of interest. Second, the constructs and processes identified by the SCT suggest many new and important avenues for behavioral research and practice (Baranowski, et al., 2002). Few

research studies use SCT to understand the influence of individual and environmental factors on PCa testing in black men. Most research using social cognitive perspectives have focused on limited individual-level factors, without including an analysis of perceived environmental factors (Bandura, 1986, 1997). Examining individual psychological and perceived social environmental determinants could allow for a more comprehensive understanding of the PCa testing intention-PSA testing gap (Bandura, 1997).

Constructs of the Social Cognitive Theory

The constructs within the SCT have been established as those that play a crucial role in health related decisions and contribute or interfere with the adoption of health behavior. The major concepts of SCT are: *the environment* (family, friends); *situations* (perception of the environment); *behavioral capabilities* (knowledge and skill to perform a given behavior); *emotional coping responses* (strategies or tactics that are used by a person to deal with emotional stimuli); *self-control* (personal regulation); *outcome expectations* (anticipated consequences); *outcome expectancies* (value placed on the outcome); *self-efficacy* (performance confidence); o*bservational learning* (learning by watching others); *reinforcement* (responses to a person's behavior), and *reciprocal determinism* (dynamic interaction of the person, the behavior, and the environment). SCT constructs that are relevant to PCa testing intention- PSA testing are discussed in depth. Refer to Table 2 for a summary of the SCT construct.

Table 2. Relevant Constructs of Social Cognitive Theory

Construct	Definition
Environment	Factors physically external to the person, usually composed of the social environment that includes family, friends, peers at work or in the classroom.
Behavioral Capability	Knowledge of the behavior and possessing the skills to perform it.
Outcome Expectations	Anticipatory outcomes of a behavior. A person learns outcomes occur in a given situation and expects them to occur when that situation presents itself again and the person performs similarly.
Outcome Expectancies	The values that the person places on a given outcome; incentives. A person will choose to maximize a positive outcome over a negative outcome. This is a key in motivating adoption of new behaviors
Self-efficacy	The person's confidence in performing a particular behavior. The most important pre-requisite for behavior change

Self-efficacy. Self-efficacy is defined as one's confidence in their ability to carry out a specific behavior in a specific situation (Bandura, 1997). Self-efficacy influences whether a person will initiate a health behavior, health behavior goals, capacity to cope with setbacks, and how long the behavior will be sustained in the face of obstacles (Baranowski, et al., 2002). Self-efficacy is a powerful predictor of intention and subsequent behavior in physical activity, alcohol consumption, safe sex practices, smoking cessation, adherence to medical regimes, and breast self-examination (Armitage & Conner, 2000; Bandura, 1986; Luszczynska & Schwarzer, 2003). However, data regarding self-efficacy and PCa testing is scant.

Boehm et al (1995) conducted a study to evaluate the effectiveness of a PCa education and screening program to increase PCa self-efficacy and knowledge in 123 black men. PCa testing self-efficacy, along with knowledge, increased following their intervention, $p<.001$. However, increased PCa testing self-efficacy and knowledge was not enough to turn PCa testing into a regular habit in this sample. Modeling of PCa testing by similar men, in addition to knowledge and self-efficacy, was key (Boehm, et al., 1995). Myers et al (1999) found that self-efficacy to obtain a PCa test was associated with getting a PCa test in the future, $p<.01$. Higher self-efficacy was related to higher intention to undergo a recommended follow-up compared to men who reported lower self-efficacy levels, $p<.01$ (Myers, et al., 2000). Self-efficacy to get a PCa test, along with positive outcome expectancies, was related to PCa testing in first-degree relatives of PCa patients (Cormier, Reid, Kwan, & Litwin, 2003; Vadaparampil, et al., 2004).

An extension of self-efficacy to have a PCa test is a self -efficacy to communicate with a physician about PCa. In a randomized controlled trial of 314 men attending a VA clinic in Minnesota, 34% of the men had never talked to their physician about PCa (Wilt, et al., 2001). Fearing et al (2000) investigated a patient's desired role in talking about PCa with physician. Forty percent of black men felt uncomfortable discussing PCa testing with their primary care physician (Fearing, et al., 2000). Qualitative studies have suggested that many black men lack the self-efficacy to communicate effectively with their physician regarding PCa testing (Allen, Kennedy, Wilson-Glover, & Gilligan, 2007; Woods,

Montgomery, Belliard, Ramirez-Johnson, & Wilson, 2004). Although these studies did not directly measure self-efficacy to talk to a physician regarding PCa, these studies suggest self-efficacy may be low. It is worth exploring self-efficacy to communicate with a physician regarding PCa as a moderator between the PCa testing intention-behavior relation. Men with higher self-efficacy to communicate with their physician will have stronger intention-relation consistency than men with lower levels of self-efficacy to communicate with their physician about PCa.

Outcome Expectancies. Outcome expectancies are the perceived values a person places on a particular outcome of a given behavior. Based on beliefs about the positive and negative desirability of the outcome, the perceived value can be quantified and weighted for any given behavior. Positive expectancies, such as enhanced overall health, often result in initiation and repetition of a behavior. Negative expectancies, such as discomfort, often result in bringing to a stop to the behavior. Typically, individuals will perform behaviors that minimize negatively perceived outcome expectancies and maximize positively perceived outcome expectancies (Baranowski, et al., 2002).

Outcome expectancies of PCa have been studied extensively, often in the form of perceived value of PCa testing benefits and perceived value of PCa testing risks. Value of PCa testing benefit is the personal belief about the usefulness of testing and early detection; positive expectancies will result in having a PSA test. The perceived value of PCa testing benefit is positively and significantly associated with intention to have a PCa test (Myers, et al., 1996; A.

M. Wolf & Schorling, 1998) and future PCa testing (Cormier, et al., 2003; Gattellari & Ward, 2005; Livingston, et al., 2002; Myers, et al., 1999; Myers, et al., 2000; Partin, et al., 2004). Conversely, the value of PCa testing risk is the personal belief of the potential harms and risks of PCa testing; negative expectations will result in not having a PSA test. The value of PCa testing risk has not been studied within PCa testing intention or PSA testing.

As a moderator, higher perceived value of PCa testing benefit will result in a stronger PCa testing intention and PSA testing relation compared to men with a lower perceived value of PCa testing benefit. Lower perceived value of PCa testing risks will have a stronger intention-behavior relation compared to men with a higher perceived value of PCa testing risk.

Outcome Expectations. Outcome expectations are the anticipated results from performing any given behavior. Outcome expectations can be learned in numerous ways ranging from talking to others to previous performance of the behavior. Past behavior provides an individual with information regarding the consequences of performing (or not performing) the behavior (Ouellette & Wood, 1998). An outcome expectation of past PCa testing has predicted testing intention (Jacobsen, et al., 2004; Myers, 1999; Myers, et al., 1996) and future PSA testing actions (Sweetman, et al., 2006).

Moderation effects of past behavior within the intention-behavior relation have been reported in other health behaviors (Cooke & Sheeran, 2004; Kashima, Gallois, & McCamish, 1993; P. Sheeran & Abraham, 2003). Consistent with these findings, past PSA testing is a potential moderator of the PCa testing

intention-behavior relation. Men with a history of PCa testing should have a stronger intention-behavior consistency, compared to men who have never had a previous PSA test.

Environment. Environmental factors are those that are physically external to an individual such as their social (family members, friends and physicians) or physical environment (urban vs. rural area) (Baranowski, et al., 2002). There is evidence that the social environment is related to PSA testing (Allen, et al., 2007; Honda & Kagawa-Singer, 2006; Knops-Dullens, de Vries, & de Vries, 2007; Thomas, Simpson, Tarver, & Gwede, 2008). Qualitative studies have found discussions with friends, spouses, and children influence the perception of PCa and PSA testing decisions among black men (Ford, Vernon, Havstad, Thomas, & Davis, 2006; Odedina, et al., 2004; Woods, et al., 2004). Qualitative studies have also found discussions with physicians influence the perception of PCa and PSA testing decisions among black men (Ford, et al., 2006; Odedina, et al., 2004; Woods, et al., 2004). The influence of family and friends was not associated with having a PSA test in Black men recruited from both the community and clinic samples, but physician communication, encouragement, and communication style was positively and significantly related (Woods, Montgomery, Herring, Gardner, & Stokols, 2006).

In quantitative studies, support from family and friends were found to be significant reasons for PCa testing (Demark-Wahnefried, Catoe, Paskett, Robertson, & Rimer, 1993; Odedina, et al., 2004). Interest in testing and subsequent testing has also been influenced by whether or not a man knows

someone close to him diagnosed with PCa (A. R. Ashford, et al., 2001). The 2005 HINTS data found that men who received a PSA test in the prior year were more likely to have family support of testing, while having a family member with cancer is associated with a decreased likelihood of PCa testing (Thomas, et al., 2008). In a cross-sectional telephone survey of a population based sample of New York men aged 50 and older, physician recommendation increased the likelihood of a past PSA test (Steele, Miller, Maylahn, Uhler, & Baker, 2000).

The role of the social environment as a moderator between PCa testing intention-behavior is mixed. Physician recommendation will influence the intention-behavior consistency, such that a man with a physician recommendation to have a PCa test will have a PCa testing intention, which in turn will result in higher PCa testing behavior. The role family and friends play in moderating the intention-behavior relation is unclear.

Behavioral Capability. Knowledge of a behavior and possessing the skills to perform the behavior is required to perform a health behavior, to develop strategies to deal with barriers, and to maintain a health behavior. The ability to describe and recognize information is also necessary to translate a behavioral intention to behavioral performance (Bandura, 1986). PCa knowledge levels vary across samples, but are generally low in black men (A. R. Ashford, et al., 2001; S. N. Davis, et al., 2010; Ross, Uhler, & Williams, 2005). In a Harlem based sample of 723 black men recruited from clinic and community populations, 15% of men had never heard of PCa and 41% of men had heard of PCa, but had never heard of a test to screen for PCa (A. R. Ashford, et al., 2001). Davis et al

(2010) found that within 201 black men who lived and work around NYC, general PCa knowledge levels were fairly low. In addition, higher knowledge levels were associated with having health insurance, higher education, past screening, and having a discussion about the benefits and risks of PCa testing with a physician.

Thus, misinformation regarding PCa epidemiology, testing, and treatment, adversely effect PCa testing intentions and PSA testing (Ford, et al., 2006; Forrester-Anderson, 2005). Low levels of PCa knowledge among black men influence participation in PSA testing (A. R. Ashford, et al., 2001; S. N. Davis, et al., 2010; Myers, et al., 1994; Myers, et al., 1996; Weinrich, et al., 2004; Woods, et al., 2006). As a moderator, men with higher levels of knowledge are expected to have the strongest intention–behavior consistency. It is also expected that men who lack an awareness of PCa tests will not have any PCa testing intentions and will consequently lack the skills necessary to have a PSA test.

Demographic Factors. Age, race, education, and income are consistently associated with PCa testing intention and PSA testing behavior (Berglund, et al., 2005; Fowke, Schlundt, Signorello, Ukoli, & Blot, 2005; Gilligan, 2005; Gilligan, Wang, Levin, Kantoff, & Avorn, 2004; Myers, et al., 2000; Myers, et al., 1996; Vadaparampil, et al., 2004; Watson, et al., 2006; Weinrich, Reynolds, Tingen, & Starr, 2000; Wilkinson, List, Sinner, Dai, & Chodak, 2003; A. M. Wolf, Nasser, & Schorling, 1996). The SCT assumes demographics effect health behavior through their influence on the cognitive and environmental process (Bandura, 1986). These variables will be investigated as potential control variables within this study.

In summary, the underlying assumption of the SCT is behavior is a dynamic, ongoing interaction where personal, behavioral and environmental factors exert influence on each other (Bandura, 1986, 1997). The SCT highlights an individual's ability to regulate their health by setting health goals, monitoring progress towards these goals, and actively intervening to make their social and/or physical environments supportive of these goals. The complex and the dynamic nature of the SCT allows for individual differences in the accessibility and organization of the relation between the variables to inform the search for variables, which accounts for the gap within the PCa testing intention and PSA testing in black men.

Social Cognitive Variables as Moderators

PCa testing intention is a necessary but not sufficient condition to have a PSA test (Orbell & Sheeran, 1998; P. Sheeran, 2002). The relatively small relation between intention to receive a test for PCa and PSA testing in black men suggest unknown variables are effecting the pathway from PCa testing intention to PSA testing behavior. Therefore it is insufficient to state the effects of variables on PSA testing are mediated through intention (Sutton, 1998).

The psychological processes that lead from intention to action are not yet well understood. Therefore, further research into this phase of health behavior change is needed (P. Sheeran, 2002; Sniehotta, et al., 2005; Webb & Sheeran, 2006). This study's primary focus was to examine the relation between the PCa testing intention and PSA testing outcomes using the constructs found within the SCT. For that reason, the impacts of SCT constructs were assessed as

moderators. A moderator is a variable that effects the direction and/or strength of relation between the predictor variable (PCa testing intention) and the outcome variable (PSA testing behavior) and may be able to increase the predictive validity of the predictor and outcome (Baron & Kenny, 1986).

Summary

The limitations within the intention-behavior literature specific to PCa testing intention-PSA testing achieving are numerous: (a) few studies have investigated the PCa testing intention-PSA testing relation in a population of black men, a group at the highest risk for PCa incidence and mortality in United States; (b) the gap that exists between intention and behavior has not been thoroughly studied in PCa; (c) the majority of the information regarding the intention-behavior relation has involved correlations from cross-sectional studies; (d) factors known to predict PCa testing intention and behavior have not been examined as moderators; and (e) the intention-behavior relation has traditionally been studied using theories that have not incorporated personal and environmental factors.

This study aims to address the limitations in the PCa testing intention-PSA testing behavior relation, by exploring the gap within the intention-behavior consistency. Exploration of the gap will be done through the use of the SCT which incorporates PCa knowledge, awareness of PCa tests, history of PCa testing, self-efficacy to communicate with physician, value of perceived PCa testing benefits, value of perceived PCa testing risks, physician recommendation to have a PCa test, and social support. A unique strength of this study is that the

population is black men from New York City, with a huge proportion from the Caribbean, and with access to health insurance and primary care provider. This longitudinal study will use medical records, along with self-report data, to assess PCa testing behavior within this population. The main hypothesis of the study are as follows:

Hypothesis One. Intention to have a PCa test will be positive and significant predictor of self-report of a PSA test between the time one and time two interview, medical claim of a PSA test between the time one and time two interview, and medical claim of a PSA test between time one interview and one-year after the time one interview.

Hypothesis Two. Social cognitive variables (PCa knowledge, history of PCa testing, physician recommendation to test, awareness of PCa tests, efficacy to talk to a physician, perceived value of PCa testing benefit, and perceived value of PCa testing risks) will have independent main effects on self-report of a PSA test between the time one and time two interview, medical claim of a PSA test between the time one and time two interview, and medical claim of a PSA test between time one interview and one-year after the time one interview.

Hypothesis Three. Social cognitive variables (PCa knowledge, history of PCa testing, physician recommendation to test, awareness of PCa tests, efficacy to talk to a physician about PCa, perceived value of PCa testing benefit, and perceived value of PCa testing risks) will moderate the relation between PCa testing intention and self-report of a PSA test between the time one and time two interview, medical claim of a PSA test between the time one and time two

interview, and medical claim of a PSA test between time one interview and one-year after the time one interview.

CHAPTER 3

METHODS AND PROCEDURES

This chapter describes the research methodology used to obtain data for this study including: sample population, setting, study design, protection of human subjects, measures of predictors, behavioral outcomes, covariates, and the data analysis plan.

Study Design

This study was based on data from the Cancer Awareness and Prevention (CAP) trial (Stephen Lepore, Principal Investigator). The CAP trial was one of the largest to administer repeated surveys about PCa knowledge, PCa testing intention, PCa testing behaviors, PCa testing decisional conflict, and PCa testing outcomes to 490 black men. The CAP trial was a two-group, pre-post randomized controlled trial designed to promote informed decision making about PCa testing (R. L. Wolf, Lepore, Vandergrift, Basch, & Yaroch, 2009). The trial included medical records data to ascertain physician visits and submitted PSA testing medical claims.

Black men who were beneficiaries of the New York 1199 Service Employees International Union (SEIU) health benefit fund were recruited as participants in the CAP trial. The 1199 SEIU is comprised of approximately 355,000 individuals in the New York City metropolitan area. Membership in the 1199 SEIU is contractually mandated for eligible employees at over 95% of the private hospitals in New York City. This population is significant because over 80% of 1199 SEIU workers are from low-income occupations (e.g. food service,

custodians, clerks, etc.) and approximately 80% of 1199 SEIU is comprised of minority populations (predominately black).

Data were collected from June 2005 to June 2007 via telephone interviews and review of the 1199 SEIU medical claim database. Trained interviewers, blind to the participant's study condition, used a structured telephone interview to collect data at time one and time two. Time one and time two interviews were audio-recorded for monitoring and quality assurance.

CAP research staff contacted participants using telephone numbers provided by the 1199 SEIU. Potential participants were interviewed to confirm eligibility, to obtain consent for baseline interview, and to obtain baseline data. To be eligible, a man had to self-identify as black, aged 45 – 70 years old, an active beneficiary of 1199 SEIU for at least 12 months, use the 1199 SEIU as their primary health insurance carrier, no medical claim submissions of a PSA test in the prior 12 months, telephone accessibility, have a primary care physician, and consent to participate. A man was considered ineligible to participate in the study if they had a prior PCa diagnosis, intention to retire within the next 12 months, intention to travel out of the country within the next 12 months, or any condition that precluded meaningful participation in the study.

After enrollment and completion of the baseline interview, participants were randomized to one of two telephone-delivered health education intervention conditions promoting either informed decision-making about PCa testing or awareness and adoption of national dietary recommendations for fruit and vegetable consumption (R. L. Wolf, et al., 2009). Participants randomized to the

informed decision making intervention condition received a mailed PCa-specific brochure and tailored telephone education intervention on PCa, whereas participants randomized to the fruit and vegetable attention-control condition received a fruit and vegetable brochure on national recommendations and tailored telephone education intervention on fruit and vegetable consumption recommendations. Follow-up telephone interviews were administered approximately ten months after the time one interview. Participants received $10 cash or $10 gift card upon completion of each interview.

Study Sample

The participants for this study were selected from 246 black men, 50.2% of the original sample, randomized to the fruit and vegetable attention-control condition of the CAP trial, see Figure 3. Men randomized to the informed decision-making PCa intervention condition received significant health education regarding PCa. Consequently, information provided to them during the PCa health education could inform and influence their time two PSA testing. Men randomized to the fruit and vegetable attention control condition were selected to explore the relation between testing intention and PSA testing.

To be eligible for this secondary analysis, men randomized to the fruit and vegetable attention-control condition had to have complete time one and time two data on both PCa testing intention and PSA testing. Thirty men, 12% of the control group, were lost to attrition at follow-up and thus missing time two PSA testing outcomes data. The final study sample consisted of 216 participants with complete time one and time two data.

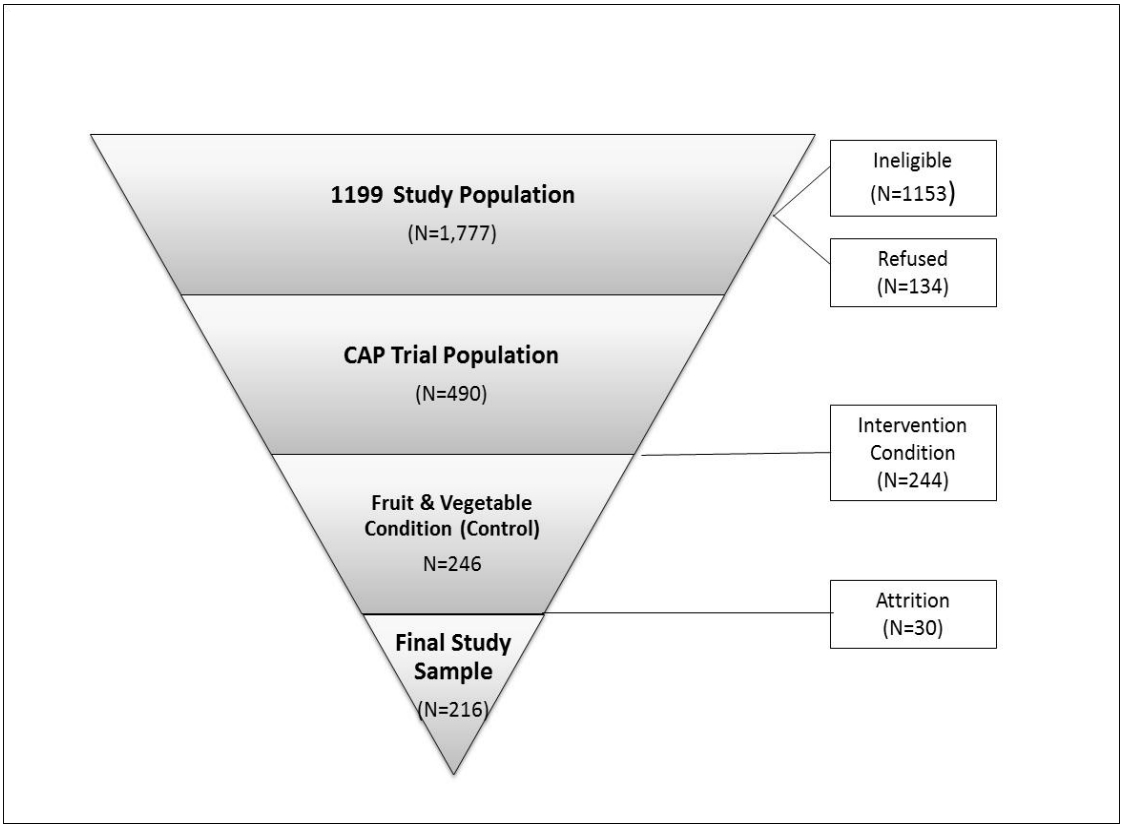

Figure 3. Participant Flow through Dissertation Study. CAP=Cancer Awareness and Prevention Trial.

Table 3 displays demographic and PCa testing intention frequencies of the primary study sample and the control-attrition group. The primary study sample and the control-attrition group were comparable on age, education, immigrant status, and marital status. Most important, there were no significant differences of intention to have a PCa test between the groups.

Table 3. Demographics of the Study Sample and Control-Attrition Sample

Variables	Primary Study Sample N=216	Attrition Sample N=30	P-value
Age (%)			
45-49	52 (24.1)	9 (30.0)	.54
50-54	64 (29.6)	5 (16.7)	
55+	100 (46.3)	16 (53.3)	
Immigrant	181 (83.8)	26 (86.7)	.75
High School Graduate or Beyond	150 (69.4)	18 (60.0)	.58
Married or Living with Partner	176 (81.5)	27 (90.9)	.37
Positive Intention to test	127 (58.5)	19 (63.3)	.83

Note. Tests are Pearson chi-square, with Yates correction. None of the groups are significantly different at p<.05.

Ethical Considerations

The secondary data analyzed in this study was collected within the confines of the CAP trial. All participants gave informed consent. Data were collected on a voluntary basis and kept confidential in locked file drawers. Identifiers were removed from the data and only the principal investigator and project manager had a master list connecting participant names to study identification. The Temple University Institutional Review Board granted exempt approval for this secondary data analysis since the data was already collected and therefore posed no additional risk to participants.

Research Measures

Predictor Variables. Intention to have a PCa test and social cognitive variables were included as independent variables to examine their predictive effects on PSA testing behavior at time two.

Intention to have a PCa test. Intention to test for PCa was a dichotomous variable measured by the participants' stated plans to receive a PCa test or receive a PCa test again. At time one, participants were asked, "Before today, had you ever thought about getting [tested/tested again] for prostate cancer?" Participants who responded, "I have decided to get tested/tested again," were classified as having a positive intention to test for PCa and were coded as 1. Participants who responded "Never thought about testing", "Thought about testing, but undecided" or "Decided not to get tested/not to get tested again," were classified as having a negative intention to test for PCa and were coded as 0.

History of PCa testing. Past PCa testing was a dichotomous variable which determined if a participant had a self-reported history of PCa testing. At time one, participants were asked, "Have you ever had a test for prostate cancer?" Men who responded that they never had a test or were unsure about ever having a test were classified as not having a history of PCa testing and were coded 0. Men who responded they have had a test were classified as having a history of PCa testing and were coded 1.

Awareness of PCa tests. Awareness of PCa tests was a dichotomous variable that determined if a man was aware of any tests for PCa. At time one, participants were asked, “Have you ever heard of any tests you could take to find out if you have prostate cancer?” Men who were not aware of any PCa tests were coded as 0 and men who were aware of PCa tests were coded as 1.

Physician recommendation of PCa test. Physician recommendation was a dichotomous variable to determine whether a physician has ever recommended getting tested for PCa. At time one, participants were asked,”At any time has a doctor recommended getting tested for prostate cancer?” Men who reported that their physician had not recommended getting tested for PCa were coded as 0. Men who reported their physician recommended getting tested for PCa were coded as 1.

Self-efficacy to communicate with physician about PCa. Self-efficacy to communicate with physician about PCa was a continuous variable designed to assess participants’ confidence in their ability to have a knowledgeable discussion with their physician about PCa testing. Perceived efficacy to communicate with a physician, assessed at time one, was the sum of three communication efficacy items rated on a three-point scale 0= “no”, 1= “a little confident”, and 2= “very confident”. The score for perceived efficacy to communicate was a summed score that ranged from 0 to 6 (alpha=0.77).

PCa knowledge. Prostate cancer knowledge is a continuous variable designed to assess participants’ overall knowledge of PCa. PCa knowledge, assessed at time one, was the sum of 12 questions within three PCa sub-scales:

controversy surrounding PCa testing and early detection options (four items), PCa epidemiology and risk (five items), and treatment side effects and effectiveness (three items). Each PCa knowledge question answered correctly was scored as 1, while each PCa knowledge question answered incorrectly was scored as 0. Possible scores ranged from 0 to 12. In addition to the total PCa knowledge score, the percentage of correct responses for each subscale was also analyzed.

Perceived value of PCa testing benefits. Perceived value of PCa testing benefits was a continuous variable that assessed the value men place on the potential benefits PCa testing. Due to the potential reactivity of the questions, this measure was administered at time two. Five items assessed the value men placed on the benefits of testing: early detection, increased treatment options of early detection, learning that you don't have PCa, peace of mind to family members, and reduced possibility of treatment side effects. Men were asked if each benefit made them interested in PCa testing. Response options were 0= "no", 1= "a little bit interested", and 2= "very interested". The possible score range was 0 to 10, a score of 10 indicated the highest reported benefits (alpha=0.82).

Perceived value of PCa testing risks. Perceived value of PCa testing risks was a continuous variable that assessed the value men place on the potential risks PCa testing. Due to the potential reactivity of the questions, this measure was administered at time two. Five items assed the value men placed on the risks of testing: inaccuracy of tests, unproven benefits of testing, inability

to know growth rate of cancer, sexual and urinary side effects, and consideration of co-morbidities. Men were asked if each risk made them less interested in PCa testing. Response options were 0= “no”, 1= “a little less interested”, and 2= “a lot less interested”. The possible score range was 0 to 10, a score of 10 indicated the highest reported risks (alpha=0.89).

Decisional conflict-social support subscale. The decisional conflict-social support subscale was a three item measure designed to assess the social influence of family and friends in PCa testing decisions (O'Connor, Jacobsen, & Stacey, 2002). Due to the potential reactivity of the questions, this measure was administered at time two. The original measure used a five point Likert type scale; however, because of the nature of the telephone interview, participants were instructed to answer 0= “no” and 1= “yes” regarding their agreement with each statement.

The internal consistency of the social support subscale was poor within this sample (alpha=0.28). The lowest acceptable level of inter-item reliability between variables measuring one concept/construct is 0.70 (DeVellis, 2003; Nunnally & Bernstein, 1994). This instrument was subsequently removed from analysis because unreliable and faulty instruments introduce error, and therefore any significant results would be meaningless (DeVellis, 2003; Nunnally & Bernstein, 1994).

Additional Variables. Demographic data was assessed through self-report at time one. Participants were asked their age, race, marital status, highest level of education completed, and immigrant status. The potential covariates in

this study were age, education, and employment status. Age was a continuous variable, while education and employment were categorical variables.

Outcome Variables. This study utilized three PSA testing outcomes: (a) self–report of PSA test between time one and time two interview, (b) medical claim of a PSA test between time one and time two interview, and (c) medical claim of a PSA test between time one and one year after the time one interview. The rationale to use both self-report and medical claim data was due to uncertainty around which should be the gold standard to obtain accurate reporting of a PSA test. Medical claim data are relatively accessible and presumed to have accurate information (Volk & Cass, 2002). However, the quality of the medical claim data can be effected by the misfiling of reports and test, the completeness and accuracy of documentation by physicians, and abstraction by reviewers (Newell, Girgis, Sanson-Fisher, & Savolainen, 1999). In contrast, patient self-report is cheaper, faster, and easier to obtain than medical claim data; however, quality of self-report is effected by bias related to patient recall of testing, patient's lack of knowledge of screening tests, poorly designed survey instruments, and untruthful responses due to social desirability (Newell, et al., 1999). The low levels of agreement between self-report and medical claim data in PSA testing (Ferrante, et al., 2008; Hall, et al., 2004; Newell, et al., 1999; Volk & Cass, 2002) indicate the two are very different PSA testing outcomes. Therefore, the moderators of the relation between PCa testing intention and testing outcomes may be different for self-report and medical claim data.

Self-report of a PSA test between time one and time two. Self-report of a PSA test between the time one and time two interviews was a dichotomous variable. At time two, participants were asked "Since the study began, have you gotten tested for PCa? If so what test did you have?" Men who self-reported PSA test were coded as 1; men who did not self-report a PSA test were coded as 0.

Medical claim of a PSA test between time one and time two. Medical claim of a PSA test between the time one and time two interviews was obtained through the 1199 SEIU billing claims system. The 1199 SEIU billing claims file was scanned weekly in between interviews for PSA testing codes to determine whether a PSA test medical claim had been submitted.

Medical claim of a PSA between time one and one year after time one. Medical claim of receipt a PSA test between time one interview and one year after the time one interview was obtained through the 1199 SEIU billing claims system. This outcome is necessary because some participants had a PSA test just prior to their time one interview. Consequently, those participants would not have been eligible to receive a PSA test before their time two interview. In order to allow all participants the "opportunity" to fulfill their PCa testing intention, the 1199 SEIU billing claims system was scanned weekly up to one year after the time one interview to determine whether a PSA test medical claim had been submitted.

Data Preparation

Univariate data analysis was conducted to examine accuracy of data entry via frequency distributions and means, missing data, outliers, and assumptions of normality and linearity. Frequencies and percentages were calculated for categorical variables, while means and standard deviations were calculated for continuous variables.

According to Tabachnick and Fidell (2007) missing data is one of the most important problems related to data analysis. Missing data has the potential to influence the statistical power of sample size, introduce bias, and influence the effect of the independent variable on the dependent variable. The pattern of missing data is more important than the amount of missing data. Patterns of missing data can be characterized as MCAR (missing completely at random), MAR (missing at random), and MNAR (missing not at random). The current dataset did not have missing data on predictor or outcome variables. As such, techniques to handle missing data were not applicable.

Screening for normality (i.e. skewness and kurtosis) in continuous variables was conducted statistically and graphically. The test of non-normality was the ratio of each statistic, skewness and kurtosis, to its standard error, which translates into a z score (Tabachnick & Fidell, 2007). Using this procedure, z scores of 2.0 or greater indicated non-normality. Normal probability plots were also examined to assess non-normality.

Efficacy to talk to a physician had significant non-normality based on kurtosis. According to Tabachnick and Fidell (2007), in samples with 200 or more

cases, statistically significant skewness or kurtosis often does not deviate enough from normality to make a substantive difference in analysis. Therefore, this variable was not transformed; however the variable was trichotomized into equal thirds. Based on the recommendation of Tabachnick and Fidell, (2007) variables with moderate skew and extreme univariate outliers received a square root transformation to bring variable distributions closer to normality. Univariate outliers were identified as those with z-scores of greater than 3.29 (Tabachnick & Fidell, 2007). The variables value of PCa testing benefits and value of PCa testing risks, were both square root transformed due to moderate skewness, kurtosis, non-normal probability plots, and univariate outliers (Tabachnick & Fidell, 2007).

Pearson and Spearman rank correlation coefficients were conducted to examine the relation among predictor and outcome variables. The correlation coefficients (greater than 0.70) and collinearity statistics (greater than 0.20) were used to detect multi-collinearity between pairs of variables, a problem known to cause misleading interpretations of results. To examine the relation between potential covariates on predictors and outcome variables, an unadjusted bivariate analysis was conducted. Covariates, variables that require adjustment in the statistical analysis, must be correlated with the outcome variable, the predictor variable and not correlated with each other (Lieberson, 1985; Tabachnick & Fidell, 2007). Age and education were not correlated with the outcome or predictor variable and were both correlated with employment. Employment was correlated with medical claim of a PSA test between time one and time two

interview only. Age, education, and employment were excluded from statistical analysis as covariates.

Statistical Analysis

Bivariate Analysis. Separate chi-square tests were used to assess the relation between PCa testing intention and three PSA testing outcomes (self-report of PSA testing between time one and time two interview, medical claim of a PSA test between time one and time two interview, and medical claim of a PSA test between time one and one year after time one interview). The temporal sequence of this longitudinal analysis sets up a plausible causal direction of effects. The chi-square test (X^2) is a non-parametric test and therefore does not assume normal distributions of the data. However, the chi-square test does assume: (a) a large sample size (small sample size opens exposure to Type II error) and adequate cell sizes, a minimum expected sample size of 87 with no more than 20% of the cells containing less than five expected observations in a 2 x 2 table; (b) each observation is independent of all others and there is only one observation per subject; and (c) normal distribution of deviations (observed minus expected values). All chi-square assumptions were met. The effect size (ES), reported as phi (ϕ) for 2 x 2 tables was calculated. An ES of .01, .03, and .05 is associated with small, medium, and large ES, respectively(Cohen, 1992).

Multivariate Analysis. To examine the independent main effects of social cognitive variables on the PCa testing intention and PSA testing relation, logistic regression was conducted. Main effects were examined in the absence of interaction effects. Variables that were significant predictors of PSA testing

outcomes, $p<.05$, were further examined in a reduced logistic regression model to ensure main effects of variables were not suppressed by other variables within the full regression model.

Logistic regression is commonly used when the independent variable includes either numerical or nominal measures and the dependent variable is dichotomous, a mandatory condition. A common goal of logistic regression modeling is to investigate the association between an independent and dependent variable, controlling for the possible effects of additional variables. Logistic regression can be used to determine the percent of variance in the outcome variable that is explained by the independent variable, assess interaction effects, and to understand the impact of the covariate control variables. Unlike linear regression, logistic regression does not assume linearity of the relation between independent and dependent variables and does not require normally distributed variables (Tabachnick & Fidell, 2007). The Cox and Snell R^2 (Cox & Snell, 1989) and Nagelkerke R^2 (Nagelkerke, 1991) are two descriptive measures of goodness of fit and are presented for each logistic regression analysis. The adequacy of a logistic regression model depends on the following assumptions (Tabachnick & Fidell, 2007):

***Ratio of cases to variables*.** Problems occur when there are too few cases relative to the number of predictor variables. Logistic regression may produce extremely large parameter estimates and standard errors. Cross-tabulations were used to ensure that all cell frequencies formed by the

independent variable contain at least one case and no more than 20% of the cells contain less than five observations.

Linearity in the logit. Logistic regression requires that the independent variable be linearly related to the logit of the dependent variable. Each logistic regression model met this assumption.

***Absence of multicollinearity*.** As independent variables increase in correlation with each other, the standard errors of the logit (effect) coefficients will become inflated. Multicollinearity was assessed in the data cleaning process.

***Absence of outliers*.** Outliers in the variable increase the likelihood that the model will have a poor fit. Variables with outliers were transformed during the data cleaning process, this transformation eliminated majority of the outliers.

Moderation Analysis. Moderation is a statistical concept that occurs when the relationship between two variables depends upon a third variable, see Figure 4. Moderation was tested by using the SPSS macro MODPROBE approach developed by Hayes and Matthes (2009). A moderated effect of the focal variable F on outcome variable Y was one in which its size or direction depended on the value of a third moderator (M) variable (Hayes & Matthes, 2009). The focal independent variable is the variable in which its effect on the dependent variable is thought to vary as a function of the moderator variable (Baron & Kenny, 1986).

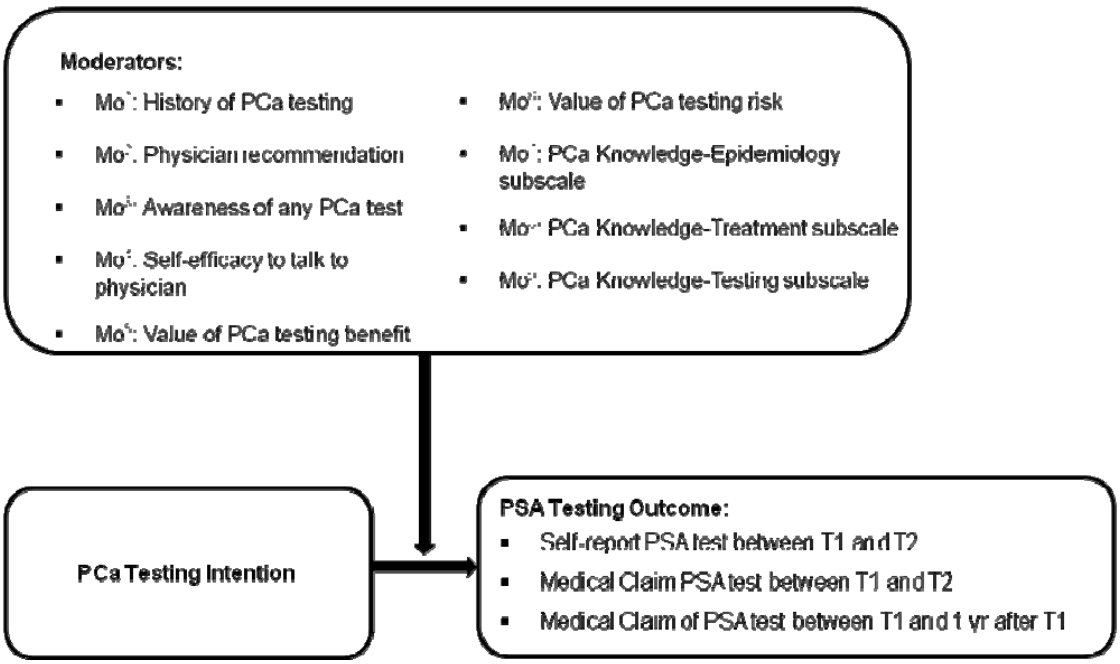

Figure 4. Schematic of Tested Moderation Model (on the basis of Baron & Kenny, 1986).

MODBROBE is a moderation technique for investigating single degree-of -freedom interactions in ordinary least squares (OLS). The technique estimates model coefficients and standard errors in a model that includes predictor variables or focal variables, the product of moderator and the focal variable, and any additional predictor variables to test dependent variable. In addition to estimating the models coefficients, MODBROBE produces tests on the conditional effect of the focal predictor on dependent variables at values of the moderator, also referred to as simple slopes. With the MODBROBE, conditional effects of focal variables were automatically calculated at the moderators sample mean as well as one standard deviation above and below the sample in which case it produced conditional effects for the focal variables at the two values of the moderating variable.

Hayes and Matthes (2009) argued that moderated effects reveal themselves statistically as an interaction between F (focal variable) and M (the moderator) in a mathematical model of Y. In OLS, moderation effects are tested by including the product of the focal independent variable and the moderator as an additional predictor in the model. When an interaction is found, it should be probed in order to better understand the conditions under which the relationship between the focal predictor and the outcome is strong versus weak, positive versus negative. The MODBROBE approach tests two models to detect if a moderation effect exists between the focal predictor variable and the dependent variable. While the first model includes the focal, moderator, and other predictor variables, the second model includes the interaction variable that is the product of focal and moderator variables. If an interaction effect is present, then the difference between the two R2 values should be statistically significant (Hayes & Matthes, 2009).

If an interaction effect was present, $p<0.05$, a data plot was examined for meaningfulness and interpretability. The plot was prepared by generating predicted values of PSA testing behavior using various levels of the moderator variable and PCa testing intention. If a significant interaction effect was not detected, but there were significant sub group differences $p<.05$, data plots were generated and examined for meaningfulness and interpretability.

CHAPTER 4

RESULTS

The primary purpose of this study was to determine the extent to which selected variables moderated the relation between intention to have a PCa test and PSA testing behavior.

Preliminary Analysis

Data from 216 black men were analyzed in this secondary data analysis. Table 4 summarizes the patient characteristics. The participant's ages ranged from 45 to 70, the average age was 54.8 years (SD=6.3). Majority of the men were older than 55 years of age, employed, currently married, had at least a high school education, reported no family history of PCa and were immigrants. Approximately half of the immigrants (51%) were from Jamaica or Haiti. This is roughly reflective of the New York City area, in which black Caribbean immigrants compose 42% of the black population in 2005 (Kent, 2007). Men of Hispanic origin comprised 7.4% of the sample.

Table 5 presents the means and standard deviations of the continuous variables in the study. PCa knowledge in the sample was fairly low, mean percentage correct was 54%, SD= 0.19. Among the PCa knowledge subscales, treatment side effects had the highest percentage of questions answered correctly (M=66.2; SD=0.31), whereas knowledge of the PCa testing controversy had the lowest percentage of questions answered correctly (M=0.34; SD=0.23). The low number of PCa testing controversy questions answered correctly indicated this sample was not aware of the debate surrounding the PSA test.

The relative value men placed on the potential benefits of PCa testing was high, while the value of PCa testing risk was low. The majority of the sample, 92%, believed the value of PCa testing benefits outweighed the value of the PCa testing risks.

Table 4. Participant Demographics *(N=216)*

Characteristic	n	(%)
Age		
45-49	52	(24.1)
50-54	64	(29.6)
55+	100	(46.3)
Immigrant	181	(83.8)
Education		
Less than High School	66	(30.6)
High School Grad or Some College	121	(56.1)
College graduate or beyond	29	(13.4)
Married or Living with Partner	176	(81.5)
Employed	188	(87.0)

Table 5. Means and Standard Deviations of Continuous Variables *(N=216)*

Variable	Min	Max	Mean	SD
Total PCa knowledge, % correct	0	0.92	0.54	0.19
PCa Knowledge- Epidemiology, % correct	0	1.00	0.62	0.27
PCa Knowledge- Treatment, % correct	0	1.00	0.66	0.31
PCa Knowledge- Testing controversy, % correct	0	1.00	0.34	0.23
Perceived Value of PCa Testing Benefits	1	3.32	1.32	0.57
Perceived Value of PCa Testing Risks	0	3.16	0.67	0.98

Table 6 presents the frequencies and percentages of categorical variables within this study. The majority of the sample was aware of tests for PCa, however only 33% of men have had a physician recommend PCa testing. The low rate of physician recommendation to test indicated SDM between physician and patient may not occur in this sample. Men were evenly distributed in their self-efficacy to talk to a physician about PCa, roughly a third of the sample in each self-efficacy category. Approximately 55% of the sample had a self-reported history PCa testing. Among the men who self-reported a history of testing, 46% specifically mentioned a past PSA test and 42% specifically mentioned a past DRE. Within the entire sample only 38% men self-reported having both a PSA test and a DRE in the past.

PCa testing intention at time one was the primary predictor variable. At time one 60% of the men had a positive intention to have a PCa test. Intention was also asked at time two to verify the stability of PCa testing intention in this sample. At time two, PCa testing intention had increased to 81% of the sample. Intention to have a PCa test at time one was significantly and positively related to intention to have a PCa test at time two, X^2 (1, n=216) = 7.19, p<.01. Self-report of any PCa test between the time one and time two interview was low at 31%. Majority of men who stated they had a test for PCa were able to specifically mention having a PSA test between their interviews. Medical claim of a PSA test between the time one and time two interviews was 32.0%. Extending the PSA testing medical claim to one year after the time one interview, 48% of the men had a medical claim.

Table 6. Frequency and Percentages of Categorical Variables *(N=216)*

Variable	N	(%)
Positive Intention to Test	127	(58.8)
Awareness of PCa Tests	146	(67.6)
Physician Recommend PCa Testing	71	(32.9)
History of PCa Testing	121	(56.0)
History of DRE[a]	51	(23.6)
History of PSA Testing[a]	56	(26.0)
Efficacy to Talk to Physician about PCa		
Low	68	(31.5)
Medium	82	(38.0)
High	66	(30.6)
Self-Report of any PCa Test between T1 and T2	66	(30.6)
Self-Report of PSA Test between T1 and T2[b]	43	(19.9)
Medical Claim of a PSA Test between T1 and T2	69	(31.9)
Medical Claim of a PSA Test between T1 and 1 yr after T1	103	(47.7)

Note. T1= Time 1; T2=Time 2; PCa=Prostate Cancer; PSA= Prostate Specific Antigen; DRE=Digital Rectal Exam; yr=Year

[a] Percentages of self-report of ever had a PSA test or a DRE are for the entire sample and are not a subset of participants that self-report ever having any PCa test.

[b] Percentages for self-report of a PSA test between time one and time two are for the entire sample and are not a subset those who self-report having any PCa test between time one and time two.

The relation between self-report of a PSA test between time one and time two interview and medical claim of a PSA test between time one and time two interview was decomposed into a two by two table, see Table 7.

Table 7. Chi-Square of Self-report of a PSA Test and Medical Claim of a PSA Test *(N=216)*

	Medical Claim of PSA Test between T1 and T2	
	Yes	No
Self-report of PSA Test between T1 and T2	25 (11.5%)	18 (8.33%)
No Self-report of PSA Test between T1 and T2	44 (20.4%)	129 (59.7%)

Note. T1=Time 1; T2=Time 2; PSA= Prostate Specific Antigen.
X^2 (1, n=216) = 15.48, p<.001

There was a significant association between self-report of a PSA test between the time one and time two interview and medical claim of a PSA test between the time one and time two interview, χ^2 (1, N=216) = 15.48, p<.001. Although there was a positive and significant association, discrepancies between the two testing outcomes were noticeable. Among the men with a medical claim of PSA testing, 44 men (64.0%) did not self-report a PSA test. It appears that uninformed opportunistic PSA testing is occurring. In addition, there are discrepancies in the other direction. Among the men with a self-report of PSA testing, 18 men (42.0%) did not have a medical claim of a PSA test.

The discrepancy between self-report and medical claim is further evidence that gold standard for receipt of PSA testing is unclear.

Correlations were computed to examine the relation between social cognitive variables. As expected, the three PSA testing outcomes were statistically correlated ranging from r=0.24 to r=0.72, p<.01. Total PCa knowledge was highly correlated with its subscales, ranging from r=0.63 to r=0.78, p<.01. To avoid multi-collinearity problems associated with variables that represent the same general construct, total PCa knowledge and its three subscales were not considered together in the same models in order

As shown in Table 8, PCa testing intention was positively correlated with history of PCa testing (r= 0.17, p<.05), physician recommendation to test (r= 0.25, p<.01), awareness of PCa tests (r= 0.22, p<.01), value of PSA testing benefit (r= 0.31, p<.01), and PCa knowledge controversy subscale (r= 0.14, p<.05). PCa testing intention was negatively correlated with value of PSA testing risk (r= -0.15, p<.05).

Self-report of a PSA test between the time one and time two interviews was positively correlated with past history of testing (r=0.16, p<.05), physician recommendation to test (r=0.15, p<.05), awareness of PCa tests (r=0.22, p<.01), self-efficacy to talk to a physician (r=0.18, p<.05), PCa knowledge epidemiology subscale (r=0.20, p<.01), and PCa knowledge treatment subscale (r=0.17, p<.01). Medical claim of a PSA test between time one and time two interview was positively correlated with physician recommendation to test (r=0.16, p<.05) and value of PSA testing benefit (r=0.15, p<.05). Medical claim of a PSA test between

time one and one year after the time interview was positively correlated with history of PCa testing (r=0.21, p<.01) and value of PSA testing benefit (r= 0.16, p<.05).

Table 8. Zero order correlations between social cognitive variables on PCa intention and PSA testing

	PCa Testing Intention	Self-Report of PSA test between T1 and T2	Medical Claim of PSA test between T1 and T2	Medical Claim of PSA test between T1 and 1 yr after T1
History of PCa Testing	.17*	.16*	.05	.21**
Physician Recommend PCa testing	.25**	.15*	.16*	.12
Awareness of PCa tests	.22**	.22**	.05	.13
Self-Efficacy to Talk to Physician about PCa	.09	.18**	.07	.08
Perceived Value of PCa Testing Benefits	.31**	.13	.15*	.16*
Perceived Value of PCa Testing Risks	-.15*	-.12	-.08	-.11
PCa Knowledge-Epidemiology	.10	.20**	.03	.11
PCa Knowledge-Treatment	-.04	.17*	.08	.08
PCa Knowledge-Testing controversy	.14*	.01	.11	.10

Note. PCa=Prostate Cancer; PSA= Prostate Specific Antigen; T1=time one; T2= time two.
*p<.05, two-tailed; **p<.01, two-tailed

Research Aim One

Chi-square analysis indicated a significant association between PCa testing intention and PSA testing outcomes. As shown in Table 9, PCa testing intention and self-report a PSA test between time one and time two interview association was significant, χ^2 (1, N=216) = 6.24, p<.05. Roughly 48% of men had an inconsistent testing intention and PSA testing behavior, 44% were inclined abstainers and 5% were disinclined actors.

Table 9. Chi-Square of PCa Testing Intention and Self-report of a PSA Test between Time One and Time Two *(N=216)*

	PCa Testing Intention	
	Yes	No
Self-report of PSA test between T1 and T2	33 (15.3%)	10 (4.6%)
No Self-report of PSA test between T1 and T2	94 (43.5%)	79 (36.6%)

Note. T1=Time 1; T2=Time 2; PCa= Prostate Cancer; PSA= Prostate Specific Antigen.
X^2 (1, n=216) = 6.24, p<.05, phi=.18

As shown in Table 10, the PCa testing intention and medical claim of a PSA test between time one and time two association was significant, χ^2 (1, N=216) = 8.67, p<.01. Roughly 44% of the men had an inconsistent PCa testing intention and PSA testing behavior, 35% were inclined abstainers and 8% were disinclined actors.

Table 10. Chi-Square of PCa Testing Intention and Medical Claim of a PSA Test between Time One and Time Two (N=216)

	PCa Testing Intention	
	Yes	No
Medical Claim of PSA test between T1 and T2	51 (23.6%)	18 (8.3%)
No Medical Claim of PSA test between T1 and T2	76 (35.2%)	71 (33.0%)

Note. T1=Time 1; T2=Time 2; PCa= Prostate Cancer; PSA= Prostate Specific Antigen. X^2 (1, n=216) = 8.67, p<.01, phi=.21

As shown in Table 11, the PCa testing intention and medical claim between time one interview and one year after their time one interview association was significant, χ^2 (1, N=216) = 6.12, p<.05. Roughly 42% of the men had an inconsistent PCa testing intention and PSA testing behavior, 26% were inclined abstainers and 15% were disinclined actors.

Table 11. Chi-Square of PCa Testing Intention and Medical Claim of a PSA Test between Time One and One Year after Time One (N=216)

	PCa Testing Intention	
	Yes	No
Medical Claim of PSA test between T1 and one year after T1	70 (32.4%)	33 (15.3%)
No Medical Claim of PSA test between T1 and one year after T1	57 (26.4%)	56 (26.0%)

Note. T1=Time 1; T2=Time 2; PCa= Prostate Cancer; PSA= Prostate Specific Antigen. X^2 (1, n=216) = 6.24, p<.05, phi=.18

Research Aim Two

Self-report of a PSA Test between Time One and Time Two*.* A test of the full model that included all of the social cognitive variables along with testing intention was statistically significant, χ^2 (10, N=216) = 31.22, p<.001. This indicated that collectively, social cognitive variables and testing intention reliably distinguished between men who self-reported a PSA test and those who did not. The model had an overall classification success rate of 81.0%. The variance ranged between 13.5% (Cox and Snell R^2) and 21.3% (Nagelkerke R^2). The contribution of individual predictors is shown in Table 12. Unfortunately, when controlling for the effects of all of the other variables in the model, none of the social cognitive variables had significant independent main effects on self-report a PSA test between time one and time two.

Medical Claim of a PSA Test between Time One and Time Two. A test of the full model that included all of the social cognitive variables along with testing intention was statistically significant, χ^2 (10, N=216) = 15.52, p<.05. This indicated that collectively, social cognitive variables and testing intention reliably distinguished between men who had a medical claim for a PSA test between time one and time two and those who did not. The model had an overall classification success rate of 69.4%. The variance accounted for was low, between 6.9% (Cox and Snell R^2) and 9.7% (Nagelkerke R^2). The contribution of individual predictors to the model is shown in Table 13.

Table 12. Logistic Regression of Main Effects Predicting Self-report of a PSA Test between Time One and Time Two (N=216)

Variable	*B*	SE	OR	Wald	95% CI
Step 1[a]					
Positive Intention	1.03**	.39	2.77	6.77	1.29, 6.00
Step 2[b]					
Positive Intention	.74[†]	.44	2.10	2.86	.88, 4.96
Awareness of PCa Tests	1.03[†]	.54	2.79	3.59	.97, 8.06
History of PCa Testing	.21	.42	1.23	.25	.54, 2.82
Efficacy to Talk to Physician	.36	.25	1.44	2.06	.88, 2.31
PCa Knowledge - Epidemiology	1.16	.81	3.19	2.05	.65, 15.58
PCa Knowledge -Treatment	1.08	.67	2.93	2.58	.79, 10.87
PCa Knowledge - Testing Controversy	-.98	.87	.38	1.25	.07, 2.09
Physician Recommend PCa Testing	.32	.39	1.38	.65	.64, 2.97
Perceived Value of PSA Testing Benefits	-.26	.46	.77	.31	.31, 1.91
Perceived Value of PSA Testing Risks	-.08	.23	.92	.13	.59, 1.44

Note. PCa= Prostate Cancer; PSA=Prostate Specific Antigen; Time 1=time one; Time 2=time two; B=beta; SE=standard error; OR=odds ratio; CI= confidence interval. Dependent variable = Self-report PSA test between time one and time two interview; 0=no self-report, 1= self-report.
[a]$X^2(1, N=216)=7.55$**; [b]$X^2(10, N=216)=31.22$**
[†] p<.10, *p<.05, **p<.01.

Table 13. Logistic Regression of Main Effects Predicting Medical Claim of a PSA Test between Time One and Time Two (N=216)

Variable	*B*	SE	OR	Wald	95% CI
Step 1[a]					
Positive Intention	.97**	.32	2.65	9.25	1.41, 5.96
Step 2[b]					
Positive Intention	.78*	.35	2.17	4.91	1.09, 4.31
Awareness of PCa Tests	-.15	.37	.86	.17	.42, 1.77
History of PCa Testing	-.06	.34	.94	.03	.48, 1.84
Efficacy to Talk to Physician	.11	.20	1.12	.32	.76, 1.66
PCa Knowledge-Epidemiology	-.34	.62	.71	.29	.21, 2.42
PCa Knowledge-Treatment	.46	.54	1.59	.75	.57, 4.55
PCa Knowledge- Testing Controversy	.53	.73	1.70	.53	.41, 7.02
Physician Recommend PCa Testing	.40	.33	1.49	1.44	.78, 2.87
Perceived Value of PSA Testing Benefits	-.45	.35	.64	1.66	.32, 1.26
Perceived Value of PSA Testing Risks	-.02	.17	.98	.01	.71, 1.37

Note. PCa= Prostate Cancer; PSA=Prostate Specific Antigen; Time 1=time one; Time 2=time two; B=beta; SE=standard error; OR=odds ratio; CI= confidence interval. Dependent variable = Medical Claim of PSA test between time one and time two interview; 0=no medical claim, 1= medical claim.
[a]$X^2(1, N=216)=9.90$ **; [b]$X^2(11, N=216)=15.52$*
*p<.05, **p<.01.

Unfortunately, when controlling for the effects of all of the other variables in the model, none of the social cognitive variables had significant independent main effects on medical claim of a PSA test between time one and time two interviews. PCa testing intention remained a significant predictor of medical claim of a PSA test between time one and time two interview, *b*=0.78, *SE*=0.35, *p*<.05.

Medical Claim of PSA Test between Time One and One Year after Time One*.* A test of the full model that included all of the social cognitive variables along with testing intention was statistically significant χ^2 (10, N=216) = 18.07, p<.05. This indicated that collectively, social cognitive variables and testing intention reliably distinguished between men who had a medical claim of a PSA test between time one and one year after the time one interview and those who did not. The model had an overall classification success rate of 62.0%. The variance ranged between 8.0% (Cox and Snell R^2) and 10.7% (Nagelkerke R^2). The contribution of individual predictors to the model is shown in Table 14. When controlling for the effects of all of the other variables in the model, history of PCa testing was the only social cognitive variable that had an independent main effect on medical claim of a PSA test between the time one interview and one year after the interview, *b*=.65, *SE*= 0.31, OR=1.92, *p*<.05.

Table 14. Logistic Regression of Main Effects Predicting Medical Claim of a PSA Test between Time One and One Year after Time One (N=216)

Variable	*B*	SE	OR	Wald	95% CI
Step 1[a]					
Positive Intention	.73**	.28	2.08	6.74	1.20, 3.63
Step 2[b]					
Positive Intention	.47	.32	1.60	2.21	.86, 2.98
Awareness of PCa Tests	.04	.34	1.04	.01	.54, 2.01
History of PCa Testing	.65*	.31	1.92	4.32	1.04, 3.53
Efficacy to Talk to Physician	.06	.19	1.07	.12	.74, 1.54
PCa Knowledge-Epidemiology	.30	.58	1.34	.26	.43, 4.18
PCa Knowledge-Treatment	.20	.50	1.22	.15	.46, 3.26
PCa Knowledge-Testing Controversy	.42	.68	1.52	.38	.40, 5.72
Physician Recommend PCa testing	.17	.32	1.18	.27	.63, 2.22
Perceived Value of PSA Testing Benefits	-.27	.29	.76	.86	.43, 1.35
Perceived Value of PSA Testing Risks	-.01	.16	.99	.00	.73, 1.34

Note. PCa= Prostate Cancer; PSA=Prostate Specific Antigen; Time 1=time one; Time 2=time two; B=beta; SE=standard error; OR=odds ratio; CI= confidence interval. Dependent variable = Medical Claim of a PSA test up to one year after time one interview; 0=no medical claim, 1= medical claim

[a]$X^2(1, N=216)=6.99$**; [b]$X^2(2, N=216)=18.07$*

*p<.05, **p<.01.

To confirm that history of PCa testing was a significant predictor, additional regressions were conducted. A model that contained testing intention and all of the social cognitive variables except history of PCa testing, was not statistically significant χ^2 (7, N=216) = 13.78, p>.05. In addition, a model that contained only testing intention and history of PCa testing was a statistically significant, χ^2 (2, N=216) = 14.45, p<.001. The results of this sub analysis confirmed history of PCa testing had a main effect on medical claim of PSA testing between the time one and one year after the time one interview.

Research Aim Three

Self-report of a PSA Test between Time One and Time Two. Social cognitive variables (PCa knowledge, self-efficacy to talk to a physician, history of PCa testing, physician recommendation to test, value of PCa testing risk, value of PCa testing benefit, and awareness of PCa tests) did not moderate the relation between PCa testing intention and self-report of a PSA test. However, additional analysis revealed significant differences among groups of men within attributes of select social cognitive variables.

As shown in Figure 5, there were significant differences among men with a history of PCa testing, *b*=1.27, *SE*=0.58, *p*<.05. Men who had a history of PCa testing and had a positive PCa testing intention were more likely to self-report a PSA test compared to men who had history of PCa testing and had a negative PCa testing intention.

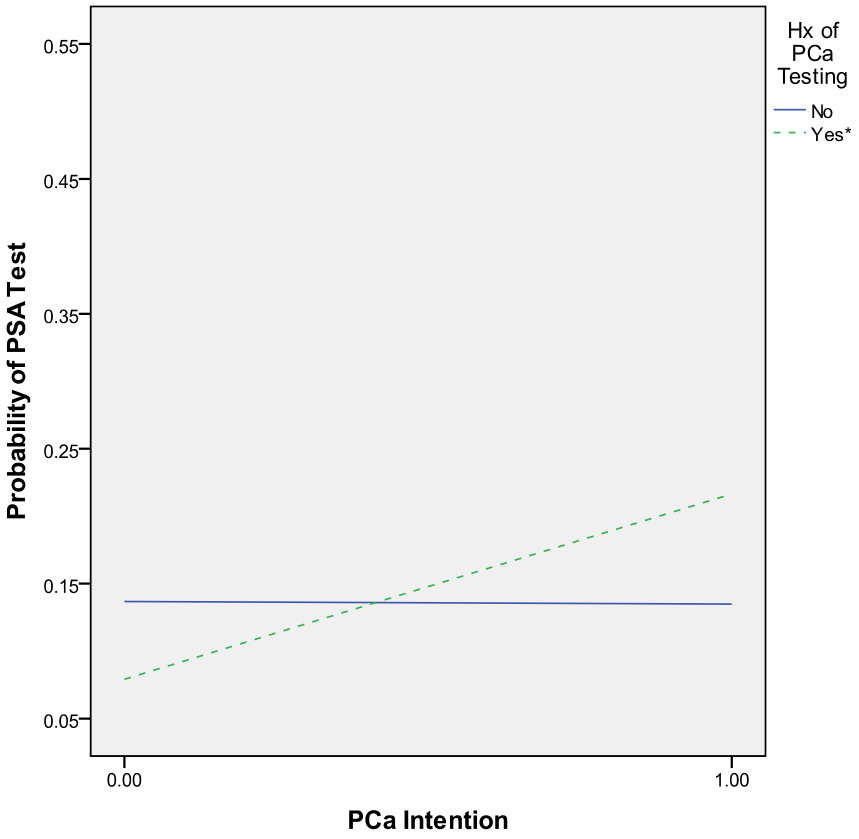

Figure 5. History of PCa Testing on the Relation between PCa Testing Intention and Self-Report of a PSA Test between Time One and Time Two.
0=No, 1=Yes, Hx=History, PCa= Prostate Cancer, PSA= Prostate Specific Antigen.
*p<.05

As shown in Figure 6, there were significant differences among men who had a low value of PCa testing risk, b=1.38, SE=0.62, p<.05. Men who perceived a low value of PCa testing risk and had a positive PCa testing intention were more likely to self-report a PSA test compared to men who perceived a low value of PCa testing risk and had a negative PCa testing intention.

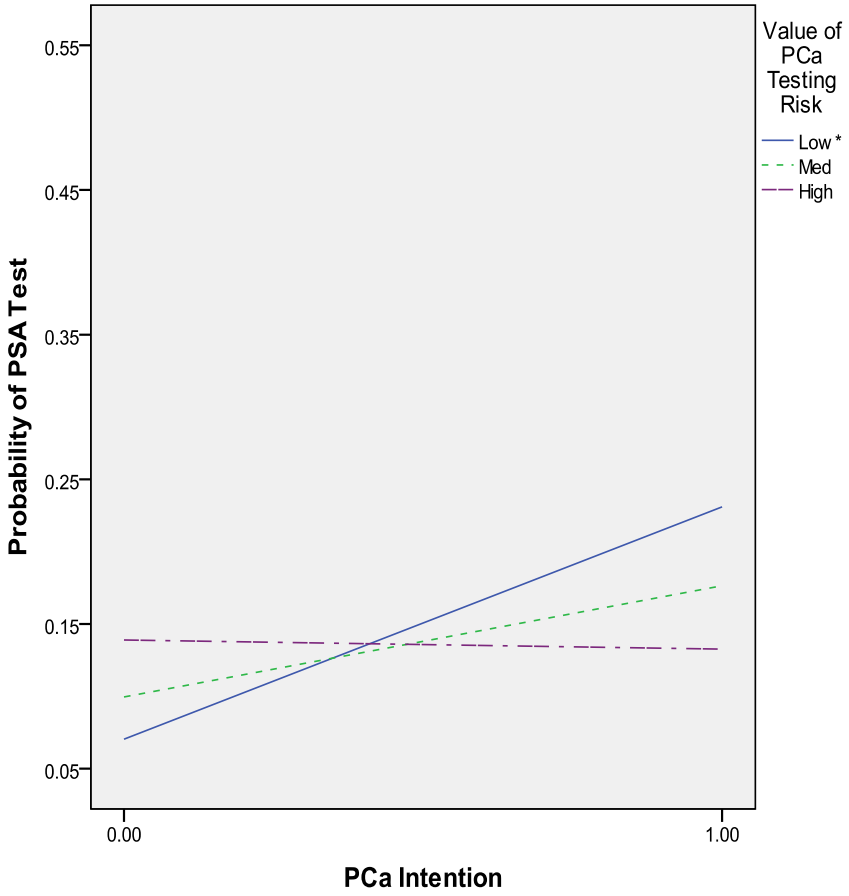

Figure 6. Perceived Value of PCa Testing Risks on the Relation between PCa Testing Intention and Self-Report of a PSA Test between Time One and Time Two. 0=No, 1=Yes, PCa= Prostate Cancer, PSA= Prostate Specific Antigen.
*p<.05

As shown in Figure 7, there were significant differences among men who answered a high percentage of PCa-knowledge epidemiology questions correctly, b=1.27, SE=0.58, p<.05. Men who answered a high percentage of PCa-knowledge epidemiology subscale questions correctly and had a positive PCa testing intention were more likely to self-report a PSA test compared to men who answered a high percentage of PCa-knowledge epidemiology questions correctly and had a negative PCa testing intention.

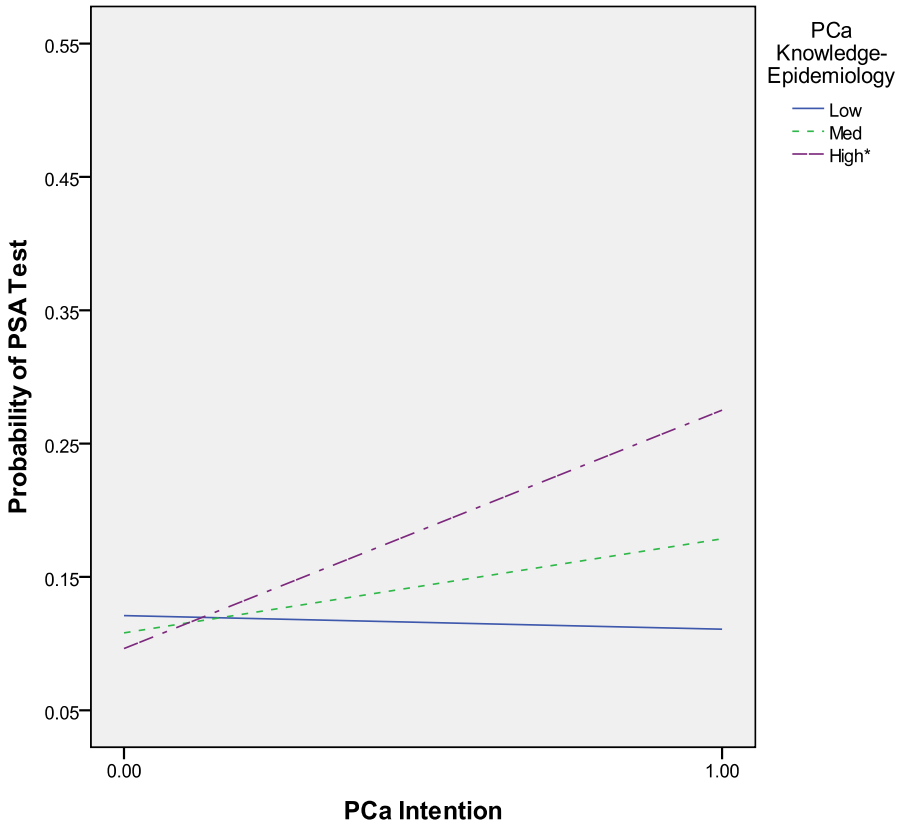

Figure 7. PCa Knowledge-Epidemiology on the Relation between PCa Testing Intention and Self-Report of a PSA Test between Time One and Time Two.
0=No, 1=Yes, PCa= Prostate Cancer, PSA= Prostate Specific Antigen.
*p<.05

As shown in Figure 8, there were significant differences among men who answered a low percentage of PCa-knowledge testing controversy questions correctly, *b*=1.31, *SE*=0.67, *p*<.05. Men who answered a low percentage of PCa-knowledge testing controversy questions correctly and had a positive PCa testing intention were more likely to self-report a PSA test compared to men who answered a low percentage of PCa-knowledge testing controversy questions correctly and had a negative PCa testing intention.

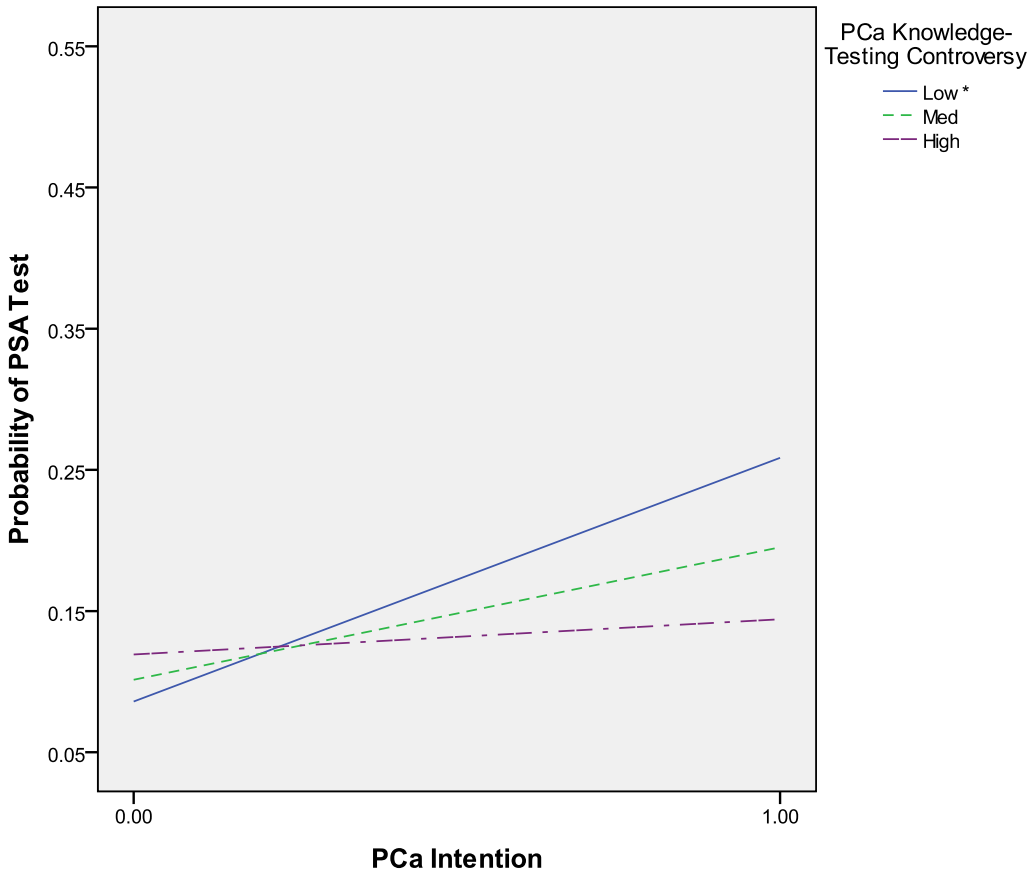

Figure 8. PCa Knowledge- Testing on the Relation between PCa Testing Intention and Self-Report of a PSA Test between Time One and Time Two. 0=No, 1=Yes, PCa= Prostate Cancer, PSA= Prostate Specific Antigen. *p<.05

Medical Claim of a PSA Test between Time One and Time Two. There was evidence of significant interaction effect between PCa intention and PCa knowledge PSA testing controversy subscale on medical claim of a PSA test between time one and time two interview, *b*=-3.75, *SE*=1.67, *p*=.02, OR=.02, Wald=5.04. As shown in Figure 9, men who answered a low percentage of PCa knowledge testing controversy questions correctly and had positive PCa testing intention were more likely to have a medical claim of a PSA test between

the time one and time two interview compared to men who answered a low percentage of PCa knowledge controversy questions correctly and had a negative PCa testing intention. However, among men who answered at least 50% of the questions correct, PCa testing intention had no effect on their time two medical claim of a PSA test between the time one and time two interviews.

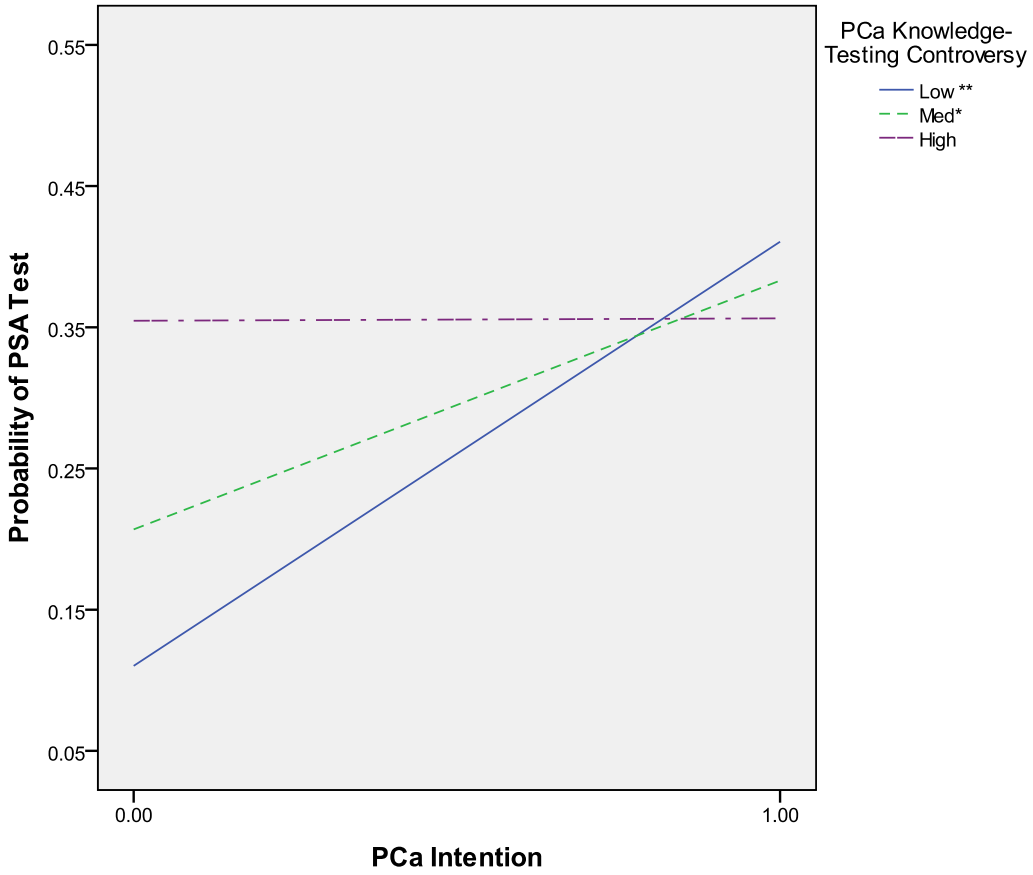

Figure 9. Significant Interaction of PCa Knowledge- Testing on the Relation between PCa Testing Intention and Medical Claim of a PSA Test between Time One and Time Two.
0=No, 1=Yes, PCa= Prostate Cancer, PSA= Prostate Specific Antigen. *p<.05, **p<.01

Additional analysis revealed significant differences among groups of men within the attributes of select social cognitive variables. As shown in Figure 10, there were significant differences among men with a history of PCa testing, b=0.84, SE=0.41, p<.05. Men who had a history of PCa testing and a positive PCa testing intention were more likely to have a medical claim of a PSA test compared to men who had history of PCa testing and a negative PCa testing intention.

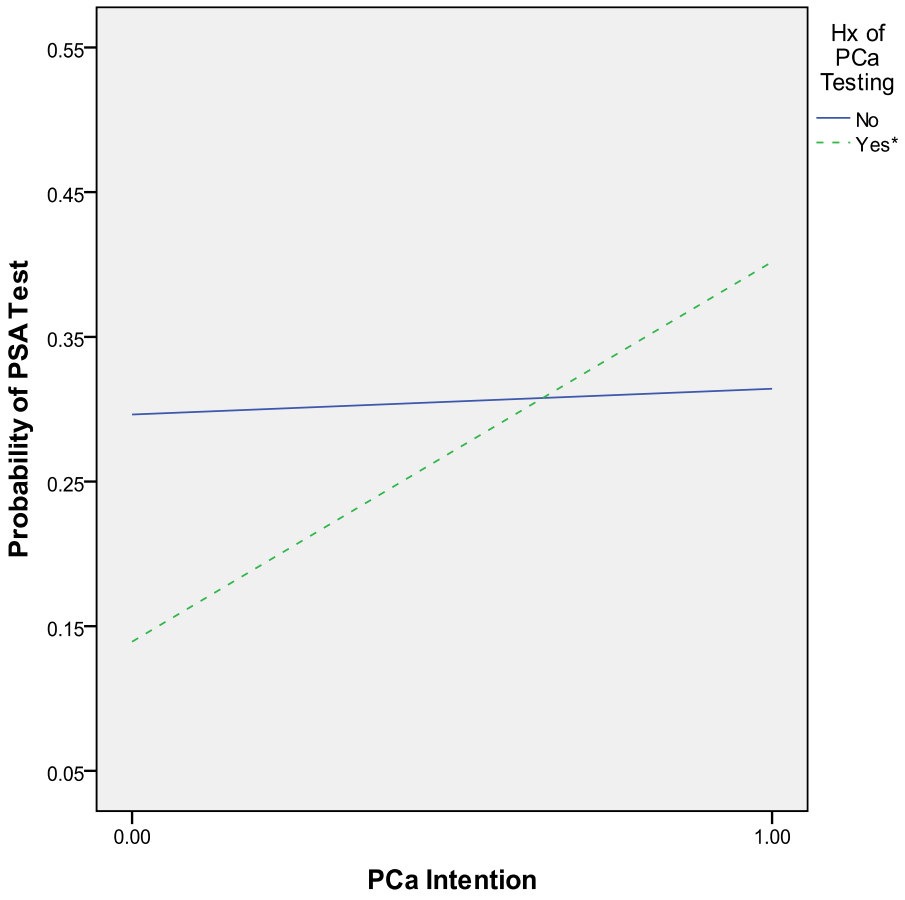

Figure 10. History of PCa Testing on the Relation between PCa Testing Intention and Medical Claim of a PSA Test between Time One and Time Two.
0=No, 1=Yes, Hx=History, PCa= Prostate Cancer, PSA= Prostate Specific Antigen.
*p<.05.

As shown in Figure 11, there were significant differences among men without a physician recommendation to have a PCa test, *b*=0.83, *SE*=0.41, *p*<.05. Men who did not have a physician recommendation and had a positive PCa testing intention were more likely to have a medical claim of a PSA test compared to men who did not have a physician recommendation and a negative PCa testing intention.

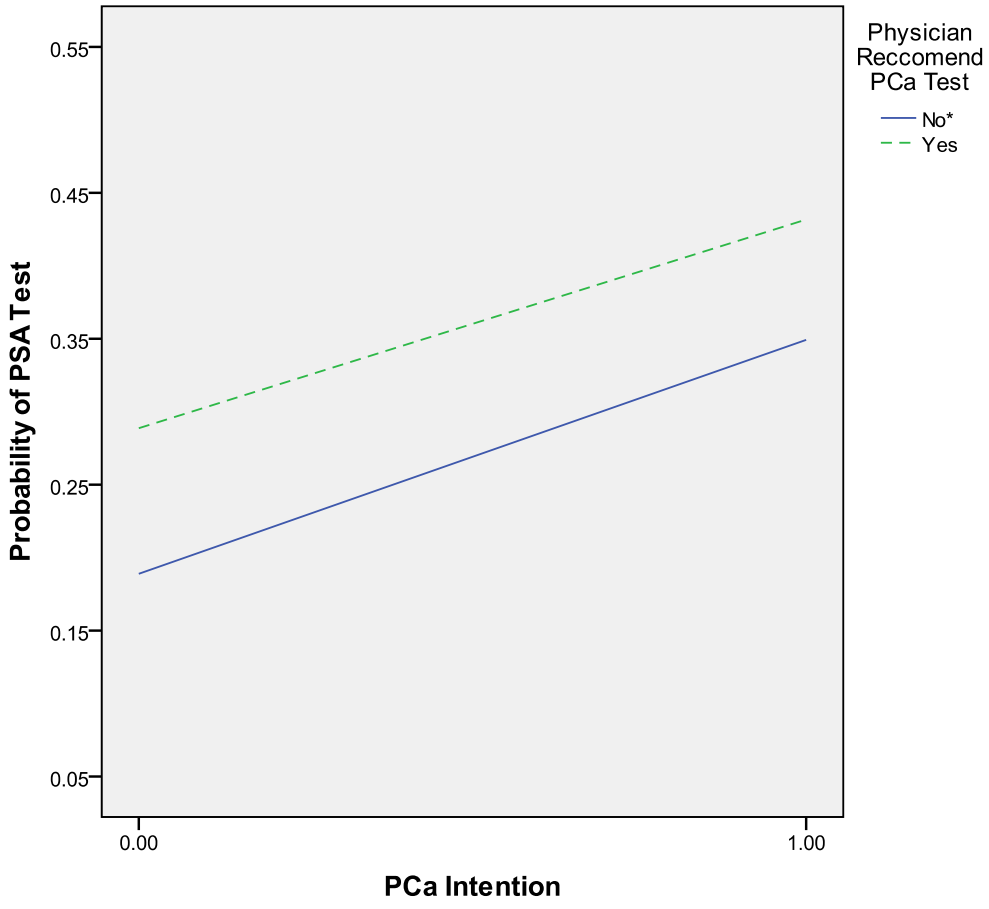

Figure 11. Physician Recommendation to Test on the Relation between PCa Testing Intention and Medical Claim of a PSA Test between Time One and Time Two. 0=No, 1=Yes, PCa= Prostate Cancer, PSA= Prostate Specific Antigen. *p<.05

As shown in Figure 12, there were significant differences among men who had both medium (b=0.81, SE=0.35, p<.05) and high (b=1.17, SE=0.56, p<.05) levels of value of PCa testing benefits. Men who had both medium and high levels of value of PCa testing benefits and had a positive PCa testing intention were more likely to have a medical claim of a PSA test between time one and time two compared to men who had both medium and high levels of value of PCa testing benefits and had a negative PCa testing intention.

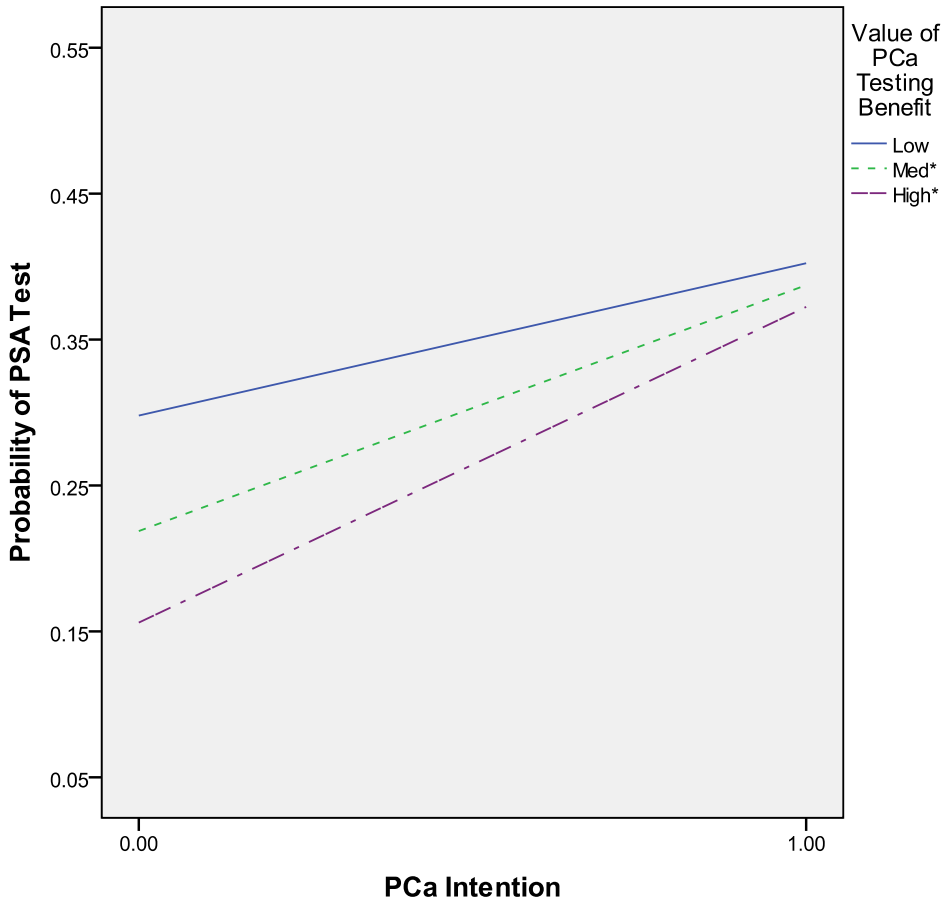

Figure 12. Perceived Value of PCa Testing Benefit on the Relation between PCa Testing Intention and Medical Claim of a PSA Test between Time One and Time Two.
0=No, 1=Yes, PCa= Prostate Cancer, PSA= Prostate Specific Antigen. *p<.05

As shown in Figure 13, there were significant differences among men who had both low (b=1.23, SE=0.49, p<.05) and medium (b=0.78, SE=0.36, p<.05) levels of value of PCa testing risks. Men who had both low and medium levels of value of PCa testing risks and had a positive PCa testing intention were more likely to have a medical claim of a PSA test between time one and time two compared to men who had both low and medium levels of value of PCa testing risks and had a negative PCa testing intention.

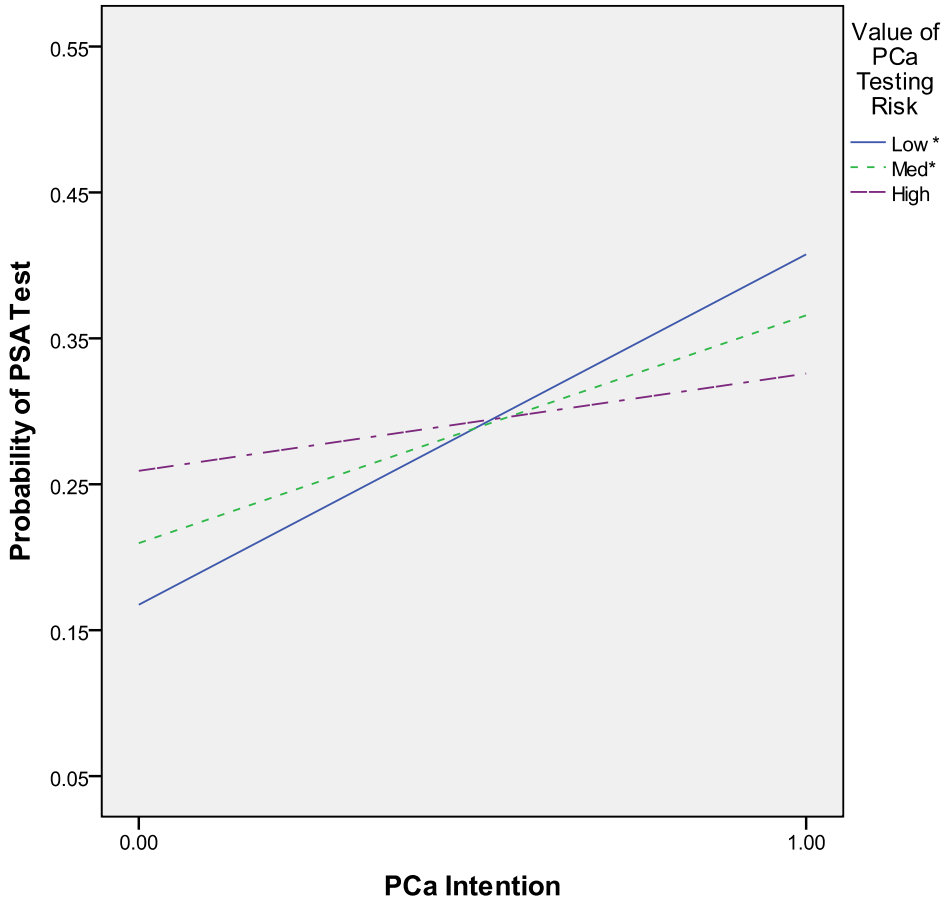

Figure 13. Perceived Value of PCa Testing Risk on the Relation between PCa Testing Intention and Medical Claim of a PSA Test between Time One and Time Two. 0=No, 1=Yes, PCa= Prostate Cancer, PSA= Prostate Specific Antigen. *p<.05

As shown in Figure 14, there were significant differences among men who answered a medium (b=0.77, SE=0.36, p<.05) to high (b=1.16, SE=0.50, p<.05) percentage of PCa-knowledge epidemiology questions correctly. Men who answered either a medium or high percentage of PCa-knowledge epidemiology subscale questions correctly and had a positive PCa testing intention were more likely to have a medical claim of a PSA test between the time one and time two interview compared to men who answered a medium to high percentage of PCa-knowledge epidemiology questions correctly and had a negative PCa testing intention.

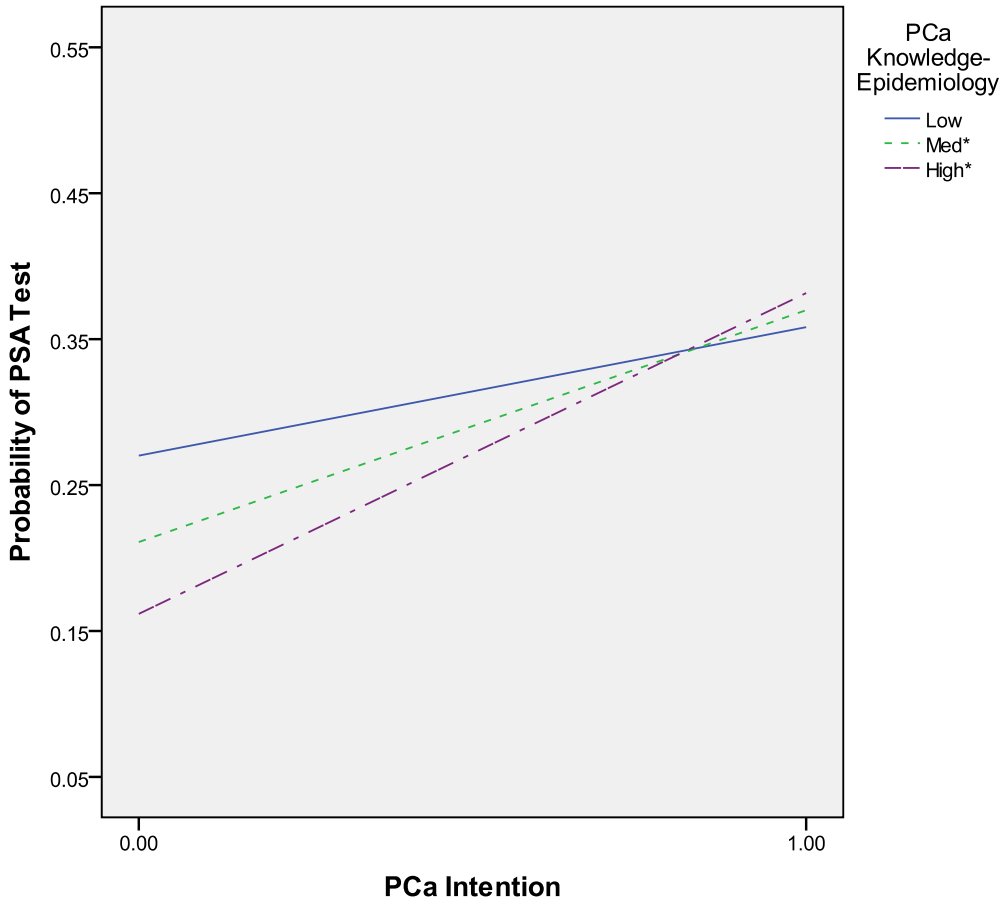

Figure 14. PCa Knowledge-Epidemiology on the Relation between PCa Testing Intention and Medical Claim of a PSA Test between Time One and Time Two.
0=No, 1=Yes, PCa= Prostate Cancer, PSA= Prostate Specific Antigen.*p<.05

As shown in Figure 15, there were significant differences among men who answered a high percentage of PCa-knowledge treatment questions correctly, b=1.20, SE=0.47, p<.05. Men who answered a high percentage of PCa-knowledge treatment subscale questions correctly and had a positive PCa testing intention were more likely to have a medical claim of a PSA test between the time one and time two interview compared to men who answered a high percentage of PCa-knowledge treatment questions correctly and had a negative PCa testing intention.

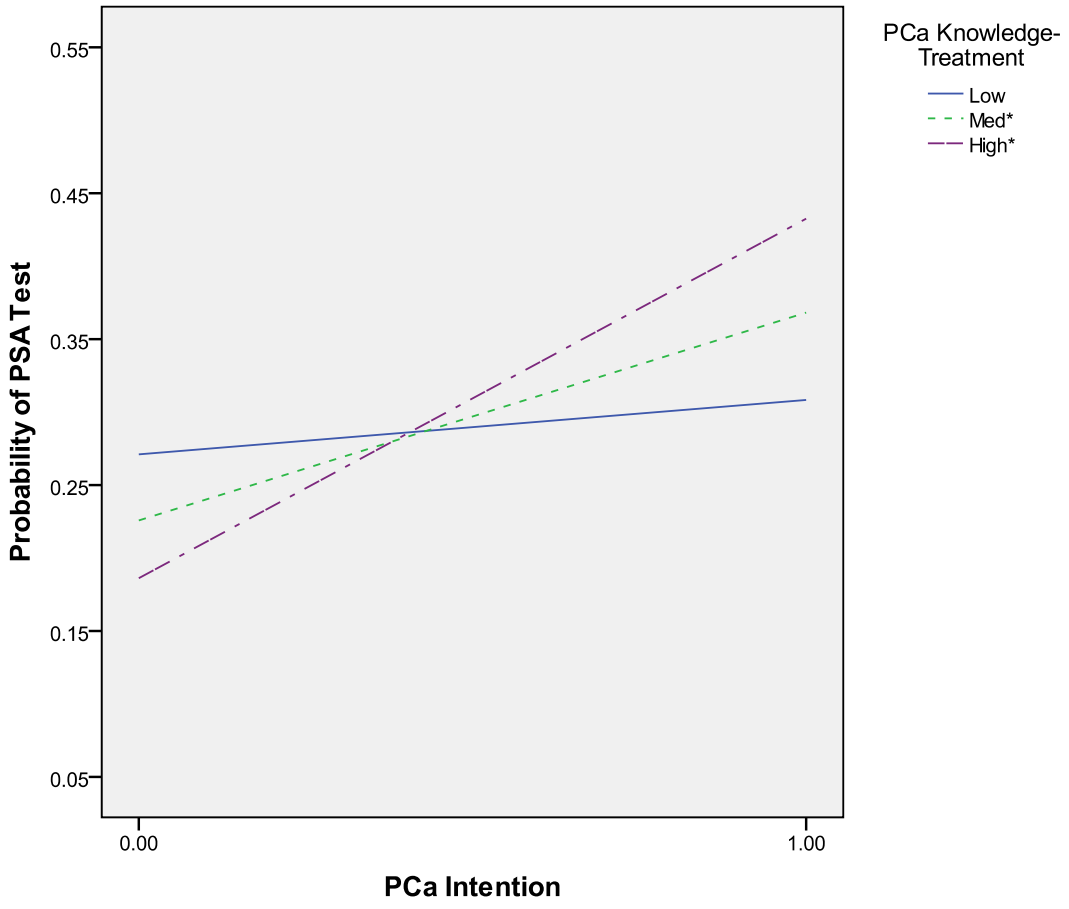

Figure 15. PCa Knowledge-Treatment on the Relation between PCa Testing Intention and Medical Claim of a PSA Test between Time One and Time Two.
0=No, 1=Yes, PCa= Prostate Cancer, PSA= Prostate Specific Antigen. *p<.05

Medical Claim of PSA Test between Time One and One Year after Time One. Social cognitive variables (PCa knowledge, self-efficacy to talk to a physician about PCa, history of PCa testing, physician recommendation to test, perceived value of PCa testing risk, perceived value of PCa testing benefit, and awareness of PCa tests) did not moderate the relation between PCa testing intention and medical claim of a PSA test between the time one interview and one year after the time one interview. Additional analysis revealed there was a significant difference among men who answered a low percentage of PCa-knowledge testing controversy questions correctly, b=0.98, SE=0.44, p<.05. As shown in Figure 16, men who answered a low percentage of PCa knowledge testing controversy questions correctly and had a positive PCa testing intention were more likely to have a medical claim of a PSA test between time one interview and one year after the time one interview compared to men who answered a low percentage of PCa-knowledge testing controversy questions correctly and had a negative PCa testing intention.

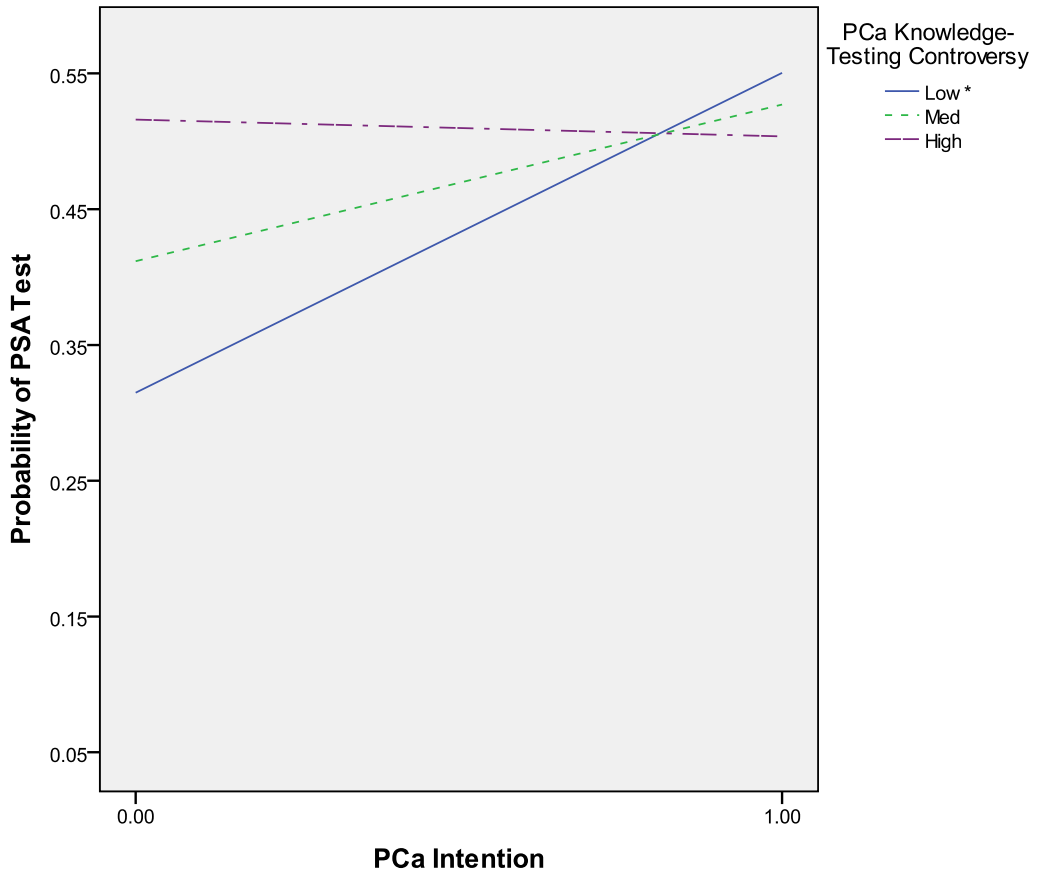

Figure 16. PCa Knowledge-Testing on the Relation between PCa Testing Intention and Medical Claim of a PSA Test between Time One and One Year after Time One. 0=No, 1=Yes, PCa= Prostate Cancer, PSA= Prostate Specific Antigen. *p<.05

CHAPTER 5

DISCUSSION

The goal of this study was to shed light on the relation between PCa testing intention and PSA testing behavior in black men, a group highly burdened by PCa. In order to increase preference-sensitive PCa testing decisions among black men, it was necessary to examine the main and moderating effects of social cognitive variables associated with the PCa testing intention-PSA testing gap preference-sensitive. To further understand and explore the gap between intention and testing, this chapter discusses the results of each research aim. This is followed by an overall summary of the study, study limitations and strengths, and a discussion of the implications of these findings. The chapter concludes with recommendations for future research.

Research Aim One

The first research aim was to determine the relation between PCa testing intention and three PSA testing outcomes. The hypothesis was that PCa testing intention would be a predictor of PSA testing. PCa testing intention was a positive and moderate predictor of self-report of a PSA test between time one and time two, medical claim of a PSA test between time one and time two, and medical claim of a PSA test between time one and one year after the time one interview. The effect sizes ranged from between small to moderate (r=0.18 to 0.21) (Cohen, 1992). Based on effect size, intention to have a PCa test only explains 3.2% to 4.4% of the variance in PSA testing in this sample. The explained variance in PSA testing was very low compared to other intention

studies (Armitage & Conner, 2001; Milne, et al., 2000; P. Sheeran, 2002). According to Sutton (1998) and Sheeran (2002) a very large proportion of unexplained variance in PSA testing (95.6% to 96.8%) indicates that the observed correlation between intention and testing is mostly likely an underestimation of the true relation between intention and PSA testing. The weakened correlation is due to measurement issues related to intention and PSA testing, i.e. intention and PSA testing were not measured at the same level of specificity. That is, men were asked about general PCa testing intention, while the measured outcome was specific to the PSA test. In addition, men were not asked if they had an intention to test within a specific time period, before the time two interview. Thus stated intentions may have been different if men were asked if they had an intention to have a PSA test by their time two interview or one year after their time one interview.

Results confirmed a gap between intention and testing. The gap was highlighted by the association between testing intention and PSA testing behavior. Men who tested in accordance with their PCa testing intention (positive or negative) ranged from 52% to 58%, depending on the PSA testing outcome. Inclined actors, men with a positive PCa testing intention that also had a subsequent PSA test report or claim, ranged from 15.3% to 32.4%. This is consistent with other studies that found the relation between positive PCa testing intention and subsequent PSA testing ranged from 29% to 34% (Flood, et al., 1996; Partin, et al., 2004; Schapira & VanRuiswyk, 2000; Taylor, et al., 2006). Schapira & VanRuiswyck (2000) had a positive intention-testing relation of 84%;

however, men in their study were offered an on-site PSA test two weeks after they were asked their testing intentions. It was confirmed that inclined abstainers, men who had a positive intention but did not have a PSA test, drove the gap between PCa testing intention and PSA testing. The percentage of inclined abstainers in this study ranged from 26% to 43%. This was comparable to other cancer screening studies (Orbell & Sheeran, 1998; Sutton, Bickler, Sancho-Aldridge, & Saidi, 1994; Volk, et al., 2003).

It is interesting to note that the number of disinclined actors, men who had a negative intention but had a PSA test, (Orbell & Sheeran, 1998) varied from 4.6% to 15.3%. The percentage of disinclined actors between intention and medical claim PSA test between the time one and time two interviews was 8.3%, while the percentage of disinclined actors between intention and medical claim of a PSA test one year after the time one interview was 15.3%. The discrepancy between the two medical claim outcomes in this sample could be indicative of two very different phenomena. First, men are becoming more inclined to test over time, an indication that PSA testing intention is not stable in this population. Second, it may also mean that the PSA test is linked to routine medical visits. As medical visits increase, the likelihood of a PSA test also increased. Black men receiving a PSA test as a part of a routine medical visit is in accordance with national PSA testing studies and points to a rise of PSA testing in black men (Farwell, et al., 2007; Ross, et al., 2008; Shavers, et al., 2009a).

PSA testing as part of a routine medical visit was further explored within the concordance of the self-report of PSA test between the time one and time

two interview and medical claim of a PSA test between the time one and time two interviews. As found in other PSA testing studies, 29% of men within this sample had a discrepancy between their self-report of a PSA test and medical claim of a PSA test (Chan, Vernon, Ahn, & Greisinger, 2003a; Ferrante, et al., 2008; Hall, et al., 2004; Volk & Cass, 2002). Nine percent of men had unconfirmed PSA testing, self–report of a PSA test without evidence of a medical claim. Unconfirmed PSA testing may be due to social desirability to report health protective behaviors, lack of knowledge regarding which medical tests were ordered by their physician, or an undocumented medical claim of a PSA test (Newell, et al., 1999; Pizarro, Schneider, & Salovey, 2002).

Roughly 20% of men had uninformed opportunistic PSA testing, evidence of a medical claim of a PSA test without self-report of a PSA test. Uninformed opportunistic PSA testing suggests two issues. First, physicians are ordering the PSA test as a part of routine medical visit without discussing the benefits and risks of the test with their patients. This action contradicts national PSA testing recommendations and undermines preference-sensitive PCa testing decisions in black men. Second, the patient's PSA testing experience may have been unremarkable compared to a DRE. As a result, a patient may not remember having a PSA test, a form of recall bias.

In summary, PCa testing intention is a positive and moderate predictor of self-report and medical claim of a PSA test in black men. Intention to have a PCa test is not the sole predictor of PSA testing. There is evidence of a gap between PCa testing intention and PSA testing behavior, in accordance with the general

intention-behavior literature. Inclined abstainers primarily drive the gap between PCa testing intention and PSA testing, however the percentage of disinclined actors indicate PSA testing is becoming a routine part of medical visits. The rates of uninformed opportunistic testing and unconfirmed PSA testing underscore that SDM between physician and patient about PCa is not occurring. Regardless of the reason, unconfirmed PSA testing and uninformed opportunistic PSA testing further illustrate that PSA testing rates may not be a reflection of a man's desire or preference to have a PSA test.

Research Aim Two

The second aim was to investigate the independent main effects of social cognitive variables on PSA testing outcomes. The hypothesis was that social cognitive variables would exhibit independent main effects on each PSA testing outcome.

Self-report of PSA Test between Time One and Time Two. Bivariate analysis indicated history of testing, physician recommendation to test, awareness of PCa tests, self-efficacy to talk to physicians about PCa, PCa knowledge epidemiology subscale, and PCa knowledge treatment subscale variables were all significantly associated with self-report of a PSA test between time one and time two. When controlling for the effects of all of the predictor variables, independent main effects of social cognitive variables were not found. The bivariate associations of the social cognitive variables either disappeared (history of PCa testing, physician recommendation, self-efficacy to talk to a physician, PCa knowledge) or were reduced (awareness PCa tests). The

trending significance of awareness of any PCa tests was expected. Undeniably, in order to self-report a PSA test, a man must have awareness of PCa test. The disappearance or reductions of the correlational effects of social cognitive variables can be attributed to sample size. The sample size was too small to reach statistical significance in a full regression model. The addition of nine social cognitive variables into one model meant that the variance of these variables had to be shared. Consequently, there was not enough power to sustain bivariate associations.

Medical Claim of PSA Test between Time One and Time Two.

Bivariate analysis indicated physician recommendation to test and perceived value of PCa testing benefits were significantly associated with medical claim of a PSA test between the time one and time two interviews. When controlling for the effects of the predictor variables, independent main effects of any of the social cognitive variables on medical claim between the time one and time two interviews was not found. The bivariate associations of physician recommendation to have a PCa test and value of PSA testing benefit disappeared. The disappearance of a bivariate association between testing and perceived value of PCa testing benefit also occurred in another PCa study in urban black men. Ashford et al (2001) found that the value of PCa testing benefit disappeared when controlling for the effects of PCa knowledge and value of PCa testing risk. This is a signal that men's perceived value of testing PCa benefit is not based on accurate PCa information or SDM between them and their physician.

The bivariate association of physician recommendation may have disappeared when the effects of other variables were controlled, due to another unmeasured variable not being taken into account. An unmeasured third variable, such as satisfaction with physician or choice in physician, may hamper the relation between physician recommendation and medical claim of a PSA test between time one and time two. Another possibility is that many men may not have remembered the physician's recommendation to test, a form of recall bias. The disappearance of the correlational effects may also be attributed to the small sample size.

Medical Claim of PSA Test between Time One and One Year after Time One. Bivariate analysis indicated history of PCa testing and value of PCa testing benefit were significantly associated with medical claim of a PSA test between time one and one year after the time one interview. However, when controlling for the effects of all other predictor variables, history of testing was the only variable that had an independent main effect on medical claim of a PSA test one year after the time one interview. This is in line with a 1998 meta-analysis that reported past behavior could drive up to 13% of the variance in behavior, after controlling for the effects of intention and other cognitive variables (Conner & Armitage, 1998).

In summary, history of PCa testing was the only variable to exhibit significant independent main effects. In accordance with the SCT, the nature and strength of the social cognitive variables were unique to each PSA testing outcome. This aim helped to demonstrate self-report of a PSA test is a very

different testing outcome, as compared to medical claim of a PSA test. The inclusion of all social cognitive variables within the full logistic regression model may not be the best model to utilize in order to explore the gap between intention and testing. The logistic regression model should be specialized depending on the type of PSA testing outcome under review. The discovery of significant and trending effects supported the use of social cognitive variables to explore the gap between testing intention and PSA testing.

Research Aim Three

The third aim investigated whether social cognitive variables would moderate the relation between PCa testing intention and PSA testing. The hypothesis was that the direction and strength of the relation between PCa testing intention and PSA testing would be moderated by social cognitive variables.

Self-report of a PSA test between Time One and Time Two. Moderation effects were not found on the relation between intention to test and for self-report of a PSA test between the time one and time two interviews. Additional analysis found that based on intention status, there were differences in PSA testing among men along attributes of history of PCa testing, perceived value of PCa testing risks, PCa knowledge epidemiology subscale, and PCa knowledge of the PSA testing controversy subscale. A man with a positive PCa testing intention was more likely to self-report a PSA test between time one and time two if he had a history of PCa testing, perceived value of PCa testing risk was low, had high

PCa epidemiology knowledge, and had low PCa knowledge of the PSA testing controversy.

Medical Claim of a PSA Test between Time One and Time Two. A significant moderation effect of the PCa knowledge PSA testing controversy subscale was found on the relation between PCa testing intention and medical claim of a PSA test between time one and time two interview. The PCa knowledge PSA controversy testing subscale asked men about their knowledge of the controversy within the medical community surrounding the efficacy of PSA testing. It appears PCa testing intentions are not based on accurate information regarding the PSA test. Men who don't know about the controversy or believe all physicians agree testing is a benefit are more likely to have a positive intention and more likely to fulfill their testing intention. These men who answered a low percentage of testing controversy questions correctly and who had a positive testing intention were more likely to have a medical claim of a PSA test compared to men who had a negative testing intention. Conversely, men who are aware and appreciate the controversy surrounding PSA testing are more ambivalent about the importance of testing. Therefore their testing is not effected by intention. These men who answered at least 50% of testing controversy questions correct, PCa testing intention was not related to a medical claim of a PSA test.

Additional analysis found that based on intention status, there were differences in PSA testing among men along attributes physician recommendation to test, perceived value of PSA testing benefit, perceived value

of PSA testing risk, PCa knowledge epidemiology subscale, and PCa knowledge treatment subscale. A man with a positive PCa testing intention was more likely to have a medical claim for a PSA test between time one and time two if he had a history of PCa testing, did not have a physician recommendation to test, medium to high perceived value of PCa testing benefits, low to medium perceived value of PCa testing risks, high PCa epidemiology knowledge, and high PCa treatment knowledge.

Medical Claim of PSA Test between Time One and One Year after Time One. Moderation effects were not found on the relation between intention and medical claim of a PSA test between time one and one year after the time one interview. Additional analysis found that based on intention status; there were differences in PSA testing among men along attributes of the PCa knowledge testing controversy subscale. A man with a positive PCa testing intention was more likely to have a medical claim of a PSA test between time one and one year after the time one interview if he had a low level of knowledge regarding the controversy surrounding PSA testing.

In summary only one social cognitive variable moderated the PCa intention-PSA testing. Although only one significant moderation effect was found, trending moderation effects indicated this study was significantly underpowered. It does appear that moderators of the intention-testing gap varied by PSA testing outcomes.

Summary of Social Cognitive Variables

PCa Knowledge. PCa knowledge in this sample was very low; slightly more than half of the PCa knowledge questions were answered correctly. The low levels of PCa knowledge, along with non- significant main effects is evidence that knowledge is not driving the gap between intention and testing. The lack of accurate PCa knowledge in this sample is disturbing because this is a high risk PCa population. Black men have a lower likelihood of localized PCa diagnosis, a poorer five-year survival and are younger at diagnosis (Gilligan, 2005; Merrill & Lyon, 2000).

Among the subscales, knowledge of the PCa testing controversy plays a major role in the PCa testing intention-PSA testing gap, while knowledge of PCa epidemiology and PCa treatment have a much smaller role. As a moderator, there was a strong relation between low knowledge of the testing controversy on the strength and direction of PCa intention-PSA testing relation. Men are not getting the message regarding the potential benefits and risks associated with PSA testing. As a consequence, men formed their testing intention based on inaccurate PCa information. PCa treatment knowledge had the least impact on this sample. This may be due to treatment decisions are not a concern among men who have not been diagnosed with PCa.

The questions within the PCa epidemiology subscale were about risk factors associated with PCa morbidity and mortality As in this sample, most men do don't know their personal PCa risk. There is a very low correlation between men's objective PCa risk and perceived risk of PCa (Allen, et al., 2007; Bloom,

Stewart, Oakley-Girvans, Banks, & Chang, 2006; Myers, et al., 1994; V. L. Shavers, W. Underwood, & R. P. Moser, 2009b; Steele, et al., 2000). Shavers, Underwood, and Moser (2009a) found that of 105 black men, 50% of black men thought their risk of developing PCa was somewhat or very low and only 17.5% of black men thought they were more likely than the average man their same age to develop PCa; both were significantly more likely to never had a PSA test.

Men who could answer this subscale correctly are more likely to understand their personal risk of PCa. Among men who answered a high percentage correct of PCa knowledge-epidemiology subscale answered correctly, there was a strong relation between PCa testing intention and self-report of a PSA test. These men are more likely to realize their testing intentions. Bloom, Stewart, Oakley-Girvans, Banks, and Chang (2006) found that perception of being higher-than-average risk for PCa was associated with concerns about getting PCa and with having a PSA test among black men.

Physician Recommendation to Test. Weinrich et al (2000) and Woods et al (2006) reported that the strongest factor associated with testing was the influence of physicians. Majority of primary care physicians recommend PSA testing to their average-risk male patients (A. Ashford, et al., 2000; Pendleton, et al., 2008; Purvis Cooper, et al., 2004; Voss & Schectman, 2001). Chan et al (2003) found that black men whose physicians recommended testing were 28.5 times as likely to participate in screening. It is therefore surprising that only 33% of men in the sample had a physician recommended PCa testing, a rate that is similar to other study of urban black men (S. N. Davis, et al., 2010). Among men

who did not have a physician recommendation to test, there was a relation between intention to test and medical claim of a PSA test between the time one and time two interviews. Men without physician recommendation are more likely to form intention and fulfill intentions based on other factors.

The low percentage of physician recommendation coupled with PSA testing rates, illustrates the relationship or lack thereof between physicians and their patients. Physicians order PSA tests without undergoing SDM. Within the SDM, physicians may only impart the benefits of the PSA test or assume all men desire a PSA test. Therefore this negates their need to actually recommend men to have a PSA test. It must be noted that this is a self-reported measure of physician recommendation, thus men who had a physician recommend testing may not recall the recommendation to test.

History of PCa Testing. In this study, 56% of the men had a history of PCa testing. A past history of PCa testing was associated with both self-report and medical claim of a PSA test. History of PCa testing was a trending moderator between intention and medical claim of a PSA test between the time one and time two interviews. Past PCa testing influences the PCa testing intention and PSA testing relation due to outcome expectations, anticipated results from performing any given behavior. Men who do not have a history of testing do not have an exception of the outcome of getting a PSA test. Among men with a history of PSA testing, there was a stronger relation between testing intention and self-report of a PSA test. This indicated a known history of testing influences intention and PSA testing behavior. A man with a previous PSA test can

anticipate the outcome of a future PSA test. Therefore he is more likely to act in accordance with his intentions. In the case of medical claim, the association of history of testing may just be a reflection of yearly visits to a primary care physician. Indeed, an increased opportunity to see a physician increased the likelihood of a yearly medical claim of a PSA test. Thus, by default, men have established a history of testing.

Perceived Value of PCa Testing Risks*.* Majority men in this study had a low perceived value of PCa testing risk. Among men with a low value of PCa testing risk, there was a strong relation between intention and testing. This indicated that men who perceived a low value of risk, despite being told potential harms of testing were more likely to fulfill their testing intention. This may be because men who perceive low PCa testing risks are most likely to be men who perceive a high PCa testing value.

High perceived value of PCa testing risk did not effect the intention-testing relation. This suggests that the conceptualization of PCa testing risk is very different from the conceptualization of the PCa testing benefit among black men. It is possible that men who have a high perceived value of PCa testing risk are actually voicing their own personal risk of disease. According to Miller and Diefenbach (1998) individual differences in beliefs about a health threat (in this case PCa), its cause, consequences, time line, and control, while not medically accurate, reflect the individual's view of the cancer threat. The belief subsequently effects their outcome expectations, self-efficacy expectations (S. M. Miller & Diefenbach, 1998) and perceived value of PCa testing risk. Among

black men, a perceived higher-than-average risk for PCa was associated with concerns about getting PCa and with having a PSA test (Bloom, et al., 2006).

Perceived Value of PCa Testing Benefits. The perceived value of PCa testing benefit was high, consistent with Myers et al study (1999). In this study, 91% of black men thought the perceived benefits of PCa testing outweighed the risks (Myers, et al., 1999). Among men with a medium to high perceived value of PCa testing benefit, there is a relation between testing intention and PSA testing. Men who perceive a high value of PCa testing benefit and have a positive PCa intention are more likely to have a PSA test. However, value of PCa testing benefit should be interpreted with caution. Black men tend to have a high perceived value of PCa testing benefit (positive attitude), despite limited knowledge about PCa risk factors and PCa tests (A. R. Ashford, et al., 2001). Therefore, once perceived risk and knowledge are controlled, the perceived benefit disappears (A. R. Ashford, et al., 2001).

These findings may be due in part to the media's positive portrayal of testing and low frequency of the topic rarely accurately discussed. A 2004 review of PCa testing in popular magazines from 1996 to 2001, found 91% of in-depth articles surrounding PCa advocated testing, of which only 85% actually cited screening guidelines (Katz, et al., 2004). Forty six percent of the articles stated that getting tested for PCa will actually save lives and only 28% of articles provided all the information necessary to make an informed choice of whether or not to test for PCa. This helps to explain why perceived value of PCa testing

benefit disappears once knowledge and perceived value of PCa test risk are controlled.

Awareness of PCa Tests. Roughly 33% of men in this sample have not heard of any test for PCa, similar to awareness rates in other PCa studies. In a Harlem based sample of 723 black men recruited from both clinic and community populations, 15% of men had never heard of PCa and 41% of men had heard of PCa, but had never heard of a test to screen for PCa (A. R. Ashford, et al., 2001). A study which measured awareness of PSA testing among black men with and without a first degree relative with PCa, found that first degree relatives were more likely to be aware of PSA testing then men without a family history (Ross, et al., 2005).

Although 67% of men have heard of PCa tests, only a 30% PCa testing rate was found in this study and others (Shavers, et al., 2009b; Spencer, et al., 2006; Steele, et al., 2000). Thus, awareness of PCa tests does not always translate into intention or action. Awareness of PSA testing is regarded as an “important cognitive precursor” of PCa testing and was found to contribute to differences in prostate cancer screening rates among racial and ethnic groups (Ahmed, Borrell, & Spencer, 2008; McFall, 2007). Intuitively, a man who is unaware of any test for PCa is less likely to test or be able to name a PCa test. A man must have an awareness of a test in order to self-report a PSA test. However a man does not have to have an awareness of PCa tests to have a medical claim of a PSA test. Awareness of any PCa test did not have a significant impact in this study. This

may be because it operates through another variable such as PCa knowledge or physician recommendation.

Self-efficacy to Communicate with a Physician about PCa. To enact a behavior, an individual must possess the knowledge and skill necessary to self-regulate behavior and have a firm belief in their efficacy to initiate and practice a new behavior (Bandura, 1997). Thirty percent of the men within this sample had low self-efficacy to communicate with their physician about PCa. In other PCa studies, 40% of black men feel uncomfortable discussing PCa (Fearing, et al., 2000) and 68% men don't have intentions to discuss PCa at their next appointment. Men who are able to effectively communicate with their physician about other health issues are more likely to have increased self-efficacy to start a dialogue with their physician about PCa. On the other hand, men who are unable to communicate with their physician about health issues would have little confidence in their ability to communicate about PCa. It is possible that self-efficacy to communicate with a physician did not have a significant impact in this study because it may operate through an unmeasured variable.

Limitations

This study investigated the PCa testing intention–PSA testing gap in black men who were beneficiaries of the 1199 SEIU in New York City. This study highlighted the importance of considering the multi-dimensional nature of PCa and PSA testing among black men. However, several limitations of the study should be noted. First, this study did not demonstrate moderation effects within all of the social cognitive variables on the PCa testing intention and PSA testing

relation. A larger sample size may have allowed additional significant moderation effects to be found. The small sample size also decreased the generalizability of the findings. A larger sample size would have also allowed more advanced statistical analysis such as structural equation modeling or multinomial logit analysis. Structural equation modeling may have led to detection of other relationships that might exist between social cognitive variables and PSA testing outcomes. Multinomial logit analysis would have allowed prediction of group membership in four distinct intention-behavior categories based on social cognitive variables.

Second, rates of PCa testing intention in this analysis were slightly lower than intention rates in other studies (Partin, et al., 2004; Taylor, et al., 2006; Volk, et al., 1999). The lower rate may be the result of participants in this study being primarily Caribbean immigrants. The predominantly Caribbean sample, while unique to the PCa literature, is reflective of the black population in the New York City region. There has been a rapid increase in Caribbean immigrants to the U.S., which and currently represent almost one-third of New York City's black population (Kent, 2007). Differences between immigrant men and men born in the United States are found in cultural belief's, trust of the healthcare system, and socioeconomic status (Consedine, Morgenstern, Kudadjie-Gyamfi, Magai, & Neugut, 2006; Fearing, et al., 2000; Kent, 2007; Lewis, Hankin, Reynolds, & Ogedegbe, 2007; McKinstry, Ashcroft, Car, Freeman, & Sheikh, 2006).

Third, the percentage of men with a positive intention to test varied. The number of men in this study with a positive intention to test increased by nearly

20% between the time one and time two interviews. Due to the change in intention between time one and time two the temporal stability of intention in this study is a concern. When intentions and behaviors occur months apart, there is more opportunity for intentions to fluctuate and behaviors to change, thereby reduce the ability of intention to predict behavior (P. Sheeran, 2002; P. Sheeran & Abraham, 2003). The lag between time one intention and time two PSA testing may have contributed to a weakened association between intention and testing. Unstable intentions contribute very little to the variance in behavior. Stable intentions form a stronger intention-behavior relation (P. Sheeran, 2002; P. Sheeran & Abraham, 2003).

Fourth, due to the limitations of secondary analysis the cultural variables relevant to immigrant black men were not analyzed. Consequently, factors associated with the health behaviors of minority populations, such as spirituality, medical mistrust, acculturation and length of time in the United States, were not investigated as moderators (Fearing, et al., 2000; Lewis, et al., 2007; Thompson, Valdimarsdottir, Winkel, Jandorf, & Redd, 2004). Spirituality goes hand in hand with the concept of well-being (Lewis, et al., 2007). The salience of spirituality and faith includes belief in God's power to cause and cure cancer, recognition of spiritual and religious practices in cancer progression, and the attribution of cancer as "God's will" (Lewis, et al., 2007). Fifty percent of black men rely on faith to stay healthy and PCa-free (Fearing, et al., 2000). In this light, some black people may view PCa testing as useless, which may negate the need for preventive care and treatment of illness.

Acculturation is the extent to which members of an ethnic group participate in the cultural traditions, values, beliefs, assumptions, and practices of the dominant society (Landrine & Klonoff, 1994). It has proposed that certain interracial attitudes, specifically, dislike and mistrust of whites, are common among less acculturated (i.e., more traditional) black people. Therefore attitudes, as an important dimension of black culture, should be assessed (Landrine & Klonoff, 1994). Black people consistently report greater mistrust of physicians and healthcare institutions compared to white people (Boulware, Cooper, Ratner, LaVeist, & Powe, 2003; Keating, Gandhi, Orav, Bates, & Ayanian, 2004; McKinstry, et al., 2006; Whetten, et al., 2006). Indeed, 40% of blacks felt uncomfortable discussing problems with their primary care physician (Fearing, et al., 2000), perceived to be treated differently by their physician (Mohler, 2007) and have confirmed that suspicions of their physician influenced their medical decisions in general and in cancer discussions specifically (McKinstry, et al., 2006). It is unclear the role spirituality, medical mistrust, acculturation may have played in the gap between intention and testing.

Fifth, health literacy was not assessed. Health literacy is defined as the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions (Ratzan, 2000). A systematic review of health literacy found that 46% of patients had either inadequate or marginal health literacy skills (Paasche-Orlow, Parker, Gazmararian, Nielsen-Bohlman, & Rudd, 2005). Patients with low health literacy had greater difficulty understanding and recalling complex medical

information (M. V. Williams, Baker, Parker, & Nurss, 1998). This may partially explain the low rates of self-report of a PSA test, low PCa knowledge, and low self-efficacy to talk to a physician in this sample.

Sixth, participants with intention to seek PCa testing may actually reflect social desirability. This may have led some participants to modify their responses based on what they think the interviewer would want to hear regarding attitudes, beliefs, and intention. Finally, a lack of a control group will make it difficult to eliminate competing explanations of the observed associations.

Strengths

There is a gap between intention and behavior. This study contributed to the current understanding of the gap between PCa testing intention-PSA testing among predominantly immigrant black men in several unique ways. First, this study has advanced the understanding of the intention-behavior inconsistency in its test of nine social cognitive moderator variables. Relatively little research has been conducted in the investigation of social and cognitive factors that may help to explain and ultimately close the intention-behavior gap. This study confirmed that social cognitive variables such as history of testing and knowledge of the controversy surrounding the PSA test are associated with improving the prediction of behavior by intention.

Second, this was the first longitudinal study to examine the PCa testing intention-PSA testing behavior gap exclusively in black men. The longitudinal nature of this study allowed a temporal sequence to be established that provided valid information to infer possible causal relations between variables. A sample of

predominately Caribbean men introduced a new population and outcome to the intention-behavior literature. Prior PCa studies investigated testing intention in mixed race, white, U.S.-born black populations. In addition, testing intention was assessed secondary to the description of PSA testing behaviors.

Third, most studies investigated PCa testing intention with one measure of PSA testing, usually self-report. This study utilized both a subjective (self-report of a PSA test) and an objective (medical claim of a PSA test) measure of PSA testing. The use of both types of PSA testing outcomes highlighted that the pathway from intention to behavior is dependent on the PSA testing outcome under review. The issues associated with self-report, such as recall bias, social desirability of responses and lack of knowledge may have contributed to the weakened association between intention and self-report of a PSA test and lack of main effects or moderation effects. Despite the small sample size, only objective measures of PSA testing exhibited significant main and moderation effects in relation to the social cognitive variables. Thus, based on this study, medical claim of a PSA test appears to be the best outcome to explore and explain the gap between intention and testing gap in immigrant black men.

Fourth, the reciprocal nature of the SCT was used to investigate the direct and indirect effects between the personal, behavioral, and environmental determinants on PCa testing intention and subsequent PSA testing. The results of this study indicate PCa testing intention and subsequent PSA testing are not based on a rational decision making process. The PSA testing patterns seen in this study were not based on cognitive factors, such as PCa knowledge. Self-

report of PSA testing was associated with primarily cognitive variables, while medical claim was associated with primarily social and attitudinal variables. It appears that attitude, along with emotions such as risk, are primarily responsible for PSA testing patterns.

Fifth, this study adds to the literature regarding uninformed opportunistic PSA testing. The rate of the uninformed opportunistic testing in this sample, 20.4%, gives credence to men participating in PSA testing without an informed decision regarding testing. In comparison with other PCa testing studies, the rate of uninformed opportunistic testing in this sample are low compared to other groups of men. In a survey of 369 Veterans, the uninformed opportunistic testing rate was 73.4% (Diefenbach, Ganz, Pawlow, & Guthrie, 1996). In a survey of 173 Veterans, Federman et al (1999) found the uninformed opportunistic testing rate was 31%.

Sixth, participants in this study had health insurance and a primary care physician. Controlling the effects of resources (i.e. money and/or insurance) and opportunity (i.e. access to a physician) on PCa testing, allowed other factors that may effect the PCa intention-PSA testing relation, to be examined.

Implication of Findings

The results of this study have valuable implications for researchers, practitioners, and public health officials who promote preference-sensitive, informed, shared decision making among black men. Testing intention and PSA testing in this sample was not based on a rational decision-making process. The rates of uninformed opportunistic testing rates and low PCa knowledge highlight

that many black men are unaware of the benefits, risks, and limitations of PCa testing. Therefore the goal of any PCa intention and PSA testing intervention should not be to blindly strengthen the PCa testing intention-PSA testing relation. Interventions that blindly strengthen intention would only encourage men to make critical health decisions based on inaccurate information. The goal of any intervention should be first to inform men, then based on accurate information strengthen their PCa testing intention-PSA testing consistency. Informed patients are adherent to medical recommendations, likely to understand treatment rationale and recommendations, and carry out health related behavior change (Beck, Daughtridge, & Sloane, 2002; Harrington, Noble, & Newman, 2004).

The goal of SDM is to help men understand the benefits, harms, and uncertainties surrounding the PSA test that has persisted since it was introduced in the late 1980s. However, Hoffman et al (2009) have reported the deficiencies of SDM in ordinary medical practice. In a telephone interview of 375 men, only 70% of men recalled a discussion that came before making a decision to have a PSA test, and only 31% of men remembered discussing the cons of testing. Data from the 2000 NHIS study indicated that 23% of black men reported that doctors had not discussed advantages and disadvantages of PSA testing before ordering a test (Tannor & Ross, 2006). In community samples, the rates of comprehensive PCa testing discussions between physicians and their black patients ranged from 13% to 46% (Chan, Vernon, Ahn, & Greisinger, 2003b; S. N. Davis, et al., 2010). Within the Hoffman et al study (2009), 81% of men stated they were satisfied

with their level of involvement in PSA testing decision, but only 55% of men reported that their physician asked them about their testing preferences.

Preference-based SDM interventions that actively promote men to make preference-based testing decisions after SDM with their physician are needed in within the community and healthcare systems. Thus the target audience should be both the patient and the physician. Although this study investigated the testing intention-PSA testing consistency in black men, subsequent interventions based on these results could also be generalized to non-immigrant black men. Knowledge of PSA testing controversy is low in this sample, but it is low in all men. The perceived value of PSA testing benefit outweighed the perceived value of PSA testing risks in this sample; this is probably universal for all men. As a result of these values, attitudes, and lack of knowledge, demand for the PSA test is high. Many patients visit the physician seeking the PSA test, equate testing with optimal care, feel better when tested and neglected when not, and are unmoved by data that question the efficacy of the PSA test.

Given that physicians and patients often believe in testing, SDM may be hard to achieve. Thus physicians could use social cognitive variables to guide their interactions and SDM with all men. During a general medical visit, 50% of psychosocial and psychiatric problems are missed, physicians interrupt patients an average of 18 seconds into the patients description of the presenting problem, 54% of patient problems and 45% of patient concerns are neither elicited by the physician or disclosed by the patient, patients and physicians do not agree on the main presenting problem in 50% of visits, and that patients are dissatisfied with

the information provided to them by physicians (Stewart, 1995). The results of the aforementioned studies suggest many physicians may miss the purpose of SDM, which is to engage men in discussions and examine their personal testing preferences. The complexity of the issues (relative risks, benefits, and limitations of PCa screening) surrounding PCa makes it is hard to ascertain the level of patient understanding of their personal PSA testing preferences after a visit with their physician. The goal of a physician-centered intervention should help physicians understand the myriad of concerns that are preventing black men from initiating communication about PCa, understand how to effectively deliver personal PCa health risk information, and understand it is their responsibility to share and collaborate on a medical plan. Patients that receive SDM tend to be more satisfied with care and experience fewer symptoms and health problems when their information needs regarding treatment and care are met (Haskard, et al., 2008). Preference-based SDM interventions are applicable to PCa testing due to: (a) controversy surrounding the efficacy of PCa screening within the medical community, (b) prevalence of medical organization recommendations of PSA SDM interventions, (c) high public interest of the PSA test due to the PSA test and DRE being highly publicized and widely available, and (d) men's right to choose or refuse the PSA test.

The outcomes for an intervention, based on the social cognitive variables studied, can vary from accuracy of individual knowledge and perceptions of value of PSA testing risk and benefits; to presenting information and decision-making consistent with an individual's personal preferences and values; to distributing

information that encourages individual/population to talk with their physician about their preferences and values. Interventions that are implemented in a community setting should be designed to be interactive such that men have the opportunity to hear the questions, concerns, and opinions of their peers and physicians.

Preference-based SDM interventions should consider the relative importance of each social cognitive variable and the PSA testing outcome of interest. This informs how resources could be optimally allocated based on the interests of black men. For example, Hoffman et al (2009) found an inverse relationship between men's PCa knowledge and their sense of feeling informed. Thus, the goal of an intervention designed to increase PCa knowledge should inform patients about PCa using multiple formats (print, video, and verbal) to promote uptake of knowledge. Interventions designed to clarify the values and risks of the PSA test can include message clarification regarding the physical and emotional components of the PSA testing.

Recommendations for Future Research

The goal of future research should be to use moderator variables to explore the properties of intention that are best to turn inclined abstainers into inclined actors and disinclined actors into disinclined abstainers. The steps in the achievement of this goal are to identify additional moderators and predict group membership of the intention-behavior relation. The current analysis should be repeated in a larger sample to explore perceived PCa risk and worry, cultural variables, and physician variables as moderators of the intention-behavior

relation in black men. Perceived risk is seen as the driving force in health protective behavior (Klein & Stefanek, 2007). Shavers, Underwood, and Moser (2009) found that among 105 black men, 50% of black men thought their risk of developing PCa was somewhat or very low and only 17.5% of black men thought they were more likely than the average man their same age to develop PCa; both were significantly more likely to never have had a PSA test. As a moderator, once intention regarding whether or not to have a PSA test is formed, men may have the opportunity to reevaluate their perceived risk (Schwarzer & Renner, 2000). The level of perceived risk (high vs. low) then influences subsequent PSA testing. For example if risk is not perceived, then intention to perform a behavior decreases and vice versa.

Cancer specific worry is defined as an emotional reaction to the threat of cancer (Hay, Buckley, & Ostroff, 2005). The individualized nature of cancer worry may facilitate PSA testing in one individual, but deter testing in another. The relation between worry and subsequent health behavior will depend on the intensity of the emotion; such that either very high or low levels of worry actually prohibit action, while mid-levels enhance action (S. M. Miller & Diefenbach, 1998; S. M. Miller, Shoda, & Hurley, 1996). Affect has also been found to be associated with the intention-behavior relation. Cinciripini et al. (2003) showed that distress undermined smokers' effort to quit smoking, after controlling for demographics and self-efficacy. As a moderator, mid-levels of worry may equal a strong intention-behavior relation.

Culture effects health behavior by shaping and influencing habits, disease precursors, and environment (Arthur & Katkin, 2006). Culture also has the potential to effect the relationship between the patient and physician. This suggests that the gap in the PCa testing intention-PSA testing relation may be deeply embedded in the beliefs, experiences and customs of black men.

Physician variables such as satisfaction with physician and gender of physician should also be investigated. Patient satisfaction is the most widely used outcome measure to evaluate patient's perception of their physician (Ong, de Haes, Hoos, & Lammes, 1995) and satisfaction ratings reflect the extent to which patient's health care needs, expectations, or preferences are met (Bredart, Bouleuc, & Dolbeault, 2005). Black patients tend to report their interactions with physicians to be significantly less participatory and collaborative (Cooper-Patrick, et al., 1999), with physicians being verbally dominant (Johnson, Roter, Powe, & Cooper, 2004) and less supportive (Gordon, Street, Sharf, & Souchek, 2006) than white patients. Differences have been found in patient interaction with their physician based on gender. Male patients of female physicians report higher satisfaction than male patients of male physicians (Schmittdiel, Grumbach, Selby, & Quesenberry, 2000).

The Decisional Conflict social support subscale was unreliable in this study. However this appears to be due to inherent limitations of the scale. The social support subscale was removed from another dissertation of PCa testing in black men due to issues with reliability (Linder, 2010). Thus a better measure of

social support is necessary to determine the role spouses, children, and friends have on the PCa testing intention-PSA testing outcome of black men.

Based on social cognitive variables identified as moderators of the intention-behavior relation, future research should also predict men's group membership, e.g. inclined abstainer versus disinclined abstainer. This would allow researchers to determine whether identified moderators are capable of distinguishing between four qualitatively different patterns of intention-behavior relation. This will help provide insight into relative importance of moderator variables to the PCa testing intention-PSA testing relation.

Conclusion

This is one of the first studies to use social cognitive variables to explain the gap between PCa testing intention and PSA testing behavior, using three PSA testing outcomes, among black men. Although this study investigated the testing intention-PSA testing consistency in black men, the results could also be generalized to non-immigrant black men. The understanding of the relative influences of social cognitive moderators will help researchers, practitioners, and policy makers understand the PCa testing intention-behavior relation among men.

The potential contribution of this study to the field of public health is significant. As long as black men are disproportionally burdened with PCa, understanding the factors relevant to fulfilling their testing intention, whether they are for or against PCa testing, may help researchers develop interventions that can empower men to manage their risk for PCa in a manner consistent with their

preferences. Further research regarding the moderators of the PSA testing intention-behavior relation within black men will help to achieve this goal.

REFERENCES

Abraham, C., Sheeran, P., Norman, P., Conner, M., de Vries, N., & Otten, W. (1999). When good intentions are not enough: Modeling postdecisional cognitive correlates of condom use. *Journal of Applied Social Psychology, 29*(12), 2591-2612.

Aiken, L. S., Gerend, M. A., & Jackson, K. A. (2001). Perceived risk and health protective behavior: Cancer screening and cancer prevention In A. Baum, Revenson, T., & Singer, J. (Ed.), *Handbook of Health Psychology* (pp. 727-746). New York: Erlbaum

Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211.

Allen, J. D., Kennedy, M., Wilson-Glover, A., & Gilligan, T. D. (2007). African-American men's perceptions about prostate cancer: implications for designing educational interventions. *Soc Sci Med, 64*(11), 2189-2200.

Andriole, G. L., Crawford, E. D., Grubb, R. L., 3rd, Buys, S. S., Chia, D., Church, T. R., et al. (2009). Mortality results from a randomized prostate-cancer screening trial. *N Engl J Med, 360*(13), 1310-1319.

Armitage, C. J., & Conner, M. (2000). Social cognition models and health behaviour: A structured review. *Psychology & Health, 15*(2), 173-189.

Armitage, C. J., & Conner, M. (2001). Efficacy of the Theory of Planned Behaviour: a meta-analytic review. *Br J Soc Psychol, 40*(Pt 4), 471-499.

Arthur, C. M., & Katkin, E. S. (2006). Making a case for the examination of ethnicity of Blacks in United States Health Research. *J Health Care Poor Underserved, 17*(1), 25-36.

Ashford, A., Gemson, D., Sheinfeld Gorin, S. N., Bloch, S., Lantigua, R., Ahsan, H., et al. (2000). Cancer screening and prevention practices of inner-city physicians. *Am J Prev Med, 19*(1), 59-62.

Ashford, A. R., Albert, S. M., Hoke, G., Cushman, L. F., Miller, D. S., & Bassett, M. (2001). Prostate carcinoma knowledge, attitudes, and screening behavior among African-American men in Central Harlem, New York City. *Cancer, 91*(1), 164-172.

Bandura, A. (1986). *Social foundations of thought and action : a social cognitive theory*. Englewood Cliffs, N.J.: Prentice-Hall.

Bandura, A. (1997). *Self-efficacy : the exercise of control*. New York: W.H. Freeman.

Baranowski, T., Perry, C. L., & Parcel, G. S. (2002). How Individuals, Environments, and Health Behavior Interact. In K. Glanz, Rimer, B.K., Lewis, F.M (Ed.), *Health Behavior and Health Education: Theory, Research, and Practice* (Vol. 3rd Edition, pp. 165-184). San Francisco, CA: Jossey-Bass.

Baron, R. M., & Kenny, D. A. (1986). The Moderator Mediator Variable Distinction in Social Psychological-Research - Conceptual, Strategic, and Statistical Considerations. *Journal of Personality and Social Psychology, 51*(6), 1173-1182.

Barry, M. (2009). Screening for Prostate Cancer — The Controversy That Refuses to Die. *New England Journal of Medicine, 360*(13), 1351-1354.

Beck, R. S., Daughtridge, R., & Sloane, P. D. (2002). Physician-patient communication in the primary care office: a systematic review. *J Am Board Fam Pract, 15*(1), 25-38.

Berglund, G., Nilsson, S., & Nordin, K. (2005). Intention to test for prostate cancer. *Eur J Cancer, 41*(7), 990-997.

Bloom, J. R., Stewart, S. L., Oakley-Girvans, I., Banks, P. J., & Chang, S. (2006). Family history, perceived risk, and prostate cancer screening among African American men. *Cancer Epidemiol Biomarkers Prev, 15*(11), 2167-2173.

Boehm, S., Coleman-Burns, P., Schlenk, E. A., Funnell, M. M., Parzuchowski, J., & Powell, I. J. (1995). Prostate cancer in African American men: increasing knowledge and self-efficacy. *J Community Health Nurs, 12*(3), 161-169.

Boulware, L. E., Cooper, L. A., Ratner, L. E., LaVeist, T. A., & Powe, N. R. (2003). Race and trust in the health care system. *Public Health Rep, 118*(4), 358-365.

Bowen, D. J., Allen, J. D., Vu, T., Johnson, R. E., Fryer-Edwards, K., & Hart, A., Jr. (2006). Theoretical foundations for interventions designed to promote informed decision making for cancer screening. *Ann Behav Med, 32*(3), 202-210.

Bredart, A., Bouleuc, C., & Dolbeault, S. (2005). Doctor-patient communication and satisfaction with care in oncology. *Curr Opin Oncol, 17*(4), 351-354.

Briss, P., Rimer, B., Reilley, B., Coates, R. C., Lee, N. C., Mullen, P., et al. (2004). Promoting informed decisions about cancer screening in communities and healthcare systems. *Am J Prev Med, 26*(1), 67-80.

Burack, R. C., & Wood, D. P., Jr. (1999). Screening for prostate cancer. The challenge of promoting informed decision making in the absence of definitive evidence of effectiveness. *Med Clin North Am, 83*(6), 1423-1442, vi.

Chan, E. C., Vernon, S. W., Ahn, C. W., & Greisinger, A. (2003a). Accuracy of self-reports of prostate cancer screening with prostate specific antigen at two sites. *Journal of general internal medicine, 18*, 231-231.

Chan, E. C., Vernon, S. W., Ahn, C. W., & Greisinger, A. (2003b). Knowledge about prostate cancer screening with prostate specific antigen in two populations of African American men. *Journal of general internal medicine, 18*, 232-232.

Chu, K. C., Tarone, R. E., & Freeman, H. P. (2003). Trends in prostate cancer mortality among black men and white men in the United States. *Cancer, 97*(6), 1507-1516.

Cinciripini, P. M., Wetter, D. W., Fouladi, R. T., Blalock, J. A., Carter, B. L., Cinciripini, L. G., et al. (2003). The effects of depressed mood on smoking cessation: mediation by postcessation self-efficacy. *J Consult Clin Psychol, 71*(2), 292-301.

Clarke-Tasker, V. A., & Wade, R. (2002). What we thought we knew: African American males' perceptions of prostate cancer and screening methods. *ABNF J, 13*(3), 56-60.

Cohen, J. (1992). A Power Primer. *Psychological Bulletin, 112*(1), 155-159.

Collins, M. M., Fowler, F. J., Jr., Roberts, R. G., Oesterling, J. E., Annas, G. J., & Barry, M. J. (1997). Medical malpractice implications of PSA testing for early detection of prostate cancer. *J Law Med Ethics, 25*(4), 234-242, 230.

Concato, J., Wells, C. K., Horwitz, R. I., Penson, D., Fincke, G., Berlowitz, D. R., et al. (2006). The effectiveness of screening for prostate cancer: a nested case-control study. *Arch Intern Med, 166*(1), 38-43.

Conner, M., & Armitage, C. J. (1998). Extending the theory of planned behavior: A review and avenues for further research. *Journal of Applied Social Psychology, 28*(15), 1429-1464.

Consedine, N. S., Morgenstern, A. H., Kudadjie-Gyamfi, E., Magai, C., & Neugut, A. I. (2006). Prostate cancer screening behavior in men from seven ethnic groups: the fear factor. *Cancer Epidemiol Biomarkers Prev, 15*(2), 228-237.

Cooke, R., & French, D. P. (2008). How well do the theory of reasoned action and theory of planned behaviour predict intentions and attendance at screening programmes? A meta-analysis. *Psychology & Health, 23*(7), 745-765.

Cooke, R., & Sheeran, P. (2004). Moderation of cognition-intention and cognition-behaviour relations: a meta-analysis of properties of variables from the theory of planned behaviour. *Br J Soc Psychol, 43*(Pt 2), 159-186.

Cooper-Patrick, L., Gallo, J. J., Gonzales, J. J., Vu, H. T., Powe, N. R., Nelson, C., et al. (1999). Race, gender, and partnership in the patient-physician relationship. *JAMA, 282*(6), 583-589.

Cormier, L., Reid, K., Kwan, L., & Litwin, M. S. (2003). Screening behavior in brothers and sons of men with prostate cancer. *J Urol, 169*(5), 1715-1719.

Cox, D. R., & Snell, E. J. (1989). *Analysis of binary data* (2nd ed.). London ; New York: Chapman and Hall.

Crawford, E. D., & Thompson, I. M. (2007). Controversies regarding screening for prostate cancer. *BJU Int, 100 Suppl 2*, 5-7.

Davis, J. W., Kuban, D. A., Lynch, D. F., & Schellhammer, P. F. (2001). Quality of life after treatment for localized prostate cancer: differences based on treatment modality. *J Urol, 166*(3), 947-952.

Davis, S. N., Diefenbach, M. A., Valdimarsdottir, H., Chen, T., Hall, S. J., & Thompson, H. S. (2010). Pros and cons of prostate cancer screening: associations with screening knowledge and attitudes among urban African American men. *J Natl Med Assoc, 102*(3), 174-182.

Demark-Wahnefried, W., Catoe, K. E., Paskett, E., Robertson, C. N., & Rimer, B. K. (1993). Characteristics of men reporting for prostate cancer screening. *Urology, 42*(3), 269-274; discussion 274-265.

DeVellis, R. F. (2003). *Scale development: Theory and application* (Second ed.). Thousand Oaks , CA: SAge.

Diefenbach, P. N., Ganz, P. A., Pawlow, A. J., & Guthrie, D. (1996). Screening by the prostate-specific antigen test: what do the patients know? *J Cancer Educ, 11*(1), 39-44.

Dunn, A. S., Shridharani, K. V., Lou, W., Bernstein, J., & Horowitz, C. R. (2001). Physician-patient discussions of controversial cancer screening tests. *Am J Prev Med, 20*(2), 130-134.

Etzioni, R., Berry, K. M., Legler, J. M., & Shaw, P. (2002). Prostate-specific antigen testing in black and white men: an analysis of medicare claims from 1991-1998. *Urology, 59*(2), 251-255.

Etzioni, R., Legler, J. M., Feuer, E. J., Merrill, R. M., Cronin, K. A., & Hankey, B. F. (1999). Cancer surveillance series: interpreting trends in prostate cancer--part III: Quantifying the link between population prostate-specific antigen testing and recent declines in prostate cancer mortality. *J Natl Cancer Inst, 91*(12), 1033-1039.

Farrell, M. H., Murphy, M. A., & Schneider, C. E. (2002). How underlying patient beliefs can affect physician-patient communication about prostate-specific antigen testing. *Eff Clin Pract, 5*(3), 120-129.

Farwell, W. R., Linder, J. A., & Jha, A. K. (2007). Trends in prostate-specific antigen testing from 1995 through 2004. *Arch Intern Med, 167*(22), 2497-2502.

Fearing, A., Bell, D., Newton, M., & Lambert, S. (2000). Prostate screening health beliefs and practices of African American men. *ABNF J, 11*(6), 141-144.

Federman, D. G., Goyal, S., Kamina, A., Peduzzi, P., & Concato, J. (1999). Informed consent for PSA screening: does it happen? *Eff Clin Pract, 2*(4), 152-157.

Ferrante, J. M., Ohman-Strickland, P., Hahn, K. A., Hudson, S. V., Shaw, E. K., Crosson, J. C., et al. (2008). Self-report versus medical records for assessing cancer-preventive services delivery. *Cancer Epidemiol Biomarkers Prev, 17*(11), 2987-2994.

Finney Rutten, L. J., Meissner, H. I., Breen, N., Vernon, S. W., & Rimer, B. K. (2005). Factors associated with men's use of prostate-specific antigen screening: evidence from Health Information National Trends Survey. *Prev Med, 40*(4), 461-468.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.

Flood, A. B., Wennberg, J. E., Nease, R. F., Jr., Fowler, F. J., Jr., Ding, J., & Hynes, L. M. (1996). The importance of patient preference in the decision to screen for prostate cancer. Prostate Patient Outcomes Research Team. *J Gen Intern Med, 11*(6), 342-349.

Ford, M. E., Vernon, S. W., Havstad, S. L., Thomas, S. A., & Davis, S. D. (2006). Factors influencing behavioral intention regarding prostate cancer screening among older African-American men. *Journal of the National Medical Association, 98*(4), 505-514.

Forrester-Anderson, I. T. (2005). Prostate cancer screening perceptions, knowledge and behaviors among African American men: focus group findings. *J Health Care Poor Underserved, 16*(4 Suppl A), 22-30.

Fowke, J. H., Schlundt, D., Signorello, L. B., Ukoli, F. A., & Blot, W. J. (2005). Prostate cancer screening between low-income African-American and Caucasian men. *Urol Oncol, 23*(5), 333-340.

Freedland, S. J., & Isaacs, W. B. (2005). Explaining racial differences in prostate cancer in the United States: sociology or biology? *Prostate, 62*(3), 243-252.

Freeman, J. L., Klabunde, C. N., Schussler, N., Warren, J. L., Virnig, B. A., & Cooper, G. S. (2002). Measuring breast, colorectal, and prostate cancer screening with medicare claims data. *Med Care, 40*(8 Suppl), IV-36-42.

Frosch, D. L., & Kaplan, R. M. (1999). Shared decision making in clinical medicine: past research and future directions. *Am J Prev Med, 17*(4), 285-294.

Frosch, D. L., Kaplan, R. M., & Felitti, V. (2001). The evaluation of two methods to facilitate shared decision making for men considering the prostate-specific antigen test. *J Gen Intern Med, 16*(6), 391-398.

Gattellari, M., & Ward, J. E. (2005). Men's reactions to disclosed and undisclosed opportunistic PSA screening for prostate cancer. *Med J Aust, 182*(8), 386-389.

Gibbons, F. X., Gerrard, M., Blanton, H., & Russell, D. W. (1998). Reasoned action and social reaction: willingness and intention as independent predictors of health risk. *J Pers Soc Psychol, 74*(5), 1164-1180.

Gilligan, T. (2005). Social disparities and prostate cancer: mapping the gaps in our knowledge. *Cancer Causes Control, 16*(1), 45-53.

Gilligan, T., Wang, P. S., Levin, R., Kantoff, P. W., & Avorn, J. (2004). Racial differences in screening for prostate cancer in the elderly. *Arch Intern Med, 164*(17), 1858-1864.

Gordon, H. S., Street, R. L., Jr., Sharf, B. F., & Souchek, J. (2006). Racial differences in doctors' information-giving and patients' participation. *Cancer, 107*(6), 1313-1320.

Guerra, C. E., Jacobs, S. E., Holmes, J. H., & Shea, J. A. (2007). Are physicians discussing prostate cancer screening with their patients and why or why not? A pilot study. *J Gen Intern Med, 22*(7), 901-907.

Gwede, C. K., & McDermott, R. J. (2006). Prostate cancer screening decision making under controversy: implications for health promotion practice. *Health Promot Pract, 7*(1), 134-146.

Hall, H. I., Van Den Eeden, S. K., Tolsma, D. D., Rardin, K., Thompson, T., Hughes Sinclair, A., et al. (2004). Testing for prostate and colorectal cancer: comparison of self-report and medical record audit. *Prev Med, 39*(1), 27-35.

Hankey, B. F., Feuer, E. J., Clegg, L. X., Hayes, R. B., Legler, J. M., Prorok, P. C., et al. (1999). Cancer surveillance series: interpreting trends in prostate cancer--part I: Evidence of the effects of screening in recent prostate cancer incidence, mortality, and survival rates. *J Natl Cancer Inst, 91*(12), 1017-1024.

Harrington, J., Noble, L. M., & Newman, S. P. (2004). Improving patients' communication with doctors: a systematic review of intervention studies. *Patient Educ Couns, 52*(1), 7-16.

Haskard, K. B., Williams, S. L., DiMatteo, M. R., Rosenthal, R., White, M. K., & Goldstein, M. G. (2008). Physician and patient communication training in primary care: effects on participation and satisfaction. *Health Psychol, 27*(5), 513-522.

Hausenblas, H. A., Carron, A. V., & Mack, D. E. (1997). Application of the theories of reasoned action and planned behavior to exercise behavior: A meta-analysis. *Journal of Sport & Exercise Psychology, 19*(1), 36-51.

Hay, J. L., Buckley, T. R., & Ostroff, J. S. (2005). The role of cancer worry in cancer screening: a theoretical and empirical review of the literature. *Psychooncology, 14*(7), 517-534.

Hayes, A. F., & Matthes, J. (2009). Computational procedures for probing interactions in OLS and logistic regression: SPSS and SAS implementations. *Behavior Research Methods, 41*(3), 924-936.

Hevey, D., Pertl, M., Thomas, K., Maher, L., Chuinneagain, S. N., & Craig, A. (2009). The relationship between prostate cancer knowledge and beliefs and intentions to attend PSA screening among at-risk men. *Patient Educ Couns, 74*(2), 244-249.

Hillhouse, J. J., & Turrisi, R. (2002). Examination of the efficacy of an appearance-focused intervention to reduce UV exposure. *Journal of Behavioral Medicine, 25*(4), 395-409.

Hoffman, R. M., Couper, M. P., Zikmund-Fisher, B. J., Levin, C. A., McNaughton-Collins, M., Helitzer, D. L., et al. (2009). Prostate cancer screening decisions: results from the National Survey of Medical Decisions (DECISIONS study). *Arch Intern Med, 169*(17), 1611-1618.

Hoffman, R. M., Gilliland, F. D., Eley, J. W., Harlan, L. C., Stephenson, R. A., Stanford, J. L., et al. (2001). Racial and ethnic differences in advanced-stage prostate cancer: the Prostate Cancer Outcomes Study. *J Natl Cancer Inst, 93*(5), 388-395.

Honda, K., & Kagawa-Singer, M. (2006). Cognitive mediators linking social support networks to colorectal cancer screening adherence. *J Behav Med, 29*(5), 449-460.

Ilic, D., O'Connor, D., Green, S., & Wilt, T. (2007). Screening for prostate cancer: A Cochrane systematic review. *Cancer Causes & Control, 18*(3), 279-285.

Jacobsen, P. B., Lamonde, L. A., Honour, M., Kash, K., Hudson, P. B., & Pow-Sang, J. (2004). Relation of family history of prostate cancer to perceived vulnerability and screening behavior. *Psychooncology, 13*(2), 80-85.

Jemal, A., Siegal, R., Xu, J., & Ward, E. (2010). Cancer Statistics, 2010. *CA Cancer J Clin, 60*, 277-300.

Johnson, R. L., Roter, D., Powe, N. R., & Cooper, L. A. (2004). Patient race/ethnicity and quality of patient-physician communication during medical visits. *Am J Public Health, 94*(12), 2084-2090.

Jones, B. A., Liu, W. L., Araujo, A. B., Kasl, S. V., Silvera, S. N., Soler-Vila, H., et al. (2008). Explaining the race difference in prostate cancer stage at diagnosis. *Cancer Epidemiol Biomarkers Prev, 17*(10), 2825-2834.

Kashima, Y., Gallois, C., & McCamish, M. (1993). The theory of reasoned action and cooperative behaviour: it takes two to use a condom. *Br J Soc Psychol, 32 (Pt 3)*, 227-239.

Katz, M. L., Sheridan, S., Pignone, M., Lewis, C., Battle, J., Gollop, C., et al. (2004). Prostate and colon cancer screening messages in popular magazines. *J Gen Intern Med, 19*(8), 843-848.

Keating, N. L., Gandhi, T. K., Orav, E. J., Bates, D. W., & Ayanian, J. Z. (2004). Patient characteristics and experiences associated with trust in specialist physicians. *Arch Intern Med, 164*(9), 1015-1020.

Kent, M. M. (2007). *Immigration and America's Black Population*. Washington DC: Population Reference Bureau.

Klein, W. M., & Stefanek, M. E. (2007). Cancer risk elicitation and communication: lessons from the psychology of risk perception. *CA Cancer J Clin, 57*(3), 147-167.

Knops-Dullens, T., de Vries, N., & de Vries, H. (2007). Reasons for non-attendance in cervical cancer screening programmes: an application of the Integrated Model for Behavioural Change. *European Journal of Cancer Prevention, 16*(5), 436-445.

Krahn, M. D., Mahoney, J. E., Eckman, M. H., Trachtenberg, J., Pauker, S. G., & Detsky, A. S. (1994). Screening for prostate cancer. A decision analytic view. *JAMA, 272*(10), 773-780.

Landrine, H., & Klonoff, E. A. (1994). Cultural diversity in causal attributions for illness: the role of the supernatural. *J Behav Med, 17*(2), 181-193.

Lewis, L. M., Hankin, S., Reynolds, D., & Ogedegbe, G. (2007). African American spirituality: a process of honoring God, others, and self. *Journal of holistic nursing 25*(1), 16-23.

Lieberson, S. (1985). *Making It Count: The Improvement of Social Research and Theory*. Berkley: University of California Press.

Lilja, H., Ulmert, D., & Vickers, A. J. (2008). Prostate-specific antigen and prostate cancer: prediction, detection and monitoring. *Nat Rev Cancer, 8*(4), 268-278.

Lin, K., Lipsitz, R., Miller, T., & Janakiraman, S. (2008). Benefits and harms of prostate-specific antigen screening for prostate cancer: an evidence update for the U.S. Preventive Services Task Force. *Ann Intern Med, 149*(3), 192-199.

Livingston, P., Cohen, P., Frydenberg, M., Borland, R., Reading, D., Clarke, V., et al. (2002). Knowledge, attitudes and experience associated with testing for prostate cancer: a comparison between male doctors and men in the community. *Intern Med J, 32*(5-6), 215-223.

Luszczynska, A., & Schwarzer, R. (2003). Planning and self-efficacy in the adoption and maintenance of breast self-examination: A longitudinal study on self-regulatory cognitions. *Psychology & Health, 18*(1), 93-108.

McKinstry, B., Ashcroft, R. E., Car, J., Freeman, G. K., & Sheikh, A. (2006). Interventions for improving patients' trust in doctors and groups of doctors. *Cochrane Database Syst Rev, 3*, CD004134.

Mercer, S. L., Goel, V., Levy, I. G., Ashbury, F. D., Iverson, D. C., & Iscoe, N. A. (1997). Prostate cancer screening in the midst of controversy: Canadian men's knowledge, beliefs, utilization, and future intentions. *Can J Public Health, 88*(5), 327-332.

Merrill, R. M., & Lyon, J. L. (2000). Explaining the difference in prostate cancer mortality rates between white and black men in the United States. *Urology, 55*(5), 730-735.

Michie, S. (2008). What works and how? Designing more effective interventions needs answers to both questions. *Addiction, 103*(6), 886-887.

Miller, S. M., & Diefenbach, M. A. (1998). The Cognitive-Social Health Information-Processing (C-SHIP) model: A theoretical framework for research in behavioral oncology. In D. S. a. B. Krantz, A. (Ed.), *Technology and methods in behavioral medicine* (pp. 219-244). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

Miller, S. M., Shoda, Y., & Hurley, K. (1996). Applying cognitive-social theory to health-protective behavior: breast self-examination in cancer screening. *Psychol Bull, 119*(1), 70-94.

Milne, S., Sheeran, P., & Orbell, S. (2000). Prediction and intervention in health-related behavior: A meta-analytic review of protection motivation theory. *Journal of Applied Social Psychology, 30*(1), 106-143.

Mistry, K., & Cable, G. (2003). Meta-analysis of prostate-specific antigen and digital rectal examination as screening tests for prostate carcinoma. *J Am Board Fam Pract, 16*(2), 95-101.

Moan, I. S., & Rise, J. (2005). Quitting smoking: Applying an extended version of the theory of planned behavior to predict intention and behavior. *Journal of Applied Biobehavioral Research, 10*(1), 39-68.

Mohler, J. L. (2007). Racial Differences in Prostate Cancer Mortality. In L. W. K. Chung, W. B. Isaacs & J. W. Simons (Eds.), *Prostate Cancer: Biology, Genetics, and the New Therapeutics* (Vol. Second, pp. 355). Totowa, New Jersey: Humana Press.

Moran, W. P., Cohen, S. J., Preisser, J. S., Wofford, J. L., Shelton, B. J., & McClatchey, M. W. (2000). Factors influencing use of the prostate-specific antigen screening test in primary care. *Am J Manag Care, 6*(3), 315-324.

Mullen, P. D., Allen, J. D., Glanz, K., Fernandez, M. E., Bowen, D. J., Pruitt, S. L., et al. (2006). Measures used in studies of informed decision making about cancer screening: a systematic review. *Ann Behav Med, 32*(3), 188-201.

Murphy, A. M., McKiernan, J. M., & Olsson, C. A. (2004). Controversies in prostate cancer screening. *J Urol, 172*(5 Pt 1), 1822-1824.

Myers, R. E. (1999). African American men, prostate cancer early detection examination use, and informed decision-making. *Semin Oncol, 26*(4), 375-381.

Myers, R. E., Chodak, G. W., Wolf, T. A., Burgh, D. Y., McGrory, G. T., Marcus, S. M., et al. (1999). Adherence by African American men to prostate cancer education and early detection. *Cancer, 86*(1), 88-104.

Myers, R. E., Hyslop, T., Wolf, T. A., Burgh, D., Kunkel, E. J., Oyesanmi, O. A., et al. (2000). African-American men and intention to adhere to recommended follow-up for an abnormal prostate cancer early detection examination result. *Urology, 55*(5), 716-720.

Myers, R. E., Wolf, T. A., Balshem, A. M., Ross, E. A., & Chodak, G. W. (1994). Receptivity of African-American men to prostate cancer screening. *Urology, 43*(4), 480-487.

Myers, R. E., Wolf, T. A., McKee, L., McGrory, G., Burgh, D. Y., Nelson, G., et al. (1996). Factors associated with intention to undergo annual prostate cancer screening among African American men in Philadelphia. *Cancer, 78*(3), 471-479.

Nagelkerke, N. J. D. (1991). A Note on a General Definition of the Coefficient of Determination. *Biometrika, 78*(3), 691-692.

Newell, S. A., Girgis, A., Sanson-Fisher, R. W., & Savolainen, N. J. (1999). The accuracy of self-reported health behaviors and risk factors relating to cancer and cardiovascular disease in the general population: a critical review. *Am J Prev Med, 17*(3), 211-229.

Notani, A. (1998). Moderators of perceived behavioral control's predictiveness in the theory of planned behavior: A meta-analysis *Journal of consumer psychology, 7*(3).

Nunnally, J. C., & Bernstein, I. (1994). *Psychometric theory* (Third ed.). New York: McGraw-Hill. .

O'Connor, A. M., Jacobsen, M. J., & Stacey, D. (2002). An evidence-based approach to managing women's decisional conflict. *J Obstet Gynecol Neonatal Nurs, 31*(5), 570-581.

O'Connor, A. M., Legare, F., & Stacey, D. (2003). Risk communication in practice: the contribution of decision aids. *BMJ, 327*(7417), 736-740.

O'Dell, K. J., Volk, R. J., Cass, A. R., & Spann, S. J. (1999). Screening for prostate cancer with the prostate-specific antigen test: are patients making informed decisions? *J Fam Pract, 48*(9), 682-688.

Odedina, F. T., Campbell, E. S., LaRose-Pierre, M., Scrivens, J., & Hill, A. (2008). Personal factors affecting African-American men's prostate cancer screening behavior. *J Natl Med Assoc, 100*(6), 724-733.

Odedina, F. T., Scrivens, J., Emanuel, A., LaRose-Pierre, M., Brown, J., & Nash, R. (2004). A focus group study of factors influencing African-American men's prostate cancer screening behavior. *J Natl Med Assoc, 96*(6), 780-788.

Okotie, O. T., Roehl, K. A., Han, M., Loeb, S., Gashti, S. N., & Catalona, W. J. (2007). Characteristics of prostate cancer detected by digital rectal examination only. *Urology, 70*(6), 1117-1120.

Ong, L. M., de Haes, J. C., Hoos, A. M., & Lammes, F. B. (1995). Doctor-patient communication: a review of the literature. *Soc Sci Med, 40*(7), 903-918.

Orbell, S., & Sheeran, P. (1998). 'Inclined abstainers': a problem for predicting health-related behaviour. *Br J Soc Psychol, 37 (Pt 2)*, 151-165.

Ouellette, J. A., & Wood, W. (1998). Habit and intention in everyday life: The multiple processes by which past behavior predicts future behavior. *Psychological Bulletin, 124*(1), 54-74.

Paasche-Orlow, M. K., Parker, R. M., Gazmararian, J. A., Nielsen-Bohlman, L. T., & Rudd, R. R. (2005). The prevalence of limited health literacy. *J Gen Intern Med, 20*(2), 175-184.

Partin, M. R., Nelson, D., Radosevich, D., Nugent, S., Flood, A. B., Dillon, N., et al. (2004). Randomized trial examining the effect of two prostate cancer screening educational interventions on patient knowledge, preferences, and behaviors. *J Gen Intern Med, 19*(8), 835-842.

Pendleton, J., Curry, R. W., Kaserian, A., Chang, M., Anal, S., Nakamura, K., et al. (2008). Knowledge and attitudes of primary care physicians regarding prostate cancer screening. *J Natl Med Assoc, 100*(6), 666-670.

Pizarro, J., Schneider, T. R., & Salovey, P. (2002). A source of error in self-reports of pap test utilization. *J Community Health, 27*(5), 351-356.

Powell, I. J. (2007). Epidemiology and pathophysiology of prostate cancer in African-American men. *J Urol, 177*(2), 444-449.

Purvis Cooper, C., Merritt, T. L., Ross, L. E., John, L. V., & Jorgensen, C. M. (2004). To screen or not to screen, when clinical guidelines disagree: primary care physicians' use of the PSA test. *Prev Med, 38*(2), 182-191.

Ratzan, S. C. (2000). 21st century communication age. *J Health Commun, 5*(2), 101-103.

Roetzheim, R. G., Pal, N., Tennant, C., Voti, L., Ayanian, J. Z., Schwabe, A., et al. (1999). Effects of health insurance and race on early detection of cancer. *J Natl Cancer Inst, 91*(16), 1409-1415.

Rogers, R. W. (1983). *Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection motivation.* New York: Guilford Press.

Roobol, M. J., Schroder, F. H., Crawford, E. D., Freedland, S. J., Sartor, A. O., Fleshner, N., et al. (2009). A framework for the identification of men at increased risk for prostate cancer. *J Urol, 182*(5), 2112-2120.

Ross, L. E., Berkowitz, Z., & Ekwueme, D. U. (2008). Use of the prostate-specific antigen test among U.S. men: findings from the 2005 National Health Interview Survey. *Cancer Epidemiol Biomarkers Prev, 17*(3), 636-644.

Ross, L. E., Meade, S. A., Powe, B. D., & Howard, D. L. (2009). Prostate-specific antigen test use and digital rectal examinations among African-American men, 2002-2006. *J Natl Black Nurses Assoc, 20*(1), 52-58.

Ross, L. E., Taylor, Y. J., Richardson, L. C., & Howard, D. L. (2009). Patterns in prostate-specific antigen test use and digital rectal examinations in the Behavioral Risk Factor Surveillance System, 2002-2006. *J Natl Med Assoc, 101*(4), 316-324.

Ross, L. E., Uhler, R. J., & Williams, K. N. (2005). Awareness and use of the prostate-specific antigen test among African-American men. *J Natl Med Assoc, 97*(7), 963-971.

Ruthman, J. L., & Ferrans, C. E. (2004). Efficacy of a video for teaching patients about prostate cancer screening and treatment. *Am J Health Promot, 18*(4), 292-295.

Schapira, M. M., & VanRuiswyk, J. (2000). The effect of an illustrated pamphlet decision-aid on the use of prostate cancer screening tests. *J Fam Pract, 49*(5), 418-424.

Schmittdiel, J., Grumbach, K., Selby, J. V., & Quesenberry, C. P., Jr. (2000). Effect of physician and patient gender concordance on patient satisfaction and preventive care practices. *J Gen Intern Med, 15*(11), 761-769.

Schroder, F. H., Hugosson, J., Roobol, M. J., Tammela, T. L., Ciatto, S., Nelen, V., et al. (2009). Screening and prostate-cancer mortality in a randomized European study. *N Engl J Med, 360*(13), 1320-1328.

Schwarzer, R., & Renner, B. (2000). Social-cognitive predictors of health behavior: action self-efficacy and coping self-efficacy. *Health Psychol, 19*(5), 487-495.

Shavers, V. L., & Brown, M. L. (2002). Racial and ethnic disparities in the receipt of cancer treatment. *J Natl Cancer Inst, 94*(5), 334-357.

Shavers, V. L., Brown, M. L., Potosky, A. L., Klabunde, C. N., Davis, W. W., Moul, J. W., et al. (2004). Race/ethnicity and the receipt of watchful waiting for the initial management of prostate cancer. *J Gen Intern Med, 19*(2), 146-155.

Shavers, V. L., Underwood, W., 3rd, & Moser, R. P. (2009a). Race/ethnicity, risk perception, and receipt of prostate-specific antigen testing. *J Natl Med Assoc, 101*(7), 698-704.

Shavers, V. L., Underwood, W., & Moser, R. P. (2009b). Race/ethnicity and the perception of the risk of developing prostate cancer. *Am J Prev Med, 37*(1), 64-67.

Shaw, P. A., Etzioni, R., Zeliadt, S. B., Mariotto, A., Karnofski, K., Penson, D. F., et al. (2004). An ecologic study of prostate-specific antigen screening and prostate cancer mortality in nine geographic areas of the United States. *Am J Epidemiol, 160*(11), 1059-1069.

Sheeran, P. (2002). *Intention-behavior relations: A conceptual and empirical review.* (Vol. 12). Chichester: Wiley.

Sheeran, P., & Abraham, C. (2003). Mediator of moderators: temporal stability of intention and the intention-behavior relation. *Pers Soc Psychol Bull, 29*(2), 205-215.

Sheeran, P., Abraham, C., & Orbell, S. (1999). Psychosocial correlates of heterosexual condom use: A meta-analysis. *Psychological Bulletin, 125*(1), 90-132.

Sheeran, P., Milne, S. E., Webb, T. L., & Gollwitzer, P. M. (Ed.). (2005). *Implementation intentions and health behavior* (2nd ed.). Buckingham, UK: Open University Press.

Sheridan, S. L., Felix, K., Pignone, M. P., & Lewis, C. L. (2004). Information needs of men regarding prostate cancer screening and the effect of a brief decision aid. *Patient Educ Couns, 54*(3), 345-351.

Sniehotta, F. F., Scholz, U., & Schwarzer, R. (2005). Bridging the intention-behaviour gap: Planning, self-efficacy, and action control in the adoption and maintenance of physical exercise. *Psychology & Health, 20*(2), 143-160.

Society, A. C. (2010). *Cancer Facts & Figures 2010*. Atlanta: American Cancer Society.

Spencer, B. A., Babey, S. H., Etzioni, D. A., Ponce, N. A., Brown, E. R., Yu, H., et al. (2006). A population-based survey of prostate-specific antigen testing among California men at higher risk for prostate carcinoma. *Cancer, 106*(4), 765-774.

Steele, C. B., Miller, D. S., Maylahn, C., Uhler, R. J., & Baker, C. T. (2000). Knowledge, attitudes, and screening practices among older men regarding prostate cancer. *Am J Public Health, 90*(10), 1595-1600.

Steurer, J., Held, U., Schmidt, M., Gigerenzer, G., Tag, B., & Bachmann, L. M. (2009). Legal concerns trigger prostate-specific antigen testing. *J Eval Clin Pract, 15*(2), 390-392.

Stroud, L., Ross, L. E., & Rose, S. W. (2006). Formative evaluation of the prostate cancer screening practices of African-American physicians. *J Natl Med Assoc, 98*(10), 1637-1643.

Sutton, S. (1998). Predicting and explaining intentions and behavior: How well are we doing? *Journal of Applied Social Psychology, 28*(15), 1317-1338.

Sutton, S., Bickler, G., Sancho-Aldridge, J., & Saidi, G. (1994). Prospective study of predictors of attendance for breast screening in inner London. *J Epidemiol Community Health, 48*(1), 65-73.

Sweetman, J., Watson, M., Norman, A., Bunstead, Z., Hopwood, P., Melia, J., et al. (2006). Feasibility of familial PSA screening: psychosocial issues and screening adherence. *Br J Cancer, 94*(4), 507-512.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Analysis* (Fifth ed.). Boston: Pearson.

Tannor, B. B., & Ross, L. (2006). Physician-patient discussions about prostate-specific antigen test use among African-American men. *J Natl Med Assoc, 98*(4), 532-538.

Taylor, K. L., Davis, J. L., 3rd, Turner, R. O., Johnson, L., Schwartz, M. D., Kerner, J. F., et al. (2006). Educating African American men about the prostate cancer screening dilemma: a randomized intervention. *Cancer Epidemiol Biomarkers Prev, 15*(11), 2179-2188.

Thomas, K. B., Simpson, S. L., Tarver, W. L., & Gwede, C. K. (2008). Is social support from family associated with PSA testing? An exploratory analysis using the Health Information National Trends Survey (HINTS) 2005. *Am J Mens Health, 4*(1), 50-59.

Thompson, H. S., Valdimarsdottir, H. B., Winkel, G., Jandorf, L., & Redd, W. (2004). The Group-Based Medical Mistrust Scale: psychometric properties and association with breast cancer screening. *Prev Med, 38*(2), 209-218.

Tingen, M. S., Weinrich, S. P., Heydt, D. D., Boyd, M. D., & Weinrich, M. C. (1998). Perceived benefits: a predictor of participation in prostate cancer screening. *Cancer Nurs, 21*(5), 349-357.

Triandis, H. C. (1980). Values, attitudes, and interpersonal behavior. *Nebr Symp Motiv, 27*, 195-259.

Ulmert, D., Cronin, A. M., Bjork, T., O'Brien, M. F., Scardino, P. T., Eastham, J. A., et al. (2008). Prostate-specific antigen at or before age 50 as a predictor of advanced prostate cancer diagnosed up to 25 years later: a case-control study. *BMC Med, 6*, 6.

Vadaparampil, S. T., Jacobsen, P. B., Kash, K., Watson, I. S., Saloup, R., & Pow-Sang, J. (2004). Factors predicting prostate specific antigen testing among first-degree relatives of prostate cancer patients. *Cancer Epidemiol Biomarkers Prev, 13*(5), 753-758.

Volk, R. J., & Cass, A. R. (2002). The accuracy of primary care patients' self-reports of prostate-specific antigen testing. *Am J Prev Med, 22*(1), 56-58.

Volk, R. J., Cass, A. R., & Spann, S. J. (1999). A randomized controlled trial of shared decision making for prostate cancer screening. *Arch Fam Med, 8*(4), 333-340.

Volk, R. J., Hawley, S. T., Kneuper, S., Holden, E. W., Stroud, L. A., Cooper, C. P., et al. (2007). Trials of decision aids for prostate cancer screening: a systematic review. *Am J Prev Med, 33*(5), 428-434.

Volk, R. J., Spann, S. J., Cass, A. R., & Hawley, S. T. (2003). Patient education for informed decision making about prostate cancer screening: a randomized controlled trial with 1-year follow-up. *Ann Fam Med, 1*(1), 22-28.

Voss, J. D., & Schectman, J. M. (2001). Prostate cancer screening practices and beliefs. *J Gen Intern Med, 16*(12), 831-837.

Watson, E., Hewitson, P., Brett, J., Bukach, C., Evans, R., Edwards, A., et al. (2006). Informed decision making and prostate specific antigen (PSA) testing for prostate cancer: a randomised controlled trial exploring the impact of a brief patient decision aid on men's knowledge, attitudes and intention to be tested. *Patient Educ Couns, 63*(3), 367-379.

Webb, & Sheeran, P. (2006). Does changing behavioral intentions engender bahaviour change? A meta-analysis of the experimental evidence. *Psychological Bulletin, 132*(2), 249-268.

Webb, C. R., Kronheim, L., Williams, J. E., Jr., & Hartman, T. J. (2006). An evaluation of the knowledge, attitudes, and beliefs of African-American men and their female significant others regarding prostate cancer screening. *Ethn Dis, 16*(1), 234-238.

Weinrich, S. P., Reynolds, W. A., Jr., Tingen, M. S., & Starr, C. R. (2000). Barriers to prostate cancer screening. *Cancer Nurs, 23*(2), 117-121.

Weinrich, S. P., Seger, R., Miller, B. L., Davis, C., Kim, S., Wheeler, C., et al. (2004). Knowledge of the limitations associated with prostate cancer screening among low-income men. *Cancer Nurs, 27*(6), 442-453.

Whetten, K., Leserman, J., Whetten, R., Ostermann, J., Thielman, N., Swartz, M., et al. (2006). Exploring lack of trust in care providers and the government as a barrier to health service use. *Am J Public Health, 96*(4), 716-721.

Wilkinson, S., List, M., Sinner, M., Dai, L., & Chodak, G. (2003). Educating African-American men about prostate cancer: impact on awareness and knowledge. *Urology, 61*(2), 308-313.

Williams, H., & Powell, I. J. (2009). Epidemiology, pathology, and genetics of prostate cancer among African Americans compared with other ethnicities. *Methods Mol Biol, 472*, 439-453.

Williams, M. V., Baker, D. W., Parker, R. M., & Nurss, J. R. (1998). Relationship of functional health literacy to patients' knowledge of their chronic disease. A study of patients with hypertension and diabetes. *Arch Intern Med, 158*(2), 166-172.

Williams, R. M., Zincke, N. L., Turner, R. O., Davis, J. L., Davis, K. M., Schwartz, M. D., et al. (2008). Prostate cancer screening and shared decision-making preferences among African-American members of the Prince Hall Masons. *Psychooncology, 17*(10), 1006-1013.

Wilt, T. J., Paul, J., Murdoch, M., Nelson, D., Nugent, S., & Rubins, H. B. (2001). Educating men about prostate cancer screening. A randomized trial of a mailed pamphlet. *Eff Clin Pract, 4*(3), 112-120.

Wolf, A. M., Nasser, J. F., & Schorling, J. B. (1996). The impact of informed consent on patient interest in prostate-specific antigen screening. *Arch Intern Med, 156*(12), 1333-1336.

Wolf, A. M., & Schorling, J. B. (1998). Preferences of elderly men for prostate-specific antigen screening and the impact of informed consent. *J Gerontol A Biol Sci Med Sci, 53*(3), M195-200.

Wolf, R. L., Lepore, S. J., Vandergrift, J. L., Basch, C. E., & Yaroch, A. L. (2009). Tailored telephone education to promote awareness and adoption of fruit and vegetable recommendations among urban and mostly immigrant black men: a randomized controlled trial. *Prev Med, 48*(1), 32-38.

Woods, V. D., Montgomery, S. B., Belliard, J. C., Ramirez-Johnson, J., & Wilson, C. M. (2004). Culture, black men, and prostate cancer: what is reality? *Cancer Control, 11*(6), 388-396.

Woods, V. D., Montgomery, S. B., Herring, R. P., Gardner, R. W., & Stokols, D. (2006). Social ecological predictors of prostate-specific antigen blood test and digital rectal examination in black American men. *J Natl Med Assoc, 98*(4), 492-504.

Woolf, S. H., Krist, A. H., Johnson, R. E., & Stenborg, P. S. (2005). Unwanted control: how patients in the primary care setting decide about screening for prostate cancer. *Patient Educ Couns, 56*(1), 116-124.

Zemencuk, J. K., Hayward, R. A., & Katz, S. J. (2001). The benefits of, controversies surrounding, and professional recommendations for routine PSA testing: what do men believe? *Am J Med, 110*(4), 309-313.

APPENDICES

APPENDIX A

IRB Approval Letter

TEMPLE UNIVERSITY®
Office for Human Subjects Protections
Institutional Review Board
Medical Intervention Committees A1 & A2
Social and Behavioral Committee B
3400 North Broad Street
Philadelphia, Pennsylvania 19140
Phone:215.707.3390 Fax:215.707.8387
e-mail: richard.throm@temple.edu

MEMORANDUM

To: **LEPORE, STEPHEN J**
CHP-PUBLIC HEALTH (0910)

From: Richard C. Throm
Director, Office for Human Subjects Protection
Institutional Review Board Coordinator

Date: 28-May-2010

Re: Exempt Request Status for IRB Protocol:
13179: Moderators of Prostate Cancer Testing Intention and Subsequent Prostate Cancer Testing Behavior in Black Men

---

It has been determined by Expedited Review that this study qualifies for exemption status as follows:

45 CFR 46 Protection of Human Subjects

Section 101 (b): Unless otherwise required by department or agency heads, research activities in which the only involvement of human subjects will be in one or more of the following categories are exempt from this policy:

Exemption 4: Collection or Study of Existing Data. Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subject.

Nothing further is required from you at this time; however, if anything in your research design should change, you must notify the Institutional Review Board immediately.

If you should have any questions, please feel free to contact me at 215-707-8757.

Thank you for keeping the IRB informed of your clinical research.

APPENDIX B

Dissertation Measures

SURVEY ONE

Participant ID: _____ Date (MM/DD/YYYY): _____

Eligibility Screening

1. Do you use 1199 NBF as your primary insurer? ____NO ___ YES

2. How old are you? _____ Age in years

3. Do you consider yourself to be Hispanic or Latino? ____NO ___ YES

   Do you also consider yourself to be of African origin/descent?
   _____YES (eligible) _____NO (ineligible)

4. Do you consider yourself to be black, African, African American or Caribbean?
   _____NO, other: B.4.a _____ (ineligible)
   _____YES, black: What country were you born in? _____
   _____YES, African American: What country were you born in? _____
   _____YES, African: What nation/country: B.4.a _____
   _____YES, Caribbean*: What island: B.4.a _____

5. Have you ever had prostate cancer? ___YES (ineligible) ___NO/DK (eligible)

6. Have you ever had a test for prostate cancer? ____NO/DK ___ YES
   IF YES: What tests have you had? _____

Demographics

1. Are you currently married or living with someone in a marital-like relationship?
   ____NO ___ YES

2. Are you currently employed? ____NO ___ YES

3. What is the highest grade or year of school that you have completed?
   _____Never attended school or only attended kindergarten
   _____Grades 1 thru 8 (elementary)
   _____Grades 9 thru 11 (some high school)
   _____Grade 12 or GED (high school graduate)
   _____College 1 year to 3 years (or some college or technical school)
   _____College 4 years or more (college graduate)
   _____Post Graduate Training or degree (example: JD, MD, Masters, PhD)
   _____DK
   _____REF

Prostate Cancer Knowledge

1. Have you ever heard of any tests you could take to find out if you have prostate cancer? ____NO/DK ___ YES
   IF YES, Which ones have you heard of? _____

2. Is it possible to have a slow growing prostate cancer that WILL NOT cause any health problems? ___NO ___ YES ___DK ___ Refuse

3. Does having a brother or father who had prostate cancer increase a man's chances of getting it? ___NO ___ YES ___DK ___ Refuse

4. Do ALMOST ALL men who are diagnosed with prostate cancer die from it? ___NO ___ YES ___DK ___ Refuse

5. Are black or African American men MORE likely to get prostate cancer than other men? ___NO ___ YES ___DK ___ Refuse

6. Can prostate cancer be cured AFTER it has spread outside the prostate, to other parts of the body? ___NO ___ YES ___DK ___ Refuse

7. Are black or African American men MORE likely to die from prostate cancer than other men? ___NO ___ YES ___DK ___ Refuse

8. Do some treatments for prostate cancer cause sexual problems? ___NO ___ YES ___DK ___ Refuse

9. Do all medical doctors agree that it is good for men to get tested for prostate cancer? ___NO ___ YES ___DK ___ Refuse

10. Can some treatments for prostate cancer cause urinary problems? ___NO ___ YES ___DK ___ Refuse

11. Can tests for prostate cancer tell doctors if a man has a fast growing type of cancer? ___NO ___ YES ___DK ___ Refuse

12. If you have an abnormal result on a prostate cancer test, does that mean you definitely have cancer? ___NO ___ YES ___DK ___ Refuse

13. If you have a normal result on a prostate cancer test, does that mean you definitely do not have cancer? ___NO ___ YES ___DK ___ Refuse

Doctor Visit and Recommendation

At any time has a doctor recommended getting tested for prostate cancer?
___NO/DK ___ YES ___ Refuse
IF YES, approximately when was that_____
IF YES, Do you remember what tests s/he recommended?_____

Efficacy to Talk to a Physician

1. Are you confident that you know enough about prostate cancer testing to talk about it with your doctor?
   ____NO If YES: Would you say you are...____ a little or ___very confident

2. Are you confident that you know enough about the possible risks of prostate cancer testing to talk about them with your doctor?
   ____NO If YES: Would you say you are...____ a little or ___very confident

3. Are you confident that you know enough about the possible benefits of prostate cancer testing to talk about them with your doctor?
   ____NO If YES: Would you say you are...____ a little or ___very confident

PCa Testing Intention

First, before today, had you ever thought about getting [tested/tested again] for prostate cancer?

_____NO

_____IF YES**:** Have you decided to [get tested/tested again] or to not [get tested/tested again]?

_____YES, thought about it, but undecided.

_____YES, decided not to get tested / not to get tested again

_____YES, decided to get tested / tested again

SURVEY TWO

Participant ID: _____ Date (MM/DD/YYYY): _____

PCa Testing Intention

Have you thought about getting [tested/tested again in the future] for prostate cancer?

_____NO

_____IF YES**:** Have you decided to [get tested/tested again in the future] or to not [get tested/tested again in the future]?

_____YES, thought about it, but undecided.

_____YES, decided not to get tested / not to get tested again

_____YES, decided to get tested / tested again

Self-Report of a PCa Testing

Since the study began last **[MONTH**], have you gotten tested for prostate cancer?

____NO/DK ___ YES

IF YES, What tests did you have?_____

Decisional Conflict-Social Support Subscale

1. Did you have pressure from others to make the decision to test?
   ___NO/DK ___ YES ___ Refuse

2. Have you had the right amount of support or help from others in thinking about whether to test for prostate cancer?
   ___NO/DK ___ YES ___ Refuse

3. Have you had enough advice about whether to test for prostate cancer?
   ___NO/DK ___ YES ___ Refuse

Perceived Value of Testing Benefit

1. One benefit of testing for prostate cancer is that it often helps doctors find prostate cancer early, before it has spread to other parts of the body. Does the benefit of finding prostate cancer early make you interested in getting tested?
   ____NO IF YES: ____A little bit interested or ____very interested

2. Here's another benefit—If prostate cancer is found at an early stage through testing, you may have more treatment options. Does this benefit make you interested in getting tested?
   ____NO IF YES: ____A little bit interested or ____very interested

3. Some men feel a benefit of getting tested is that it may tell them that they don't have prostate cancer. Does this benefit make you interested in getting tested?

____NO IF YES: ____A little bit interested or ____very interested

4. Getting tested may bring peace of mind to members of your family. Does this benefit make you interested in getting tested?
   ____NO IF YES: ____A little bit interested or ____very interested

5. If testing leads your doctor to discover prostate cancer, you may get treatments that could cause sexual and urinary problems. However, there are ways to reduce these problems. Does knowing that there are ways to reduce some of the problems caused by treatments make you interested in getting tested?
   ____NO IF YES: ____A little bit interested or ____very interested

Perceived Value of Testing Risk

1. Prostate cancer tests are not perfect. So, there is a risk that they may miss cancer that is there or suggest there is cancer when there is not. Does the risk of a false test result make you less interested in getting tested?
   ___NO IF YES: ____A little bit less interested or ____a lot less interested

2. There are several other risks to consider. Some men and doctors are concerned that medical science has not proved that prostate cancer tests save lives. Does the fact that science has not proved that testing saves lives make you less interested in getting tested?
   ___NO IF YES: ____A little bit less interested or ____a lot less interested

3. If a test shows you have prostate cancer in its early stages, your doctor cannot tell if it is a slow growing cancer that might never bother you. Does this risk make you less interested in getting tested?
   ___NO IF YES: ____A little bit less interested or ____a lot less interested

4. If cancer is detected at an early stage through testing, you may get treatments that can cause sexual and urinary problems. Does this risk make you less interested in getting tested?
   ___NO IF YES: ____A little bit less interested or ____a lot less interested

5. Men with prostate cancer who have another serious illness may be more likely to die from that illness than from prostate cancer. Does this risk make you less interested in getting tested?
   ___NO IF YES: ____A little bit less interested or ____a lot less interested

6. In thinking of your choice to get tested or not, would you say that the benefits of testing outweigh the risks, the risks of testing outweigh the benefits, or are they equally important to you?
   ____Benefits outweigh Risks
   ____Risks outweigh Benefits
   ____Equally important